

Regional Cluster Policy and Economic Development

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Case study of the Basque Country and Upper Austria

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Research is a journey – Love it!

To my dear husband and our families!

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This is the page, where my PhD research journey comes to the end. It was a rich, exhausting but wonderful journey, where I could grow professionally, experience different countries, economies and policies and meet remarkable people. This page is also a huge “thank you” to everyone, whom I have come across along this journey. You all have in a unique way contributed to its successful completion.

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ZUSAMMENFASSUNG

Das übergeordnete Ziel der Forschung, die im Rahmen dieser Dissertation durchgeführt wurde, ist es, das Wissen in Bezug auf regionale Clusterpolitik zu erweitern. Das besondere Interesse liegt auf dem Einfluss von Clustern und Clusterpolitik auf die ökonomische Entwicklung einer Region. Im Rahmen der Globalisierung und Internationalisierung sowie basierend auf den untersuchten Theorien, mit Fokus auf der Neoklassik, den endogenen Theorien sowie der neuen ökonomischen Geographie und Agglomeration, konnte eine Reihe von Faktoren identifiziert werden, die das wirtschaftliche Wachstum beeinflussen (Kapitel 1). Bei der Betrachtung dieser unterschiedlichen Zugänge ist aufgefallen, dass Cluster, welche definiert werden können als Agglomerationen von Unternehmen und verwandten Institutionen innerhalb eines bestimmten Sektors, die nicht nur physische Nähe, sondern auch ein kollaboratives Verhalten aufzeigen, (Kapitel 2) die allgemeine Wettbewerbsfähigkeit und Innovation fördern und somit ein wirtschaftliches Wachstum erreicht werden kann (Porter 1998a, 2000; Scott 1998; Krugman 1991; Fujita, Krugman, Venables 1999; Brackman, Garresten, Marrewijk 2001; Baldwin et al. 2003; Genosko 1996; Maskell, Kebir 2005; Cooke, Memedovic 2003; Boja 2011; Sölvell 2008; Asheim 1996, 2006a). Obwohl Cluster unter bestimmten Voraussetzungen von selbst wachsen können, besteht ebenso die Möglichkeit, dass ihre Entstehung durch speziell gestaltete Clusterpolitik angeregt wird (Kapitel 3) (Andersson 2004; Brenner, Fornahl 2003; Dewald 2006; Hegedüs 2008; Meyer-Stamer, Harmes-Liedtke 2005; Raines 2000, 2001). Zunächst schien es so, dass der Aufbau von Clusterpolitik sehr einfach sei, wie z.B. durch die Definition der richtigen Sektoren für Clusterbildung oder durch die Verwendung der Instrumente von bereits existierenden anderen Politiken. Bei der Betrachtung mehrerer umgesetzter Clusterpolitiken, hat sich jedoch herausgestellt, dass diese Politik in der Tat sehr komplex ist und nicht einfach zu einer erfolgreichen Cluster- und Wirtschaftsentwicklung führt (Uyarra et al. 2012; Schmiedeberg 2010; OECD 2007b; Franco et al. 2012; Aranguren, Wilson 2013; Christensen et al. 2012; Kiese 2011).

Aus diesem Grund ist diese Dissertation der Fragestellung gewidmet, wie Clusterpolitik, die zur regionalen wirtschaftlichen Entwicklung führt, gestaltet werden kann. Im Rahmen dieses Erkenntnisinteresses konzentriert sich unsere Forschung auf die Studie von (A) der langfristigen Evolution von Clusterpolitik, (B) den Komponenten der effizienten Clusterpolitik und (C) deren Implikation für die regionale, wirtschaftliche Entwicklung.

In den theoretischen Betrachtungen in Kapitel 4 sind die Grundlagen für die Analyse der Clusterpolitik sowie die Basis für die Beantwortung der Forschungsfragen dargestellt worden. Hierbei wird die Wirtschaftsentwicklung in Hinblick auf ihr Hauptziel, dem Wirtschaftswachstum, betrachtet. In erster Linie ist durch sechs Kernfaktoren, nämlich Kapital, Arbeit, Humankapital, Technologischer Fortschritt, Cluster sowie Institutionen¹, das Wirtschaftswachstum beeinflusst. Die regionale Clusterpolitik kann direkt durch den Faktor - Cluster - und indirekt durch die anderen Kernfaktoren zu Wirtschaftswachstum führen. Darüber hinaus wird angenommen, dass die Gestaltung von Clusterpolitik² den Grad ihrer Effektivität bestimmt. Die regionale Clusterpolitikgestaltung wird als mehrstufiger Prozess, bestehend aus Diskussion, Wirtschaft- und Clusteranalyse, Überblick der Politik, Politikentwicklung, Politikumsetzung, Monitoring und Evaluierung sowie Verbesserung der Politik³, mit bestimmten Schlüsselkomponenten⁴ angesehen. Hierbei wäre zu erwarten, dass je größer die Ähnlichkeit der implementierten Clusterpolitik zu unserem mehrstufigen Schema ist, desto höher ist auch die Verbesserung der 5 Kernfaktoren und folglich des Wirtschaftswachstums. Dabei wird angenommen, dass es weitere Faktoren und Politiken geben kann, die sich positiv auf die Wirtschaftsentwicklung auswirken können, daher werden diese bei den Schlussfolgerungen berücksichtigt werden müssen.

Die oben genannten Forschungsfragen werden mithilfe eines qualitativen Ansatzes unter Verwendung des Mehrfach-/(Zwei-)Fallstudiendesigns beantwortet. Innerhalb jeder Fallstudie werden Mischtechniken der Datenanalyse, also quantitative (deskriptive Statistik und Regression) sowie qualitative Methoden (Typologieaufbau, Musterabgleich⁵) angewendet (Kapitel 5). Der Replikationsansatz bei den Mehrfachfallstudien diene zur Beantwortung und Stärkung unserer Forschungsergebnisse. Angesichts zeitlicher und finanzieller Beschränkungen sind die zwei folgenden Regionen als Fallbeispiele ausgewählt worden: 1) das Baskenland, die autonome Gemeinschaft im Königreich Spanien, und 2) Oberösterreich, ein Bundesland in der Republik Österreich. Diese beiden Regionen und deren Clusterpolitik zeigen in ausreichender Weise bedeutende Ähnlichkeiten, die die Anwendung des Replikationsansatzes ermöglicht, z.B. 1) die gleiche regionale Ebene der Clusterpolitik, 2) die Kennzeichnung als Best Practices, zumindest innerhalb der

¹ Referenz in Englisch: capital, labour & human capital, technological progress, clusters and institutions

² Referenz in Englisch: cluster policy making

³ Referenz in Englisch: The discussion stage, Economy and cluster analysis stage, Policy review, Policy development, Policy implementation, Monitoring & evaluation, Policy improvement

⁴ Referenz in Englisch: key components

⁵ Referenz in Englisch: Typology Setting, Pattern Matching

Europäischen Union, 3) der frühe Beginn der Clusterpolitik, 4) das ähnliche politisch-administrative Regionalsystem, 5) die wirtschaftlichen, industriellen, topographischen und kulturellen Ähnlichkeiten, die einen starken Einfluss auf den Charakter der Cluster- und Clusterpolitik in den Regionen besitzen.

Zur Erkenntnisgewinnung sind im Zuge der durchgeführten Forschungsstudie umfassende Informationen zur Clusterpolitik und der wirtschaftlichen Entwicklung der ausgewählten Regionen gesammelt worden (für die jeweilige Region siehe Kapitel 6 und 7, für beide Regionen im Vergleich – Kapitel 8). Weiterhin sind die wichtigsten Ergebnisse unserer Forschungsarbeit in Bezug auf die Forschungsfragen dargestellt. Anschließend werden einige der wichtigsten theoretischen und empirischen Forschungsbeiträge präsentiert.

Zunächst sind die wichtigsten Forschungsergebnisse und der daraus resultierenden Schlussfolgerungen in Bezug auf die Evolution der Clusterpolitik dargestellt und zusammengefasst. Als Folge der Clusterpolitik in den beiden untersuchten Regionen ist eine sehr ähnliche Anzahl von Kernclustern (9 in Oberösterreich und 11 im Baskenland) aufgebaut worden. Unsere Studie weist auf, dass der Prozess der Clusterpolitik die anderen regionalen Politiken abbildet. Weiterhin stellte sich heraus, dass die Clusterpolitik eine Tendenz dazu aufweist sich entlang des Lebenszyklus der Hauptcluster zu entwickeln. Dabei wird die regionale Clusterpolitik auch sehr von den unterschiedlichen regionalen / nationalen / globalen Entwicklungen und Institutionen beeinflusst.

Außerdem wurde festgestellt, dass sich in den beiden Regionen Clusterpolitik entlang ähnlicher Perioden entwickelt hat. Zuerst sind die Grundlagen für die erforderliche Entwicklung von Clustern gelegt worden. Dann folgte die Periode, in der Cluster aktiv unterstützt und gefördert wurden. Schließlich verankerten sich Cluster als ein natürlicher starker Kern der regionalen Wirtschaftstrategie. Dabei ist festgestellt worden, dass sich in beiden Fällen die regionale Clusterpolitik durch eine technologiegetriebene⁶ Politik entwickelt hat, welche wiederum von einer Strategie der Smart Spezialisierung, basierend auf Clustern und Innovation⁷, geprägt war.

Hierbei haben beide Regionen ähnliche Instrumente wie das Einrichten von Cluster-Initiativen sowie die öffentliche Kofinanzierung der Kooperationsprojekte zwischen

⁶ Referenz in Englisch: technology-driven

⁷ Referenz in Englisch: smart specialization cluster-based innovation strategy

Unternehmen und Forschungsinstitutionen innerhalb ihrer Clusterpolitik angewendet, obwohl der institutionelle Rahmen für die Operationalisierung der Clusterpolitik unterschiedlich war. Während im Baskenland, die auf Basis von Regierungsadministration gebildete Matrix von Experten als Verbindung zwischen dem öffentlichen Sektor, den Clusterinitiativen und den Unternehmen diente, übernahm in Oberösterreich nach 5 Jahren Clusterpolitik eine unternehmensbasierte Gesellschaft die gleiche Rolle. Diese Gesellschaft diente somit als Plattform für mehrere Clusterinitiativen.

Zweitens führte die Analyse von unseren Fallbeispielen und die Betrachtung von mehreren Studien zu Wirtschaftsentwicklungen, Stufen (stages) und Perioden (periods), der Clusterpolitik, zur Erstellung von Schlüsselkomponenten, die die Clusterpolitik effektiver machen sollte. Diese, in Verbindung mit dem entwickelten theoretischen Schema können als Toolbox für den Aufbau von Clusterpolitik von Politikern verwendet werden. Einige dieser Schlüsselkomponenten sind explizit weiter unten im Text als die wichtigsten Forschungsbeiträge zur Politikgestaltung aufgeführt.

Drittens, in Bezug auf die Auswirkungen der Clusterpolitik auf die regionale Wirtschaftsentwicklung haben beide Regionen ein evidentes und überdurchschnittliches Wirtschaftswachstum seit Beginn der Clusterpolitik aufgewiesen. Dabei hat sich vor allem das Baskenland als die führende Region in Spanien in Bezug auf das Wachstum des Bruttoinlandsprodukts (BIP) pro Kopf gezeigt. In den 1990er Jahren nahm die Region nur den fünften Platz ein. Zusätzlich hat das Baskenland im nationalen Vergleich eine der niedrigsten Arbeitslosenquoten, den höchsten Industrialisierungsgrad, eine hohe Anzahl von Patentanmeldungen je Million Einwohner und eine hohe F&E-Beschäftigungsquote aufgewiesen. Im Vergleich ist Oberösterreich zwar nicht die führende Region in Österreich in Bezug auf das BIP pro Kopf, jedoch ist der Gesamtanstieg des BIP und BIP pro Kopf von 1998 bis 2011 der Höchste im Vergleich zu anderen österreichischen Bundesländern. Dabei zeigte die Region auch die größte Stabilität in Bezug auf ihre industrielle Stärke, die günstigen Arbeitsmarktbedingungen und einen deutlich überdurchschnittlichen Technologiefortschritt. Diese ersten Schlussfolgerungen unterstützen also die Aussage, sprich, dass sich Cluster und Clusterpolitik positiv auf das Wirtschaftswachstum auswirken.

Des Weiteren sind die Ergebnisse des Regressionsmodells hervorzuheben, um wichtige Schlussfolgerungen in Bezug auf den Zusammenhang zwischen Clusterpolitik und Wirtschaftsentwicklung zu ziehen. Bei der Annahme, dass die Anzahl der Betriebe innerhalb

der Automobilbranche als die Clustervariable festgesetzt wurde, konnte eine positive Änderung von Jahr zu Jahr festgestellt werden. Demnach konnte diese in einen positiven Zusammenhang mit dem Wirtschaftswachstum gebracht werden. Trotz eines höheren Grades an Unvollständigkeit der Daten könnte dies auf die Relevanz der Cluster in Hinblick auf das regionale Wirtschaftswachstum hinweisen. Gleichzeitig kann auch ein gewisser positiver Zusammenhang zwischen Clusterpolitik und Wirtschaftsentwicklung der Region gezogen werden, da die beiden Regionen dieser Branche (Automobil) besondere Bedeutung schenken und aufgrund dessen eine der ersten Cluster-Initiative, welches ein Instrument der Clusterpolitik darstellt, geschaffen wurde. Angesichts der Tatsache, dass wir diese Ergebnisse für nur ein Cluster und nur in einer ganz bestimmten Industriebranche untersucht haben, sind oben erwähnte Schlussfolgerungen allerdings sehr vage. Eine Integration von weiteren Clustern und ihrer jährlichen Beobachtungen in Form eines Regressionsmodells würde erheblich zur Verifizierung dieser Ergebnisse beitragen.

Abschließend ist festzustellen, dass obwohl die beiden Regionen tatsächlich wirtschaftlich stark gewachsen sind, es scheint als habe die Clusterpolitik in Oberösterreich im Vergleich zum Baskenland, laut unseres Schemas, eine höhere Anzahl von Schlüsselkomponenten in der Verwaltung der Clusterpolitik aufzuzeigen. Dabei haben sich mehrere Wirtschaftsfaktoren auch als positiver erwiesen als im Baskenland. Dies, in Verbindung mit mehr strategischer Entwicklung von ausgewählten Clustern, mit dem Ausmaß und der Bedeutung der regionalen Wirtschaft für die nationale Ebene und mit einer stärkeren staatlichen Unterstützung der regionalen Clusterpolitik, könnte ausschlaggebend für die Entwicklung einer effektiveren Clusterpolitik in Oberösterreich im Gegensatz zu der im Baskenland gewesen sein. Gleichzeitig ist diese Erkenntnis wenig aussagekräftig, da keine exklusive und direkte Verbindung zwischen Wirtschaftswachstum und der eingesetzten Clusterpolitik festgestellt werden konnte.

Als generelles Fazit soll betont werden, dass auf Basis der untersuchten Fallbeispiele die Clusterpolitik, die wirtschaftliche Entwicklung in den Regionen hauptsächlich durch die folgenden Aspekte beeinflusst hat: (1) klare Restrukturierung der gesamten Regionalwirtschaft, (2) Förderung von KMUs, ihre allgemeine Einstellung zu „Doing Business“, vor allem potenzielle Vorteile von den externen Ressourcen für Betriebe, die aus Kooperation mit den anderen regionalen Institutionen entstehen und (3) Unterstützung einer Internationalisierungsstrategie und (innere / äußere) Marktpositionierung von Unternehmen.

Wichtigste Schlussfolgerungen bezüglich unserer leitenden Forschungsfrage zum Aufbau von effektiver Clusterpolitik, die zu regionaler Wirtschaftsentwicklung führt, sind in die drei Gruppen: (i) theoretische Dimension, (ii) angewandte Politik und (iii) Fallbeispielregionen eingeteilt (Tabelle A).

Tabelle A Einige der wichtigsten Forschungsbeiträge aus der durchgeführten Dissertationsstudie

Theoretische Dimension		
Politik	Cluster	Wirtschaftsentwicklung
<ol style="list-style-type: none"> 1. Identifizierung von Schlüsselkomponenten entlang der definierten 7 Stufen der Clusterpolitik stellt den theoretische Rahmen unserer Arbeit dar und bildet die Basis für weitere Forschungsfragen 2. Clusterpolitik die, wie behauptet bei z.B. Andersson (2004), Brenner, Fornahl (2003) oder Raines (2000, 2001) einen positiven Einfluss auf die wirtschaftliche Entwicklung haben kann, aber gleichzeitig sehr von den unterschiedlichen regionalen / nationalen / globalen Entwicklungen und Politiken beeinflusst sein kann 3. Die Gestaltung der Clusterpolitik wirkt sich auf die Effektivität der Politik aus und soll stärker in Wirtschaftsstudien angesprochen werden; 4. Clusterpolitik ist noch schwierig zu evaluieren durch ihre sehr offene Definition, die viel präzisiert sein soll 	<ol style="list-style-type: none"> 1. Zusätzlich zu z.B. Sölvell (2008a, 2008b), Asheim (2006a), Bathelt (2002) und Christensen et al. (2012) erhalten wir weitere Beweise zugunsten des positiven Einflusses von Clustern auf die regionale wirtschaftliche Entwicklung 2. Notwendigkeit weitere deutliche theoretische und praktische Rahmenbedingungen zwischen natürlichen Clustern und Instrumenten der Clusterpolitik, wie Clusterinitiativen zu setzen. Ein weiterer klarer Unterschied soll zwischen Clusterinitiativen und Clusternetzwerken angegeben werden 	<ol style="list-style-type: none"> 1. Die wirtschaftliche Entwicklung ist eine komplexe und mehrdimensionale Angelegenheit, die auf unterschiedliche Weise bei mehreren Wissenschaften in den heutigen Wirtschaftswachstumstheorien wahrgenommen wird 2. Trotz mehrerer Interpretationen von der Wirtschaftsentwicklung, wird das Wirtschaftswachstum als Ziel/ Objekt der Entwicklung von mehreren Politikern angesehen 3. Politische Entscheidungen können die Muster der regionalen wirtschaftlichen Entwicklung beeinflussen.
Angewandte Politik		
<ol style="list-style-type: none"> 1. Generierung des Schemas, welches aus den Schlüsselfaktoren der 7 identifizierten Stufen der Clusterpolitik besteht, und als Leitfaden/ Toolbox bei politischen Entscheidungsträgern eingesetzt werden kann <u>Weitere allgemeine Empfehlungen:</u> 2. Mehr Aufmerksamkeit auf einen systematischen und organisierten Ansatz zur Selbstevaluierung, Monitoring und zum Verarbeiten der neuen Erkenntnisse und Informationen durch die politischen Entscheidungsträger. 3. Aktive, mutige und leidenschaftliche Leute sollen früh in die Koordination und Umsetzung von Clusterpolitik einbezogen werden 4. Die Clusterpolitik soll aktiv ihre Instrumente vermarkten und die bestehenden externen (z.B. Europäische Union) konzeptionellen und finanziellen Ressourcen verwenden 5. Regionale Akteure sollen erkennen, dass die politischen Ziele und der wirtschaftliche Fortschritt nur im Umfeld von Vertrauen, Transparenz und Kommunikation erreicht werden können. 6. Clusterpolitik sollen als dauerhafte Maßnahme angesehen sein und auf die Bedürfnisse von Unternehmen, Clustern und globalen Trends abgestellt und ständig angepasst werden. 7. Clusterpolitik soll unbedingt tief in die allgemeinen Rahmenbedingungen oder Strategien der regionalen Entwicklung integriert sein 		
Fallbeispielregionen		
Baskenland	Oberösterreich	Beide Regionen
<ol style="list-style-type: none"> 1. Es soll stärkere Harmonisierung sowie verbesserte Kommunikation / Zusammenarbeit zwischen den verschiedenen Abteilungen innerhalb der öffentlichen Verwaltung als auch mit anderen Verwaltungsebenen und lokalen nationalen und europäischen 	<ol style="list-style-type: none"> 1. Stärkere Einbeziehung anderer Abteilungen in der Staatsadministration, in die Entwicklung / Umsetzung von Clusterpolitik; 2. Diversifizierung der Anzahl von zurzeit unterstützendem Sektor / Cluster; die aktuelle Anzahl (9) des 	<ol style="list-style-type: none"> 1. F & E-öffentliches Mittel für die Unterstützung konkreter Kooperationsprojekte innerhalb von Clustern könnte erhöht werden 2. Diversifikation bereits bestehender und die Entwicklung neuer Cluster-Maßnahmen. 3. Entwicklung von Cluster (Politik)

Politikmaßnahmen stattfinden 2. Verbessern und verstärken die PR & Marketing-Aktivitäten der Region für Cluster und Clusterpolitik 3. Fordern das Lernen zwischen Clusterrelevanteninstitutionen 4. Die sektorale Priorisierung von bestehenden Clustern und ihre Rolle innerhalb der regionalen Strategie kann für die folgenden Jahre verbessert werden; und damit auch die Anzahl der Cluster-Initiativen, die gefördert sind	Clusters ist niedrig und basiert auf sehr traditionellen Sektoren 3. Aufbau und Förderung von Forschungsinstitutionen, die Cluster-Initiativen sowie weitere regionale Akteure in der systematischen Realisierung von gründlichen Analysen zur regionalen und Cluster-Entwicklung unterstützen	„impact assessment tool“ für die systematische, langfristige Selbstevaluation und Lernen im Bezug zur Clusterpolitik 4. Aufbau einer Plattform oder eines Netzwerkes von Menschen (Pool von Experten), die sich bewusst zur Cluster und regionalen Entwicklung weiterbilden, unterhalten und das Wissen in und außerhalb Region verbreiten
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Darüber hinaus hat diese Arbeit auch zahlreiche weitere Forschungsbereiche identifiziert. Vorallem kann es in Kauf genommen werden, dass Clusterpolitik durch weitere Fallbeispiele (1) unter unterschiedlichen sozioökonomischen Bedingungen und (2) hinsichtlich verschiedener Arten von Clustern untersucht werden kann. Daneben muss darauf hingewiesen werden, dass weitere Studien unter Anwendung von (3) Alternativen wie z.B. Sozialmethoden, wie Verhaltensökonomie oder Aktionsforschung, entwickelt werden müssen. Dies kann das Selbstlernen und die schnelle Integration von theoretischen Ansätzen unter regionalen Akteuren fördern. Schließlich wird hervorgehoben, dass die Studien zu Clusterpolitiken stärker (4) auf quantitativen Analysemethoden, z.B. potentiellen „Regional Cluster-Index“ basieren können. Tatsächlich kann das in dieser Arbeit angewendete Regressionsmodell leicht mit einer größeren Datenmenge, z.B. Regionen der EU-Mitgliedstaaten erweitert werden und hiermit viel stärkere Aussagen abgeleitet werden.

Abschließend ist darauf hinzuweisen, dass die Analyse der wirtschaftlichen Entwicklung in den Fallbeispielregionen und ihren Clusterpolitiken über einen längeren Zeitraum und auf Stufenbasis nicht nur einen tiefen Einblick in den theoretischen Rahmen der Clusterpolitik und der wirtschaftlichen Entwicklung ermöglicht hat, sondern auch ein sehr praktisches Verständnis der Politik auf mehreren Ebenen, Stufen und Perioden ihrer Evolution geliefert hat. Somit sind unsere Erkenntnisrahmen zum Aufbau von effektiver Clusterpolitik deutlich erweitert worden.

TABLE OF CONTENTS

TABLE OF CONTENTS.....	I
LIST OF TABLES.....	V
LIST OF GRAPHS.....	VII
LIST OF ANNEXES.....	XI
LIST OF ABBREVIATIONS.....	XII
INTRODUCTION.....	1
1. Background and motivation.....	1
2. Research problem and objectives.....	5
3. Research strategy.....	8
3.1. Multiple case study analysis.....	8
3.2. Region as a level of analysis.....	10
3.3. Rationales for the choice of the regional cases.....	11
4. Structure of the research work.....	14
PART 1 THEORETICAL PART.....	17
CHAPTER 1 THEORETICAL PERSPECTIVE ON REGIONAL ECONOMIC DEVELOPMENT AND GROWTH.....	17
1. Perspectives on regional economic development.....	17
1.1. Defining regional economic development.....	17
1.2. Economic growth as core objective of economic development.....	19
1.3. Factors influencing economic development.....	22
2. Selected theories of regional economic development and growth.....	23
2.1. Classical growth models.....	25
2.2. Keynesian models.....	26
2.3. Export base theory.....	27
2.4. Neo-classical growth model.....	27
2.5. Endogenous growth theory.....	31
2.6. New economic geography.....	33
2.7. Agglomeration and location related theories.....	37
2.8. Institutional theory.....	39
3. Summary.....	40
CHAPTER 2 INSIGHTS IN CLUSTERS AND CLUSTER THEORY.....	43

1.	Cluster theory from industrial districts to learning regions	43
1.1.	Marschall’s industrial districts.....	44
1.2.	Extending Marshall’s agglomeration factors.....	46
1.3.	Innovation and trust in the creative /innovative milieus.....	47
1.4.	Porter as a conventionalist in the formation of the classical view on clusters	48
1.5.	Intensification of globalization and the learning regions	52
1.6.	Networks as mediators between market and hierarchy	52
2.	Core cluster characteristics	54
2.1.	Defining cluster	54
2.2.	Cluster diversity and their main benefits	56
3.	Summary.....	60
CHAPTER 3 CLUSTER POLICIES AS A NEW TOOL FOR STRENGTHENING REGIONAL ECONOMIC DEVELOPMENT		63
1.	General characteristics and rationales for a cluster policy.....	64
1.1.	Rationales behind the cluster policy	64
1.2.	Defining cluster policy	66
1.3.	Illustrating diversity of cluster policies	68
2.	Building cluster policy.....	73
2.1.	Determining the steps of cluster policy process	73
2.2.	Key components of an effective cluster policy process	77
3.	Summary.....	85
PART 2 METHODOLOGICAL PART.....		86
CHAPTER 4 OUTLINING THE THEORETICAL FRAMEWORK AND HYPOTHESIS ..		86
	Framework.....	86
	Regional economic development.....	88
	Economic growth as object of economic development	88
	Factors	89
	Regional cluster policies.....	91
	Management/ Making of cluster policies	92
CHAPTER 5 RESEARCH DESIGN.....		93
1.	Gathering data and sources of evidence.....	93
1.1.	Primary sources: interviews.....	93

1.2. Secondary sources	95
2. Methods and techniques of data analysis.....	95
2.1. Qualitative techniques	97
2.2. Descriptive statistics	98
2.3. Regression analysis.....	99
3. Limitations of the research.....	103
4. Summary.....	104
PART 3 EMPIRICAL PART.....	105
CHAPTER 6: THE BASQUE COUNTRY	105
1. General overview of the region and cluster policy	105
2. Cluster policy review	111
2.1. Historical overview of public policy interventions	111
2.2. Regional institutions involved in the cluster policy making	117
2.3. Evolution of cluster policy	126
2.4. Reviewing stages of cluster policy process	130
2.5. Policy important factors explicitly mentioned by regional actors.....	168
2.6. Summary on the review of cluster policy.....	169
3. Influence of cluster policy on regional economic development	169
3.1. Economic development and growth	170
3.2. Factors of influence	174
3.3. Composite influence of factors on regional economic growth.....	200
3.4. Summary of the economic development part	206
4. Main findings and conclusions	208
CHAPTER 7: UPPER AUSTRIA	214
1. General overview of the region and cluster policy	214
2. Cluster policy review	220
2.1. Historic overview of public policy interventions	220
2.2. Regional institutions involved in the cluster policy making	227
2.3. Evolution of cluster policy	238
2.4. Reviewing stages of cluster policy	242
2.5. Policy important factors explicitly mentioned by regional actors.....	274
2.6. Summary on the review of cluster policy.....	275

3.	Influence of cluster policy on economic development	276
3.1.	Economic development and growth	276
3.2.	Factors of influence	280
3.3.	Composite influence of factors on regional economic growth.....	300
3.4.	Summary of the economic development part	307
4.	Main findings and conclusions	308
CHAPTER 8: MAIN FINDINGS FROM THE CASE STUDIES		315
1.	Cluster policy review	315
1.1.	General overview of the cluster policy evolution.....	315
1.2.	Regional institutions involved in the cluster policy making	318
1.3.	Reviewing stages of cluster policy process	321
2.	Influence of cluster policy in regional economic development	334
2.1.	Economic development and growth	334
2.2.	Factors of influence	338
2.3.	Composite influence of factors on regional economic growth.....	349
3.	Main findings from the review of the both regional cluster policy case studies	353
FINAL CONCLUSIONS.....		359
1.	Overview of the research	359
2.	Outcomes from the case studies.....	361
3.	Overall findings	365
4.	Implication of the results	369
4.1.	Recommendations for theory.....	370
4.2.	Recommendations for policy-makers	371
4.3.	Recommendations for the Basque Country and Upper Austria	372
5.	Opportunities for future research	374
	Final remarks.....	374
ANNEXES.....		i
LITERATURE.....		xlvi
EHRENWÖRTLICHE ERKLÄRUNG		lxx
SCIENTIFIC CAREER		lxxi

LIST OF TABLES

Table 1 Traditional development policies vs local regional development policies	3
Table 2 Main features and outcomes of the globalization	4
Table 3 Structure of the research	15
Table 4 Regional economic development as a matrix of qualitative, quantitative process and product outcomes	19
Table 5 Factors influencing economic growth.....	22
Table 6 Selected economic growth theories	41
Table 7 Categorizing different types of agglomerations.....	44
Table 8 Key distinctions between networks and clusters	53
Table 9 Different typologies for cluster differentiation.....	57
Table 10 Overview of the listed theoretical concepts.....	61
Table 11 Key components of an effective cluster policy.....	78
Table 12 Matrix of key components of an effective cluster policy	84
Table 13 Groups and numbers of interviews	94
Table 14 Conceptual uniform framework for each case study	96
Table 15 Indicators representing factors.....	100
Table 16 Selected variables for time lag observation	103
Table 17 Key aspect of methodological approach.....	104
Table 18 Key economic indicators, the Basque Country and Spain.....	107
Table 19 The Basque Country competitiveness overview based on the Porter´s diamond, strengths and weaknesses.....	109
Table 20 Identified periods of the cluster policy evolution in the Basque Country	127
Table 21 Core studies on clusters and cluster policy in the Basque Country during the period 1986-1991	136
Table 22 Evolution of the key implementation instruments of the cluster policy in the Basque Country	155
Table 23 Generic (type 2), individual & in cooperation projects per cluster, 1993 – 1996, the Basque Country.....	157
Table 24 Change in % of export (based on total export value) the Basque Country, 2012-1995, 2000-1995, 2006-2000, 2012-2006.....	194
Table 25 Number of employees per sector, the Basque Country, 2012	196
Table 26 Number of establishments in clusters, the Basque Country, 2011, change 2011/2005 and absolute change in number of establishments (2011-2005).....	198
Table 27 List of star-marked clusters, the Basque Country, 2011	199
Table 28 Regression results, the Basque Country, 1995-2011	204
Table 29 Regression results with time lag, the Basque country, 1995-2011	205
Table 30 Regression results with time lag, the Basque country, 2000-2011	205
Table 31 Main changes introduced in the cluster policy in the Basque country since 1991 ..	210
Table 32 Key economic indicators, Upper Austria and Austria	216
Table 33 Upper Austria competitiveness overview based on the Porter´s diamond, main strengths and weaknesses, Upper Austria.....	218

Table 34 Evolution and main aspects of the strategic regional programmes in Upper Austria	226
Table 35 Main thematic areas of TMG activities, Upper Austria.....	231
Table 36 Identified periods of the cluster policy evolution in Upper Austria	238
Table 37 Core studies on clusters and cluster policy in Austria during the period 1991-2014	249
Table 38 Evolution of the key implementation instruments of the cluster policy in Upper Austria.....	263
Table 39 Number of employees per cluster, Upper Austria, 2011	297
Table 40 Number of enterprises per cluster, Upper Austria, 2011	298
Table 41 List of star-marked clusters, Upper Austria, 2011	300
Table 42 Regression results, Upper Austria, 1995-2011	305
Table 43 Regression results time lag, Upper Austria, 1995-2011	306
Table 44 Regression results time lag, Upper Austria, 2005 -2011	306
Table 45 Main changes introduced in the cluster policy in the Upper Austria since 1998 ...	311
Table 46 Matrix of key components for the success of the cluster policy, the Basque Country	323
Table 47 Matrix of key components for the success of the cluster policy, Upper Austria....	324
Table 48 Change in number of enterprises 2011/2005, number of employees 2011 in sectors and corresponding cluster initiatives, the Basque Country, Upper Austria	348
Table 49 Regression results, panel, 1995-2011	350
Table 50 Regression results, panel with time lag, 1995-2011	351
Table 51 Regression results, panel with time lag, 2000-2011	351
Table 52 Recommendations for the Basque Country and Upper Austria.....	373

LIST OF GRAPHS

Graph 1 Core distinct characteristics of economic growth and development theories.....	24
Graph 2 Porter’s Diamond - Sources of Locational Competitive Advantage	49
Graph 3 Cluster life-cycle.....	58
Graph 4 Cluster advantages for companies	59
Graph 5 Elements of triple, quadruple and quintuple helixes.....	69
Graph 6 Positioning cluster initiatives within cluster policies	72
Graph 7 Advantages and disadvantages of cluster policy application.....	72
Graph 8 Similarities and distinction of different policy process typologies.....	75
Graph 9 Defined stages of cluster policy	76
Graph 10 Theoretical framework.....	87
Graph 11 Aspects of the framework, which were addressed in the interviews	94
Graph 12 Data sources and techniques within each case study	97
Graph 13 Geographical positioning of the Basque Country	105
Graph 14 Main regional development policies and periods of transformation since 1980s up to 2013, the Basque Country.....	116
Graph 15 Key institutional groups in the cluster policy making, the Basque Country	118
Graph 16 Organization of the Department of the Economic Development and Competitiveness, the Basque Country	119
Graph 17 Evolution of coordination and communication between Basque Government and clusters (period I / II-III/ IV).....	154
Graph 18 GDP per capita, Spanish pesetas, Spain and Spanish autonomous communities, 1990.....	170
Graph 19 GDP per capita EUR, constant prices (year 2005), Spain and Spanish autonomous communities, 2011 and 1995	171
Graph 20 GDP and GDP per capita growth (based on EUR, constant, year 2005), Spain and Spanish autonomous communities, 1995 to 2011.....	171
Graph 21 Annual GDP growth rates, Spain and the Basque Country, 1981-2011	173
Graph 22 Disposable household income, per head, constant prices EUR, Spain and Spanish autonomous communities, 1995 and 2011.....	175
Graph 23 GFCF as a share (%) of GVA, 1995 and 2007, and as a share (%) of GDP in EUR, current, 2007, Spain and Spanish autonomous communities	176
Graph 24 GVA of total activities, per worker in EUR, constant (year 2005), Spain and Spanish autonomous communities, 1995 and 2010.....	177
Graph 25 Sectoral GVA as % of total GVA, Spain and Spanish autonomous communities, 2011.....	178
Graph 26 Growth rates of GVA total and industry, the Basque Country and Spain, 2001 – 2011.....	178
Graph 27 Period based increase of population, in percentage, Spain and Spanish autonomous communities, 1990 to 2014, 1990 to 1999, 2000 to 2005, 2006 to 2012	179
Graph 28 Population pyramid, the Basque Country, 2014 (left) and 1990 (right)	180
Graph 29 Labour force total, as a % of population, total, Spain and Spanish autonomous communities, 1999 and 2013	180

Graph 30 Growth of population and labour force, the Basque Country, 2000 to 2013.....	181
Graph 31 Unemployment and long term unemployment rate, Spain and Spanish autonomous communities, 2013.....	181
Graph 32 Evolution of unemployment rates, the Basque Country, 1993 – 2012.....	182
Graph 33 Labour productivity (GDP thsd. EUR current, per employee), Spain and Spanish autonomous communities, 1995 and 2010.....	182
Graph 34 Change of labour productivity based on periods, Spain and Spanish autonomous communities, 1995 to 2010, 1995 to 1999, 2000 to 2005, 2006 to 2010.....	183
Graph 35 Labour costs, total gross per year, EUR, Spanish autonomous communities, 2001 and 2013.....	183
Graph 36 Labour cost gross period based change, in %, Spanish autonomous communities, 2001 to 2013, 2001 to 2005 and 2006 to 2013.....	184
Graph 37 Education level as a share of labour force, Spain and Spanish autonomous communities, 2013.....	185
Graph 38 Evolution of education as a share of labour force, the Basque Country, 1999-2013.....	186
Graph 39 Total enrollment as % of population, Spain and Spanish autonomous communities, 1999 and 2011.....	187
Graph 40 Evolution of PCT patent applications per million inhabitants (fractional count; by inventor and priority year), Spain and the Basque Country, 1991-2010.....	187
Graph 41 Evolution of total R&D expenditures as % of GDP, Spain and the Basque Country, 1995 - 2010.....	188
Graph 42 R&D expenditures per type, 2009, Spain and Spanish autonomous communities	189
Graph 43 R&D personnel as a share of employment, Spain and Spanish autonomous communities, 2009.....	190
Graph 44 Clusters in the Basque Country based on export value data, EUR, 1995, 2012....	193
Graph 45 Share of establishments as of number of employees, the Basque Country, 2014, Source: Eustat, 2014.....	197
Graph 46 Number of star marked clusters, Spain and Spanish autonomous communities, 2011.....	199
Graph 47 GDP growth versus variables selected for regression model: employment (1), secondary and tertiary education (2), population density (3), patent intensity (4), R&D expenditure (5), co-patenting degree inside the regions (6), co-patenting degree outside the region (7), infrastructure (8), specialization industry (9), cluster automotive entities (10), cluster automotive employment (11), the Basque Country, 1995-2010.....	201
Graph 48 Geographical position of Upper Austria.....	214
Graph 49 Key institutions in the cluster policy making in Upper Austria.....	228
Graph 50 Responsible for cluster policy within the Office of the State Government of Upper Austria.....	229
Graph 51 System of planning in Administration of the Government in Upper Austria.....	230
Graph 52 GDP per capita, in EUR, current prices, Austria and Austrian federal provinces, 1998, 2004, 2011.....	277
Graph 53 GDP and GDP per capita growth (based on EUR, constant, year 2005), Austria and Austrian federal provinces, 1998 - 2011.....	277

Graph 54 Annual GDP growth rates, Austria and Upper Austria, 1996 – 2011.....	278
Graph 55 Disposable household income, per head, constant prices EUR, Austria and Austrian federal provinces, 1998, 2004, 2011	281
Graph 56 GFCF as a % of GDP current EUR, 1998, 2004, 2011 and as a % of GVA 2011, Austria and Austrian federal provinces.....	281
Graph 57 GVA of total activities, per worker in EUR, constant (year 2005), Austria and Austrian federal provinces	282
Graph 58 Sectoral GVA as % of total GVA, Austria and Austrian federal provinces, 2011	282
Graph 59 Growth rates of GVA total and industry, Austria and Upper Austria, 2001-2010	283
Graph 60 Period based increase of population, in percentage, Austria and Austrian federal provinces, 2014 to 1998, 2012 to 2004, 2003 to 1998.....	284
Graph 61 Population spread, Upper Austria, 1998, 2014	284
Graph 62 Labour force as a percentage of population, Austria and Austrian federal provinces, 1999 and 2013.....	285
Graph 63 Unemployment and long term unemployment rate (%), Austria and Austrian federal provinces, 2013	286
Graph 64 Evolution of unemployment rates (%), Austria and Upper Austria, 1999 – 2013.	286
Graph 65 Labour productivity (GDP/ labour, thsd. EUR current) Austria and Austrian federal provinces, 1999 and 2011	287
Graph 66 Change in labour productivity in percentage, Austria and Austrian federal provinces, 1999-2011, 1999-2003, 2004 – 2011	287
Graph 67 Education level as a share of labour force, Austria and Austrian federal provinces, 2013.....	288
Graph 68 Evolution of education as a % of labour force, Upper Austria, 1999-2013.....	289
Graph 69 Total enrollment as a % of population, Austria and Austrian federal provinces, 1999 and 2011.....	289
Graph 70 PTC patent application growth, %, 1998-2010 and average R&D expenditures (% of GDP), 1998-2009.....	290
Graph 71 R&D expenditures by sector as % of GDP, Austria and Austrian federal provinces, 2009.....	291
Graph 72 R&D personnel as % of employment, Austria and Austrian federal provinces, 2009	292
Graph 73 Clusters in Upper Austria based on number of employees and enterprises, 1997, 2011.....	294
Graph 74 Number of star marked clusters, Austrian federal provinces, 2011	299
Graph 75 Evolution of number of star marked clusters, Upper Austria, 1997, 2005, 2011 ..	300
Graph 76 GDP growth versus variables selected for regression model: employment (1), secondary and tertiary education (2), population density (3), patent intensity (4), R&D expenditure (5), co-patenting degree inside the region (6), co-patenting degree outside the region (7), infrastructure (8), specialization industry (9), cluster automotive entities (10), cluster automotive employment (11), Upper Austria, 1995-2010	302
Graph 77 Evolution of cluster policies	317
Graph 78 Strategic approach of the cluster policy in the Basque Country and Upper Austria	317

Graph 79 Cluster associations, evolution of establishment, the Basque Country and Upper Austria.....	320
Graph 80 GDP per capita in percentage of the EU (base EU28=100%), EUR, EU, Spain, the Basque Country, Austria, Upper Austria, 2000-2011.....	334
Graph 81 Average annual GDP growth per capita (EUR constant (real) prices (year 2005)) from 1998 to 2011 and GDP per capita (EUR constant (real) prices (year 2005)) in 2011, Spanish and Austrian regions.....	335
Graph 82 GDP and GDP per capita growth (EUR constant (year 2005), Spanish and Austrian regions, 1998 to 2011.....	335
Graph 83 Evolution of GDP growth rate (EUR constant (real) prices (year 2005)), Spain, the Basque Country, Austria and Upper Austria, 1996-2011.....	336
Graph 84 Evolution of GVA in industry as a percentage of total GVA, 2000-2011.....	339
Graph 85 GVA in manufacturing, constant prices, EUR, % in industry 2000 to 2011.....	339
Graph 86 R&D personnel as a share of employment, the Basque Country and Upper Austria, 2002, 2005, 2009.....	341
Graph 87 Education level as a share of labour force, Austria, Upper Austria, Spain, the Basque Country, 2013.....	342
Graph 88 Average R&D expenditures to number of PCT patent applications per million inhabitant (by inventor and priority year) in 2010, Spain and Spanish regions, Austria and Austrian regions.....	343
Graph 89 Distribution of Spanish and Austrian regions based on High and medium high-technology manufacturing (as % of total manufacturing) and Knowledge intensive services (as % of total services), 2008.....	344
Graph 90 Period based change (*times) in high and medium high technology manufacturing and in knowledge intensive services, Austria, Upper Austria, Spain, the Basque Country, 1996 to 2008, 1996 to 2002, 2002 to 2008.....	344
Graph 91 Spread of clusters in the Basque Country & Upper Austria based on the employment, enterprises and focus, 2011.....	346
Graph 92 Number and character of star marked clusters, the Basque Country and Upper Austria, 2011.....	347

LIST OF ANNEXES

Annex 1 List of selected definitions of economic development.....	i
Annex 2 List of selected cluster definitions.....	ii
Annex 3 List of interviews conducted in the Basque Country and Upper Austria.....	iii
Annex 4 Inquire letter to conduct interview	v
Annex 5 Framework for semi-structure interviews, Example (English)	vii
Annex 6 Star methodology of the European Cluster Observatory	viii
Annex 7 The Basque Country cluster initiatives	ix
Annex 8 Upper Austria cluster initiatives.....	xiv
Annex 9 Table in brief on key components of the cluster policy periods and stages in the Basque Country.....	xvi
Annex 10 Table in brief on key components of the cluster policy periods and stages in Upper Austria.....	xxx
Annex 11 Distribution of grant per cluster (in EUR), 1997 – 2004, the Basque Country....	xliii
Annex 12 Different typologies of stages included in (cluster) policy process	xliv
Annex 13 List of region´s codes	xlv

LIST OF ABBREVIATIONS

AC	Automotive Cluster Upper Austria
ACEDE	Cluster of household appliances of the Basque Country
ACICAE	Automotive cluster of the Basque Country
ACLIMA	Cluster Association of companies in environment sector of the Basque Country
AFM	Spanish Association of Machine Tool Manufacturers
ARCS	Austrian Center Seibersdorf
ASEAN	Association of South East Asian Nations
AT	Upper Austria
BBC	Association of Bioscience cluster in the Basque Country
BC	The Basque country
C&T priorities	Communities and Technologies
ca.	Approximate
CATT	CATT Innovation Management GmbH
CDT	Drive Technology Cluster Upper Austria
CEO	Chief executive officer
CI	Cluster initiative
ClusterTIL	Association of Mobility and Logistics cluster of the Basque Country
e.g.	For example
EAJ-PNV	Euzko Alderdi Jeltzalea - Partido Nacionalista Vasco
EFRE	European Funds for Regional Development
EIKEN	Basque Audiovisual cluster association
ERAIKUNE	Construction cluster of the Basque Country
ETA	Basque Country and Freedom / Euskadi Ta Askatasuna
etc.	and others
EU	The European Union
EUR	Euro currency
FEAF	Foundry Association of the Basque Country and Navarra
FMV	Association of Maritime Industries of the Basque Country
FP6/ FP7	The Sixth/ Seventh Research Framework Programme
FPÖ	Freedom Party of Austria (Freiheitliche Partei Österreichs)
GAIA	Industrial Association of Electronic and Information Technologies of the Basque Country
GATT	General Agreement on Tariffs and Trade
GC	Health Technology Cluster Upper Austria
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GNP	Gross National Product
GVA	Gross Value Added
HABIC	Sector Cluster Association House space, Wood Office and Contract
HEGAN	Association of Aeronautics cluster of the Basque Country
Herramex	Spanish Association of Hand tools Manufacturers

ICT	Information and communications technology
INE	Instituto Nacional de Estadística
IRE	Network of Innovation Regions in European
ISIC Rev.4	North American Industry Classification System, Revision 4
JKU	Johannes Kepler University
KC	Plastics Cluster Upper Austria
KET	Key Enabling Technologies
Langune	Association of language industries of the Basque Country
LC	Food-Cluster Upper Austria
LDAs	Least Developed Countries
MAFEX	Spanish Association of Manufacturers and Exporters of Equipment and Rail Services
MC	Mechatronics Cluster Upper Austria
MERCOSUR	Southern Common Market
MHC	Furniture and Timber Construction Cluster Upper Austria
NACE	The Statistical Classification of Economic Activities in the European Community
NAFTA	North American Free Trade Agreement
NDM	Network Design & Medien Upper Austria
NEG	New Economic Geography
NFTI	Network Research, Technology, Innovation Upper Austria
NGOs	Non Government Organization
NHR	Network Human Resources Upper Austria
NL	Network Logistics Upper Austria
NREE	Information Technology Cluster Upper Austria
NTT	New Trade Theories
NUTS	Nomenclature des unités territoriales statistiques
OEC	Eco-energy Cluster Upper Austria
OECD	The Organization for Economic Cooperation and Development
OÖ	Upper Austria
ÖVP	Austrian People's Party (Österreichische Volkspartei)
PCT	PCT (International Patent Cooperation Treaty) for Patent Applications
RIS 3	Regional Innovation Specialization Strategies
RISC	Research Institute for Symbolic Computation
RFT OÖ	Upper Austrian Council for Research and Development
UP 2000+	Strategic Program "Upper Austria 2000+"
UP 2010	Strategic Program "Innovative Upper Austria 2010"
UP 2010+	Strategic Program "Innovative Upper Austria 2010+"
UP 2020	Strategic Programme "Innovative Upper Austria 2020"
SIDEREX	Spanish Association of Sider Exporters and Producers
SIFE	Forging Industries Association
SMEs	Small and Medium Enterprises
SPRI	Basque Business Development Agency

TCI	The global practitioners network for competitiveness, clusters and innovation
TIP	Austrian innovation research program “Technology, Information, Policy Consulting”
TMG	Technology and Marketing Company Upper Austria
UC	Environmental Technology Cluster Upper Austria
UNIPORT	Association for development and promotion of the port of Bilbao and its surroundings
WIFO	Austrian Institute of Economic Research

INTRODUCTION

1. Background and motivation

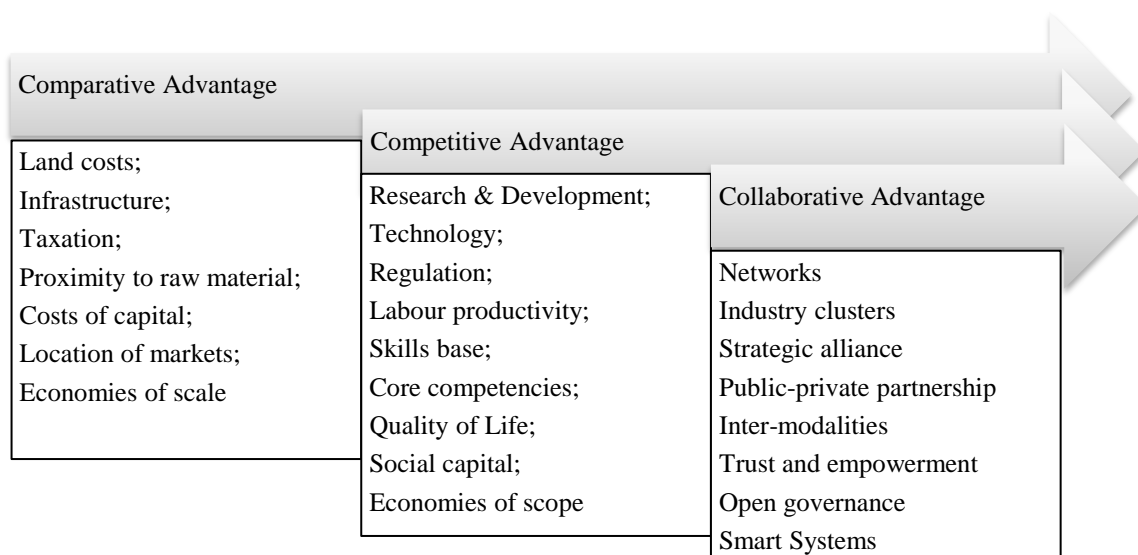
Each territory, however it is defined: city, province, region or nation, aims to enhance its economic development. This is similarly relevant for developed as well as developing countries. Whatever economic development means, it is up to the perception of each territory to interpret it. During centuries different economists are studying and analyzing the factors and forces, which on their own or in combination lead to the expected notion of economic development. They develop hypothesis, theories and assumption based on which different tools and activities, in form of e.g. policy program are being elaborated. Thus recommendations as well as policy actions don't stay the same. They are closely determined by conditions and changes, which are taking place in business and political environment.

Since the middle of the 20th century and up to now the main influence on the behavior of economies, actors and structures within them, was done through **globalization** (Genosko 1996). Officials from the World Bank (2014) e.g. see under globalization “a growing interdependence of countries resulting from the increasing integration of trade, finance, people, and ideas in one global marketplace”. That is why in order to make a clear link between developed theories and concepts leading to economic development of the territories understanding the origin and influence of globalization on current economic processes is very important. It is considered (Genosko 1996, pp. 2f; Stimson et al. 2002, pp. 1f; Pike et al. 2006, p. 27) that the globalization was and has driven by dominantly changes in **technological, economic, financial, institutional, political and socio-cultural environments**.

Technological changes have led to the immense development of communication and transportation means by facilitating the business and human connectivity especially over the long distance. This technological development has influenced the new types of qualities (computer literacy, chemistry) and skills (flexibility, mobility), which were required from people. Additionally it had affected the amount of existing knowledge, character of business decisions, way of market coordination, etc. It has also influenced the pattern of international trade and production. Thus it led to a new character of companies' allocation, appearance of agglomerations and clusters.

Economic and financial changes are closely connected with trade liberalization of the transactions and merchandise trade and increased access to the global market. This created new types of competition, which turned to be more open and competitive. The elimination of the barriers among countries caused new style of inter companies' relations and performance within them. Since 1960s based on the economic-wide characteristics following three typologies of competition have been defined: comparative, competitive and collaborative ADB 2011, pp. 5–8) (Graph 1). In such the latest period is associated with **collaborative advantages, where the role of networks, clusters, strategic alliances, public-private partnerships, open government and smart cities are associated.**

Graph 1 Elements of Competitiveness: Comparative, Competition and Collaborative Advantages



Source: ADB (2011, p. 6)

Bieger and Derungs (2006, p. 15) has also identified similar to ADB (2011) types of competitions in economies: 1) static; 2) dynamic and 3) hyper-dynamic. This led the companies to look for location(s), where they will be able to accumulate the needed resources the most. From Bieger and Derungs (2006) opinion this is possible through market proximity, and from agglomeration effects of clusters and milieus, which in their turn have been created by the companies themselves. Herewith locations in order to ensure their attractiveness and international competitiveness have to offer these conditions.

Political and institutional changes have also taken place. During the last 50 -60 years immense number of international (non-)government organization has appeared. Apart from

that, the number of free-trade agreements and zones, like EU, NAFTA, ASEAN, MERCOSUR, has also been established (McCann 2008). It led to the break-down of national borders and increase of flow of goods, services and labour. While national governments started to lose their roles to other global forces and the competition among private and public actors has shifted to the level of the regions, the efficient management of and within regions became more and more important. Stimson et al. (2002) also connects the changes in the policy making to the type of competition, where the environment with **collaborative advantages** should be interfered by **integrated strategic planning** on contrary to simple strategic planning, which was characteristic for environment with competitive advantages. Herewith the importance of the new level, **regional**, for policy intervention is also stressed (Table 1) (Stimson et al. 2002, p. 2).

Table 1 Traditional development policies vs local regional development policies

Traditional development policies	Local and regional development policies
Top-down approach in which decisions about the areas where intervention is needed are taken in the national center	Promoting of development in all territories with the initiative often coming from below
Managed by national central administrations	Decentralized, vertical cooperation between different tiers of government and horizontal cooperation between public and private bodies
Sectoral approach to development	Territorial approach to development (locality, milieu)
Development of large industrial projects, that will foster other economic activity	Use of the development potential of each area, in order to stimulate a progressive adjustment of the local economic system to the changing economic environment
Financial support, incentives and subsidies as the main factor of attraction of economic activity	Provision of key conditions for the development of the economic activity

Source: Stimson et al. (2002, p. 2)

Social and cultural changes took place due to appeared international flexibility and possibility for businesses and specialists to easily allocate to other places. Then by acquiring new and sharing the old knowledge the local norms, traditions and perceptions have been changes. Furthermore, the increased number of people especially in developed countries has shifted their interest from the desire to satisfy their first common needs such as food or living, to more advanced ones, entertainment, environment protection, etc. Table 2 in the short summarizes the key causes, elements and effects of globalization.

Table 2 Main features and outcomes of the globalization

Causes	Characteristics	Results
Rise of the semi-conducted silicon chips	Technological change: new communication, production and transportation means	Need of highly skilled, flexible and mobile labour resources and alliances; lower transportation and production costs
Collapse of Bretton Woods System; GATT/ WTO	Economic & financial change: environment of floating exchange rates; liberalization of the trade relations; increase in cross-border transaction	Easiness in the investment flows; Structural changes, firms strategy changes, industrial agglomerations; Change in the form of competitiveness and competition
Numerous signing of bilateral & multilateral agreements; UN/ OEEC; Decolonization	Political & institutional change: Liberalization in movements; Policymaking is being partially delegated to a higher level of representatives; New leading groups and blocks	High level of mobility; More complex form of decision-making; National governments lose their role and new forms / tools of governance appear
Establishment of international institutions	Social & cultural changes: Creation of international standards and certification	Easier access to the new/ other markets; Changed in the needs from basic to more advanced one; New services to satisfy rising needs

Source: Author's development

Indeed, surprisingly in such a wave of globalization and possibility to allocate companies' production in almost any place of the world, it was noticed that firms tend to choose one location over another and build cluster. With time these territories further strengthen its levels of productivity and innovation, resulting in general welfare increase. Moreover these territories, which often reside on sub-national, regional level, were also observed to be significant contributors to the national economic growth. These growth related benefits generated on the regional level (Piletis et al. 2006), e.g. location specific relationship management or communication, can result in unique skills development or knowledge accumulation decisive for requisite daily technological progress and increased companies productiveness.

Driving the core conclusion from the aforementioned events and processes taking place in the wave of globalization it can be stressed that the importance of *regions and clusters as drivers of economic development and as policy level of interference* has been numerously brought up and discussed (Porter 1998; Scott 1998; Krugman 1991; Fujita et al. 1999; Baldwin et al. 2003; Benner 2012; Genosko 1996).

In this framework the study of regional growth drivers especially clusters and the related policies on the regional levels would improve the understanding of current processes and factors leading to economic development. This builds the central motivation for our research.

2. Research problem and objectives

In such within the theories developed in the recent 20 years the concept of **regional industrial clusters** has received strong research focus and attention (Maskell, Kebir 2005; Cooke, Memedovic 2003; Stimson et al. 2002; Perlik, Messerli 2001; Boja 2011; Porter 2000; World Bank 2009; Sölvell 2008; Schätzl 2001; OECD 2007a). From Porter (1998a) point of view under cluster the “geographically proximate group of interconnected companies and associated institutions in a particular field linked by companies and associated institutions” (p. 199) can be seen.

At the early 90s a special role has been dedicated to analysis of industrial spatial agglomerations and clusters. The results of these studies (Asheim 1996, 2001, 2006; Audretsch, Feldman 1996; Bathelt, Glückler 2002; Becattini 1991; Feser 1998; Christensen et al. 2012; Sölvell 2008) show that clusters tend to indicate particular positive influence on the development of the territories. Malmberg and Power (2006), Wrobel (2008) and Blien and Maier (2008) say that it is often seen “as a synonymous with economic growth, jobs, innovations and synergies” (p.6) and is strongly associated with prosperity and wellbeing of territories as it offers conditions to produce innovation and competitiveness through actors’ interaction system in defined spatial proximity. Porter (1998) also argues the connections that develop in cluster “are fundamental to competition, to productivity, and especially, to the direction and pace of new business formation and innovation” (p. 205). Finally clusters much better align with the current needs of the companies’ business models.

This positive perception led to the opinion that the existence of cluster within territories, especially on the regional level, would lead to the improvement of an economic growth (Cooke, Memedovic 2003; Steiner 1998; Roelandt, Den Hertog 1999; Roelandt 2000). In such, clusters have created new **roles for the government**. Moreover, Porter (1998) thinks that although “macroeconomic policies for fostering competitiveness are increasingly well understood (...) they were not sufficient. Governments’ more decisive influences are often at the microeconomic level” (pp. 198 - 199). Addressing the clusters was favorable as they “represented a new and complementary way of understanding an economy, organizing

economic development, and setting public policy” (Porter 1998, p. 266). The rush over clusters has spread all over European and other countries, e.g. UK, France, Germany, the Netherlands, Portugal, New Zealand, and has started to be promoted on numerous levels and by number of organization, e.g. the OECD, the World Bank, national government, regional development agencies (Karlsson 2007).

Since then the research focus has turned toward understanding of how to make and build clusters in the regions that lead to economic development. Along with the natural conditions, that can lead to cluster establishment, there is an opinion that clusters can also be created or developed with the help of specific programs and activities, which have been called **cluster policy** (Andersson 2004; Brenner, Fornahl 2003; Dewald 2006; Hegedüs 2008; Meyer-Stamer, National Governors Association 2002; Raines 2000, 2001). Moreover it seemed that cluster policy making was relative simple. There was often no need to develop or implement extra programs. Cluster based policy could exist by already starting to see economy in form of clusters, reducing regulation barriers, which restrain the development of clusters or by combining already existing programmes originating from other policies under the common agenda. Herewith making this approach extremely effective for (under)developing countries or regions with limited financial resources or governments, which don't have strong regulation capacities (Blien, Maier 2008).

As the policies were implemented, they were showing different results. This led to questioning of policy effects and looking for models reflecting the best or perfect cluster policy. Starting from the second half of 2000s the attention moved to the **analysis of the cluster based policies**, its types and effects on the territorial development (World Bank 2009; Uyarra, Ramlogan 2012; TACTICS 2012; Schmiedeberg 2010; OECD 2007b; Franco et al. 2012; Aranguren, Wilson 2013; Christensen et al. 2012; Cotic 2009; Kiese 2011). The evaluation techniques differ from qualitative to quantitative methods and are done on the different levels of territorial units, from city over region to state level. The results from the evaluation can provide more information on whether the policy should be terminated or continued, and which aspects should be enhanced. Recently number of studies (Christensen et al. 2012; Ketels et al. 2012; Brenner, Schlump 2011) started to stress that there is no “one-size” fits all cluster policy, and that the policy makers should strongly consider the regions specific conditions and needs.

That is why, despite such a vast research on cluster policy, there is still no common census on the way cluster policies should be built in order to achieve economic development. Although numerous recommendations and tool boxes have been already developed for cluster initiatives makers, they are not systematised, don't address multiple levels of territorial governance, don't reflect the whole picture of cluster policy making and their embedding in the territorial context. Furthermore most of the cluster policy analysis has addressed only either the first years of the cluster policy building or its outcomes, rather than providing a long term study of the policy development and together with economic development of the territory. Herewith the evolutional perspective of cluster policies over longer period of time and its effects is lacking. Finally the outcomes of the cluster policy may depend not only on the concept or policy itself but rather on the form of policy making/ administration. In particular this issue hasn't been addressed almost at all. Herewith deriving from the existing research potential and motivations, we are setting following **research questions and objectives**:

How to build cluster policy leading to regional economic development?

- I. *What are the implications of cluster policy on the regional economic development?*
- II. *How have cluster policies evolved since the first years of their implementation?*
- III. *What are the components of an effective regional cluster policy making?*

Addressing aforementioned research questions would broaden and enrich our understanding of clusters and cluster policy effects for regional economic development. Along with it the review of the long term application of cluster policies can be done. We think that, especially now, the study of different cluster policies in the combination with the development of core economic indicators or factors can be done more effectively. First of all, it is already more than 20 years since the launch of the first cluster policy, thus there are good conditions to observe long-term result of the policy implementation, especially due to data availability. Secondly, due to long term observation period of policy implementation there is a good chance to study it in dynamic. Further we would be able to provide more systematized and holistic recommendations. In this way our findings will contribute significantly both to theoretical and practical understanding of cluster policy administration.

3. Research strategy

3.1. Multiple case study analysis

The building of the research methodology and the choice of the research methods is extremely important as they provide the lens through which the answers to our subject can be justified (Hammond, Wellington 2013). This as the result builds important grounds for the successful research work. In such while referring to Yin (2003), and considering remarks of Lijphart (1971) and Creswell (2003) we follow the **qualitative approach** by the application of **multiple (two) case study method**.

The **qualitative research approach** enables to gain deep insides into the studied subject. This is especially relevant considering our desire to learn on how to build a cluster policy leading to economic development of the region. Referring to Creswell (2003) “a qualitative approach is one in which the inquirer often makes knowledge claims based primarily on constructivist perspectives (...) or advocacy/participatory perspectives” (p.18). The collected data is open-ended and serves for acquiring new and developing additional data on the studied objective. Furthermore Hammond and Wellington (2013) is sure that qualitative approach gives us the tools to gather broad knowledge in order to answer our research question. This is especially important as cluster policy making does not only include quantitative elements, on contrary many of its components can be understood and highlighted only due to application of qualitative one. Finally as our main research objective is to depict the evolution of cluster policy and its economic development the **descriptive type of research** is being applied (Kothari 2004).

Among existing research methods, we consider **case study method** to be the most appropriate to learn about the building of cluster policy. This method in reference to Yin (2003) can be even viewed as a comprehensive research strategy. Case study is particularly beneficial for us as it facilitates getting an “intensive study of a phenomenon” (Singh 2006, p. 147) covering contextual conditions of its development. Herewith we can better understand the context of the cluster policy making and its connection with economic development of the territory in the full scale. This is especially relevant considering the numerously highlighted importance of the different side effects influencing the outcomes of cluster policy application (Nigatu 2009). Although case study doesn't guarantee the achievement of absolute or definite results, its enables to see some core complex matter of the issue and extract some causalities of different phenomenon (Rihoux, Ragin 2009; Hammond, Wellington 2013). Furthermore

despite giving more subjective information Singh (2006), Hammond and Wellington (2013) think that one of the biggest values of this research method is in its way to systematize the broad informational flow on a particular issue in a consistent and in a deep way. In such we expect to get new insides in the policy making, which would lead to possible new theory building and should be especially useful for the policy makers (Yin 2003; Creswell 2003).

The case study method can be built around single or **multiple case study design**. Although some researchers (Lijphart 1971) consider multiple case studies as already another methodology, Yin (2003) sees “single- and multiple-case designs to be variants within the same methodological framework” (p. 46). Agreeing with Yin (2003) we also think that multiple case study has an advantage of being more “compelling, and the overall study is therefore (...) more robust” (p. 46), which is more suitable for achieving our objectives. Mainly as it enables to study the phenomena in similar conditions and thus by comparing both to drive more generalized common conclusions and provide the basis for learning Ragin (1987, cited in Rihoux and Ragin 2009, p. xviii). This is particularly relevant to our research question where we want to understand the implications of policy making on economic development in the region.

Within multiple case study design each case study is replication of the conditions questioned within the framework, which is to be developed by us. The theoretical framework is very important as it “becomes the vehicle to generalizing” (Yin 2003, p. 48) the case. Methodologically we closely follow the logic of the multiple case study, which is expressed by Yin (2003). This means that after the developed theory, case selection and designing the data collection protocol, we conduct the first and then the second/ next case study. Then we write individual case report for each case study and finally after drawing cross-case conclusion we produce key research finding. This should result in theory extensions and policy recommendations. We follow inductive and deductive approach. Deductive through selecting hypothesis, we will try to operationalize them by means of specific evidence. Inductive approach helps to identify phenomena and should be realized through conclusion driven from case comparison. While conducting case study research in reference to Hammond and Wellington (2013) it is important to keep the balance between the width and the depth of the presented information.

Finally, the biggest benefit of the case study is in its capacity to provide the space for application of **mixed** techniques to analyze the data. Herewith, within each case study both

quantitative and qualitative tools for data analysis will be applied. Below we specify the level of analysis and the selection of the cases, whereas the detail overview of the research design is presented in the **2 part, methodological**, of the dissertation.

3.2. Region as a level of analysis

While doing the research work one of the important elements is the specification of the level of the analysis. In such referring to the previous paragraphs it was numerously mentioned that clusters as well as policies can take place on different levels, from cities to supra-country levels. At the same time, some economists (Cairncross 2001;) tend to think that globalization on contrary is suppressing the importance of location, thus the significant majority of others (Krugman 1991, 1995; Porter 1998; Scott 1998, 2001; Fujita et al. 1999; Porter 1998; Scott 1998; Fujita et al. 1999; Brackman, Garresten and Marrewijk 2001; Baldwin et al. 2003; Benner, 2012; Shearman 1997) are sure that it is other way round and on contrary highlight that especially regional economic development is very important especially as it can build the basis for countries competitiveness. Indeed, more and more economist see regions as a “salient foci of wealth creation and world trade” (Martin R., Sunley 2002, p. 3) and are persuading talking about “re-emergence of regional economies” (Sabel 1989, cited in Martin R., Sunley 2002, p. 3), the “localization of the world economy” (Krugman 1997, cited in Martin R., Sunley 2002, p. 3) and the rise of a “global mosaic of regional economies” (Scott 1998, cited in Martin R., Sunley 2002, p. 3). Therefore we also consider that economic development of regions is extremely important nowadays. That is why the analysis in this research work is set on region as a level of analysis and within them regional cluster policy as unit of the analysis.

As region can also be considered in different terms, the same word can be referred both to the region within the United States, such as e.g. Silicon Valley, as for all countries composing the South America (OECD 2012), further specification is needed. For example Combes (2008) thinks that „the term ‘region’ is one of the most elastic in the social sciences” (p. 51) as it can be applied e.g. from the global perspective for territory with similar identities, capacities and problems, that composes the collection of countries, calling them the Middle-East or Central America, to territories showing similar topographic or cultural identities, like Alps or Central Europe. In order to define some territory as region it should possess similar or common features, which is e.g. connected with certain research question or defined by certain legislative authority. Generally Störmann (2009, p. 3) sees mainly two principles for defining

the region: similarity/ homogeneity and connection/ function. In first case physical or cultural conditions can define the regions, whereas in the second the territory with the similar function can also be names as regions. The definition of territory as a region can also be connected with historical conditions. In our case the region is defined based on functioning principle. It is an administrative territory, which is below the state level and is defined by „Nomenclature des unités territoriales statistiques“(NUTS) which was developed by European Council for Statistics in 1980. There are three main reasons for the choice of this level of territorial and policy analysis: the data availability, access and comparability. In our work **region is define in term of administrative borders**, equaling to NUTS2 criteria of European Union or L2 typology of OECD. Within it, we have following main **units of analysis**: a) general economic development, b) factors influencing economic development and c) cluster policy.

3.3. Rationales for the choice of the regional cases

Following the multiple case study methods, a challenging next step is the selection of the cases (Hammond, Wellington 2013; Yin 2003). It is important to remind that the main objective of the multiple case study is to produce more substantial and robust results while replicating the context for case observation (Yin 2003). In such the main rationality for case selection based on Yin (2003) in order to follow **replication approach** is the representativeness and similarity context cluster policy leading to regional economic development. Furthermore, considering the researcher’s personal, time and financial capacities, we think that the selected **two cases** of regional cluster policies: the Basque Country, autonomous community in Spain, and Upper Austria, a state in Austria, in the best manner comply with our requirements. The two policies show important to the research study **context-based similarities**, which are in detail listed below:

a) **Regional level of the cluster policy.**

Cluster policy in the Basque Country as well as in Upper Austria has been launched by the government on the regional level of administration and had an influence primarily within the regional (NUTS2) level of operation. This goes align with our earlier set conditions for regional level of analysis.

b) Labeled as best practices within the European Union.

In reference to Hospers (2002) and OECD (2007a) for the Basque Country and Kiese (2013), Maxwell Stamp PLC (2012) for Upper Austria both policies are considered to be among best practices. In such the study of such representative cases enables us to learn on the components of an effective cluster policy making.

c) Earlier launch of the cluster policy approach.

In the Basque Country the first steps towards the application of the cluster policy have been set already in the 1990 (Azua 2008), same as to Upper Austria (Brown 2000). At the same if in the Spanish region the policy's implementation was already around 1991, for Austria it took another 6 years to launch with implementation part. Nevertheless, still in the both regions the cluster policies were set one of the first, especially within the European Union, which gives us a long term period of observation to study the evolution of the cluster policy.

d) Motivations for policy start: improvement of economic development and strengthening of competitiveness

At the beginning of the cluster policy development the economic situation within the selected regions was on the slope (Torres, Lagendijk 2000; Kaufmann, Tödting 1999). Herewith in the both cases the motivation for the start of the cluster policy was the desire to improve the economic situation in the regions. In such a way the observation of the economic progress within the region will enable us to make the link between the cluster policy making and the regional economic development.

e) Political-administrative systems

Although the Basque Country is an autonomous community within Spain and Upper Austria is a state within the federal political system of Austria, both of them have similar legislative rights on the regional level. The both regions have their own regional government authorities with the rights to pass laws and manage funds. The only significant difference is in the tax regulations system. If the generation of taxes in the Basque Country takes place on the local level, in the Upper Austria there is a central tax collection and distribution system. Thus we'll keep this difference in mind while driving the conclusions.

f) Regions belong to the countries, which are the European Union members

The two selected regions belong to the countries, which are the members of the European Union. It is important in terms of similar access to regional and structural European funds. Furthermore, both Spanish and Austrian regions have due to countries membership in the EU a favourable access to the bigger European market.

g) Region-related factors that aside of cluster policy might strongly influence the cluster and territorial development

Within the cluster policy it is considered that the **topographic structure, industrial, economic and socio-cultural characteristics** of the territory can strongly influence the making of the policy and its effects on development of the territory. In such in order to reduce this bias, the regions key factors had to be as close as possible among each other. We think that a good balance could be met for our selected regions.

One of the key issues is the **topographic similarity**. The landscape of Upper Austria is strongly influenced by the chain of the Alps and the Basque Country – Cantabrian Mountains. In such both regions are considered to be pre- and mountainous territories, with a very limited area for settling, company's location and herewith leaves a significant similar influence on the industry's and labour distribution. Additionally it further in quite similar way influences the industrial specialization by granting all with unique natural resources and limiting in available agricultural land, in such pre-determining the development of similar sectors.

Further key issue influencing the cluster development is the market conditions. Certain resemblance is seen in the small **size territory** and medium to high central **concentration of population**. The market size is important as it influences the transportation and transaction costs, connectivity and accessibility, and possible revenues from the supply market. This means that in all of the cases due to equally small territory of the region business actors have a limited demand market and it can cause a resembling need for the international exit. Furthermore geo conditions can have similar influence on networking characteristics. Another important similarity is reflected in sharing a fungible market structure, which is presented by the existence of synergies among several big companies and the rest are built by numerous small and medium enterprises. Furthermore, both of the regions are bordering with equally big neighbouring demand/ output markets.

Infrastructure is also similar around the territories. All regions have a rich network of established railways, communication lines and roads due to their geographical position on the important international roads.

The **industrial specialization** is also coherent among the regions. In e.g. 1990s automotive as well as machinery tools industry in the the Basque Country had absorbed a significant part of the regional GDP, in the Upper Austria the situation is similar. Among other industries one can mention wood and furniture sector, chemical production, light manufacturing, energy and already mentioned agricultural resemblances. This is especially relevant in terms of types of build-up clusters.

Finally there is also strong similarity in **socio-cultural** conditions. Both regions have strong cultural ties and identity. These factors influence the character of the rivalry and networking, as existence of particular type of relations among people forms a significant influence on the local business relations, networking and decision-making.

Summing up our rationalization for the case selection we consider that the Basque Country and Upper Austria indicate representative policy and sufficient contextual similarities needed to be able to respond the set research question.

4. Structure of the research work

Specifying the logic of our research, we see the closest resemblance with Yin (2003), where after the identification of the problem, we develop theoretical framework and set hypothesis. Research design, specification of data collection and analysis assist us in gathering evidence and driving conclusion and contributing to broadening of the theory. Herewith this dissertation research develops around following three core parts: theoretical, methodological and empirical one. Each part consists of several chapters, which can be clearly seen in the Table 3.

Table 3 Structure of the research

Introduction		
1. Theoretical part		
Chapter 1 Regional development Theories	Chapter 2 Agglomeration & cluster theories	Chapter 3 Regional cluster policy
2. Methodological part		
Chapter 4 Theoretical framework & main hypothesis	Chapter 5 Research design	
3. Empirical part		
Chapter 6 Case study 1: the Basque Country	Chapter 7 Case study 2: Upper Austria	
Chapter 8 Main findings & Recommendations		
Final Conclusions		

Source: Author's development

The **First part** is theoretical one and it composes of three sections. In the **First Chapter** the review of the notion of economic development together with the core theories of regional growth are done. The main factors leading to economic development is highlighted and emphasized. The **Second Chapter** makes the review of such concepts as agglomerations and clusters. Different key theories and economic visions on the role of clusters, their main drivers, their relations with economic development are being brought up. In reference to promotion of clusters governments have turn to create policies which support either existing clusters directly or which are targeted to the stimulation of clustering. These policies are known as cluster based economic policies or just cluster policy. Different definitions of cluster policy, together with the components influencing the cluster policy making are being reflected in the **Third Chapter**. In this chapter based on numerous recommendations we develop and offer our structure for the key cluster policy process components leading to economic development.

The **second methodological part** of the thesis focuses on explaining conceptional theoretical framework and the developed research design, which will be applied for the case study in order to respond to our main research objective. Herewith, when in the **Forth Chapter** the main linkages between cluster policy and economic development of the region are to be reflected, in the **Fifth** one the techniques and tools for data collection and analysis are explained.

The empirical, **third, part** is composed of the two case studies. The **Sixth Chapter** evolves around the case of the Basque Country, whereas, the **Seventh Chapter** makes in depth analysis of the regions and cluster policy in Upper Austria. Finally the last **Eighth Chapter** of the study is focused on highlighting main research finding from results obtained in the case studies and proving key recommendations in general and for each region in particular. We are closing our research work with a brief summary of the conducted work in the **Final Conclusions**.

PART 1 THEORETICAL PART

CHAPTER 1 THEORETICAL PERSPECTIVE ON REGIONAL ECONOMIC DEVELOPMENT AND GROWTH

Economic development can be recognized as an increased welfare, constant economic growth or strengthened competitiveness. These can be seen differently by various territories around the world. Along with different attitudes of the territories towards similar subjects, its perception over time within the same territory can also alter. Since the early beginnings of market-based relations economists have been interested in observing and analyzing the components of territorial promotion and factors influencing its development. The aim of this chapter is to demonstrate different notions standing behind economic development and later on to make a review of the core theories, connected with regional development and growth.

1. Perspectives on regional economic development

1.1. Defining regional economic development

In the economic literature while talking about the situation in countries, regions and other territories economists often refer to such terminology as economic and/ or social, sustainable development, welfare, growth, prosperity, competitiveness, etc. When it comes to the in-depth interpretation of each of these terms, they tend to show not only some similarities but also differences, which should be stressed. Furthermore, interpretations themselves can be strongly dependent on the geographical and historical context. Herewith, as mentioned by Pike et al. (2007), it is crucial to grasp the definition of regional development, which is implied by each particular scholar and by us within this research thesis. Pike et al. (2007) suggest that the questioning of “for and what is it designed to achieve” (p. 1254) assists researchers and practitioners in finding the common ground of what economic development is.

In order to understand what regional economic development is we dig inside some principal works and look for the explanation behind it. In the introduction we have already mentioned our understanding of the region as a notion and of the main reasons for the choice of this level of analysis. Therefore here the focus will be only on the second part of the term – economic development.

Based on Longman (2000) under development “the growth or improvement of something, so that it becomes bigger or more advanced” (p. 129) is seen. From here it can be surmised that the main aim of the development is to increase something in size, amount, degree, etc. or in making it better. The development can have different character, e.g.: economic development, human resource development, management development, etc. (Longman 2000). In our case the development is considered in strictly economic terms. Below in chapter we stress the most relevant, considering the historical period and interest of our study, definitions and the rest can be found in the Annex 1.

The classical view reflected by Eatwell et al. (1987) perceives economic development as a “regular progress and rising prosperity” (p. 818). Similar to that Todaro and Smith (2012) considers it also as “the process of improving the quality of all human lives and capabilities by raising people’s levels of living, self-esteem, and freedom” (pp. 2-5).

Meier and Baldwin (cited in Somashekar 2003, p. 2) try to go deeper in their understanding of economic development and besides recognizing it as “a process whereby an economy’s real national income increases over a long period of time” they define the following three core elements, which should be incorporated in the definition. They are 1) a process – meaning “operation of certain forces which bring about changes in certain variables”, 2) measured by real national income and 3) long period trend of the positive change of real output taking place during at least 25 years. A very close view is also expressed by Benard Okun and Richard W. Richardson (cited in Somashekar 2003), thus further raising the issue of welfare and wellbeing. Accordingly they consider economic development "as a sustained secular improvement in well-being, which may be considered to be reflected in an increasing flow of goods and services". They stress three similar aspects of development: 1) a dynamic and long term phenomenon, 2) improvement in material welfare and 3) national output is the measuring rod of material welfare.

Stimson et al. (2002) further prolongs his opinion and insists on perceiving economic development from seeing it both as a process and a product, thus where product is being used in terms of measuring outcome (quantitative or qualitative) from changes and as a process, when it is tool for changes, e.g. industry support. In reality they can often be confused and converged due to their cause-result effect. To make it clearer Stimson et al. (2002) suggests seeing the economic development in the form of the matrix with all the above-mentioned elements (Table 4).

Table 4 Regional economic development as a matrix of qualitative, quantitative process and product outcomes

	Qualitative	Quantitative
Process (tool for changes)	Policy Planning Strategy	Analysis Resource application Evaluation
Product (indicator for changes)	Social/ financial equality Sustainable development Employment Quality of life	Wealth Income Goods & services Financial security

Source: Based on Stimson et al. (2002, p. 6)

Based on the previously stated definitions we recognize *regional economic development* allied with Meier and Baldwin in Somashekar (2003, p. 2) by viewing it as *an improvement and a product of change of an economy on the regional administrative level over the long period of time*. To this understanding of economic development we are to refer in our research. This is also similar to that expressed by Stimson et al. (2002), where he mentions regional economic development as the “application of economic processes and resources acceptable to a region that results in the sustainable development of, and desired economic outcome for a region that meets the values and expectations of business, of residents and of visitors” (p. 4).

1.2. Economic growth as core objective of economic development

Considering that economic development is shaped by historical events and location means - its object of focus also varies. The objective of regional as well as national economic development can be seen as growth (Dillinger 2007), poverty reduction (Dillinger 2007; Todaro, Smith 2012), equal distribution of resources (Todaro, Smith 2012), innovation, welfare, employment or competitiveness, etc. All these are very broad definitions, thus including some core distinctions. The classical approach toward the object of economic development is often seen in **economic growth**.

Referring to Longman (2000) **economic growth** is “an increase in the value of goods and services produces in the country or area” (p. 129) or as of World Bank (2014) it is “a quantitative change or expansion in a country's economy (...) conventionally measured as the percentage increase in gross domestic product (GDP) or gross national product (GNP) during one year”.

Considering the level of economic development Parkin (2005) argues that “economic growth is the single most decisive factor influencing a country’s living standard” (p. 593). Specialists from the World Bank (2014) consider that economic growth can appear in two ways, namely “extensively” through using more and more resources or “intensively” through more efficient use of the same amount of resources. Thus from their point of view only intensive economic growth results in higher rates of income per capital and leads to an increase in average people’s living standards. In other words, in order to improve the existing conditions, within countries, regions or territorial units approaches have to be developed that enhance the better usage of existing resources. In such a way it is absolutely correct when Porter (1998a) says that “national prosperity is created, not inherited. It does not grow out of country’s national endowments, its labour pool, its interest rates, or its currency’s value, as classical economics insists” (p. 155). Herewith economic development requires intensive economic growth.

Although we will follow the opinion of Armstrong and Taylor (2000, cited in Pike et al. 2007), who mention that “local and regional development has been dominated by economic concerns such as growth, income and employment” (p. 1254) and see **economic growth as one of the possible objectives of economic development**, we should bring up other points of view perceiving development and growth as simply two different notions and not as one of its objectives.

In particular Hayami (1997) mentions that now within economic development two main research lines have been developing. One appears under the definition of “economic development” and the other – “economic growth”. Initially economic growth was seen as a direct variable of economic development. However, with the evolution of the concept of development, some significant elements started to appear. However as stated by them, these terms are sometimes used interchangeably, especially in the recent years within the development of the electric policy of economic development which combines the experience of all previous ones.

Being aware of this confusion we want to stress that in our research although **we see economic growth as an important objective of the economic development we also recognize that it is not unique one.**

With regards to measuring economic development (and economic growth as one of its core objective) several propositions have already been made.

Baran (cited in Somashekar 2003) proposes measuring "economic growth or development as an increase over time in per capital output of material goods" (p. 4). Whereas experts from the World Bank (2014) and OECD (2014), simply propose using the increase of Gross National Product (GNP) per capita or Gross Domestic Product (GDP) per capita⁸ as the main indicator of economic development.

Although today GDP is often used as one of the most popular indicators to measure economic growth, for several decades a significant degree of criticism regarding its completeness has arisen from economists. The demand towards the change of measurement was affected by the wave of globalization, where under the changed socio-cultural environment economic growth started to be seen as something more than just an increase in income. GDP couldn't fully represent these new aspects of life and business (Economist 2014). Herewith some other concepts and measurement indicators, indices have appeared. Most of them are done on the level of countries, although some also exist on the regional or city level. One of them is a Human Development Index⁹, which has been developed by UNDP, Better Life Index¹⁰ from OECD or World Bank GINI Coefficient Index¹¹.

All these new indicators try to integrate aspects of business, happiness and human environment, which are more relevant at the present moment. However, **GDP and GDP per capita still remain the most common measurements for the economic growth.** The main reason is that they include the most relevant aspects of the economy, have a similar calculation methodology in many countries and regions of the world and thus makes it possible to use for comparison and generalization of cases and theories. We will also use **GDP, GDP per capita and their rates as main indicators of economic growth, thus keeping in mind the drawback that they contain** and herewith integrate other indicators in the analysis.

⁸ GDP (Gross domestic product) is "a measure of economic activity in a country. It is calculated by adding the total value of a country's annual output of goods and services." and "Adding income earned by domestic residents from their investments abroad, and subtracting income paid from the country to investors abroad, gives the country's gross national product (GNP)." Economist (2014)

⁹ Attempts to rank all countries on a scale from 0 (lowest human development) to 1 (highest human development) based on three goals or end products of development: longevity (...), knowledge (...) and standard of living (UNDP 2014)

¹⁰ The Index aims to involve citizens in this debate, and to empower them to become more informed and engaged in the policy-making process that shapes all our lives (OECD 2014)

¹¹ Gini index measures the extent to which the distribution of income or consumption expenditure among individuals or households within an economy deviates from a perfectly equal distribution, (World Bank 2014)

1.3. Factors influencing economic development

Despite the complexity of such notions as growth and economic development, specifying its definition and ways to measure it improves our understanding of what it is and what it can be. The next question, which arises at this point, is how economic development and its main object economic growth can be increased and improved.

Traditionally three core production factors are recognized, namely capital, labour and technological progress. At the same time they are not unique ones. Specialists from OECD (2009, p. 68) are convinced that economic growth is determined by numerous factors, both endogenous and exogenous, such as e.g. geography, demography, specialization, productivity, physical and human capital, infrastructure, innovation, etc. For example, Somashekar (2003, p. 9) in his works identifies the factors affecting growth in two groups, economic and non-economic. The Table 5 summarizes them.

Table 5 Factors influencing economic growth

Economic	Non-economic
<ul style="list-style-type: none">• Natural resources• Capital formation• Technological progress• Human resources• Population growth• Social overheads• Organisation• Transformation of traditional agricultural society	<ul style="list-style-type: none">• Political factor• Social and psychological factors• Education• Urbanisation• Religious factors

Source: Based on Somashekar (2003, p. 9)

These factors, apart from being categorized differently can also have various casual effects on economic growth under various conditions and in different periods of time. Over decades the study of the effects of the factors on the evolution of the territory has remained the most challenging task for economists. The main challenge is the complexity of the economic system as a whole and the tractability of the effects from the relations within the elements of the system. In order to understand the complexity and the effects of these interconnections economic models and theories are being developed, applied and modified. It is towards the understanding of these aspects the next part of the chapter is addressed.

2. Selected theories of regional economic development and growth

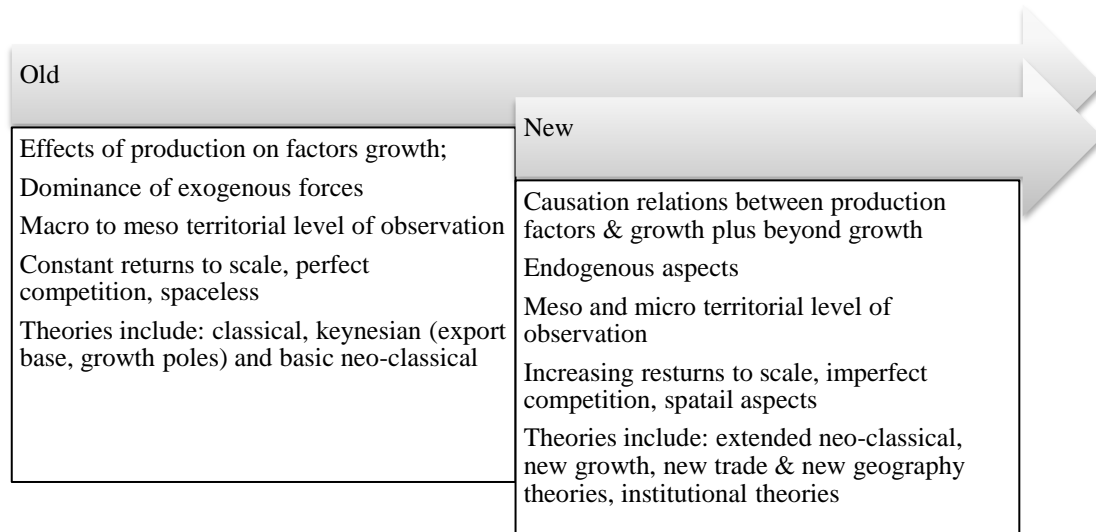
Theories, by having universal character, offer tools, methods and models, which not only help to analyze or realize the drivers of economic development, but also provide important recommendations for policy makers in terms of programs and strategy building for economic development all over the world (Parkin 2005).

As our prime concern relates to the regional level of economic development within which economic growth is seen as a core target, so our focus will remain in outlining existing theories and models. At the same time we keep in mind that growth is often not the only research interest of the economists, herewith each theory might also include a different aspect of development-related processes or issues, such as human development, welfare or competitiveness.

There exist many different models and theories. Each theoretical line is traditionally based on one core economic model or concept, which is then extended or accompanied by similar additional notions. At the same time within one theoretical line different aspects of economic relations can be discussed or omitted. This often results in loss distinctions and numerous overlapping between these models, which complicates the process of their categorization. The same appears in regard to the theories and concepts related to economic development.

Herewith e.g. Kleinewefers (2002, p. 1) in relation to economic growth suggests distinguishing the following core theories: Classical, Keynesian, Neo-classical, New Economic Geography, New Trade Theory, Institutional and theories focused on the role of innovation, knowledge and networks. Furthermore, they can also be grouped under two, more general categories, presented in the Graph 1 below. The main difference in theories belonging to the category “old” lies is their assumption of constant returns to scale, perfect competition and absence of space.

Graph 1 Core distinct characteristics of economic growth and development theories



Source: Author's development

All of the above mentioned theoretical lines have some common and distinct features in viewing the economic development/ growth and factors influencing them. There is supposedly a common ground between all these theories, which lies in the recognition (in different ways) of the predominant contribution of three core factors, such as capital, labour and technological progress on the growth.

The main distinctions appear primarily in the way of viewing and understanding the relations between them and the economic growth and development at the end. Furthermore, the majority of them have roots in the classical one, which is being developed primarily by Adam Smith and David Ricardo. At the same time Kleinewefers (2002) argues that the first theories are relatively easy in defining and setting their barriers of distinction, whereas the latest ones are considerably complex and include a broad set of approaches, models, analytical tools and concepts, which have multiple overlaps.

Subsequently, as mentioned, we are going to discuss in detail only selected theories closely related to regional economic growth. Moreover the main focus will be made on **neo-classical, endogenous, institutional and new economic geography concepts, as they are building the theoretical core for our further analytical model**. The presentation of the theories and models is mainly based on the following sources: Stimson et al. (2002), Parkin (2005), OECD (2009), Rainer (1996) and Harris (2008).

2.1. Classical growth models

One of the first perceptions and models in regard to economic growth, which now belongs to the category of the classical growth theory, has been developed mainly by Adam Smith, Thomas Robert Malthus and David Ricardo. They claimed that GDP growth is a temporary matter and thus the economic systems tend to converge. It is also assumed that an increase of the population, after GDP per capita reaches a subsistence level, can restrict growth. Such a productivity explosion happens due to conception of the “subsistence real wage rate”¹². The main driver of economic growth is technological progress. It happens through the investment in capital, which increases labour productivity. Herewith, no matter how advanced the technological progress is, the explosion of population will always appear and lead to the reduction of the GDP per capita.

At the same time the strong correlation between population and economic growth ceased to be argued. First of all it was identified that although the relation between population and growth exists, it is not direct one. Moreover economic development has a strong influence on the population, whereas population is more dependent on the opportunity costs of women’s time¹³. An additional effect on population is caused by an increase of life expectancy due to technological progress and improvement of life. Secondly, the issue of population increase has generally started to be less relevant around the 20th century, as its growth rates started to slow down.

One of the core elements of economic growth and an enhancer of technological progress and innovation was hold on to the division of labour, whose relevance was explicitly brought up in the work of Adam Smith “Wealth of Nations” (1776). Division of labour stimulates growth primarily through two ways. Firstly - through positively affecting the learning curve¹⁴ and in such technological and organizational performance; Secondly - through intensifying competitiveness and in such increasing effectiveness and innovation. Thus an important role should be given to the development of a certain legal framework influencing the above mentioned aspects.

¹² “When real wage is higher than the subsistence rate - the population will increase. However in rising populations occurs diminishing returns to labour (...), which then leads to reduction of productivity” (Parkin 2005, p. 588)

¹³ “A women’s wage rates increase and the job opportunities expand, the opportunity costs of having children increase. Faced with higher opportunity costs, families choose to have fewer children and the birth rate fall” (Parkin 2005, p. 589)

¹⁴ Reflects the connection between learning and experience

2.2. Keynesian models

The main economist, whose arguments and models have established the whole line of research and perception in after-war period, was John Maynard Keynes. Here theories and models in contrast to previous ones are more demand side driven (Pike et al. 2006). The models are built on the assumption of constant returns to scale, diminishing returns to factor production, free factor mobility and geographical diffusion of technology (Gardiner et al. 2006).

The research focus of the economists of this period was at the regional level. Under the term development they understand similar targeting as neo-classical ones, namely reduction of regional disparities (Pike et al. 2006). That is why a major part of these studies is focused on understanding and explaining regional divergence. Under their assumptions the regional disparities in development appear due to differences in the factors, particularly in capital, labour and technological development (Gardiner et al. 2006).

Under their perception convergence appears because low productivity regions catch up with high-productivity ones. Regional differences are determined by the rate of (exogenous) technological progress and by regional differences in the capital-labour growth rates (Gardiner et al. 2006). The assumptions belonging to this theoretical line have been widely researched by numerous economists and have produced a broad variety of different empirical results (Martin and Sunley 1998).

In regard to policy, Keynesian theory provides justification for state intervention, especially related to managing aggregated demand (Pike et al. 2006). They also deduce that public policies have the capacity to stimulate economic growth.

This theory faces some critics. Among the most notable ones (Pike et al. 2006) mentions over simplicity of its models, lack of attention on such region relevant factors as entrepreneurship or public policy activity. Additionally the models do not provide a systematic explanation of the determinants of demand for a region's export. Finally there is also no exact clarification on how growth and productivity are being influenced through division and specialization of labour and technical progress (Pike et al. 2006).

2.3. Export base theory

In this theory it is assumed that regional economies are built on: a) non-basic components, which exist to serve the needs of the local resident population, and b) basic components, which produce goods and services for consumption outside the local region. This is considered as an export base.

Here economic development occurs through the increase of the economic base (basic components) due to multiplying effects. It happens in the following way. Growth in export leads to a higher inflow into the local regional economy, hence generating new local consumption. This additional spending goes to the local suppliers and generates further increase in selling and later income flows again. This surplus creates growth of jobs, income, output and value added effect in local economy.

Regional growth herewith is determined by differences in export growth rates. This means that the development of the region depends more from outside, exogenous, factors rather than from inside ones. As such, in order to increase economic growth export should be supported. The competitiveness of the export sector on the international market influences its growth rates and through it economic development within the region. At the same time the strength of the regional export sector is also considered and is influenced by intermediate inputs and technology (Pike et al. 2006).

This theoretical concept also faces some critics. In the first instance the exogenous feature of regional exports sector is stressed. Secondly, the observation of the interregional demand is absent. Thirdly, the critic addresses the near absence of supply side from the observations in the models. Herewith investment in services is not considered, however the institutions on services may have a positive influence on the attractiveness for the capital inflow. Finally due to the limitation in data availability, there is also little empirical evidence provided in favor of these arguments.

2.4. Neo-classical growth model

The neo-classical growth model nowadays is considered to be one of the grounding ones, especially in terms of determining the factors influencing the economic growth. It is primarily

footed in the Solow model¹⁵ (1956, 1957). With time it has been extended by numerous other models and arguments to be consistent with later changes in the economic system.

Here regions are seen as subnational territorial units. Referring to Pike et al. (2006) growth is directly related with competitiveness of a specific region to other regions.

The central argument of the neo-classical theory revolves around three main factors, capital stock, labour force and technological progress, which accumulates to determine economic growth (OECD 2009; Solow 1956, 1957; Swan 1956). As such, growth is measured as an expansion of productive capacity, which is illustrated by extend to what the region is attracting mainly capital and labour. Output growth per worker is a measurement of productivity and reveals how efficiently resources are being used within the economy (Pike et al. (2006). Capital grows faster than labour, which can also be mainly externally generated (Klenewefers 2002).

Neo-classics also admit that growth can be affected by inter-sectorial shifts. Furthermore, they point out that growth is solely determined by input factors, herewith, neither spatial nor historic events have reflection in the growth pattern of the region. Growth is possible only in the short term, thus, being dependent on homogeneity and linearity (lineal production function) of the production factor, the price mechanism and the process of capital accumulation, leads to convergence and eliminating inter-regional differences over time. The main reason is short term improvement in productivity, which is caused by the capacity of the production factors to be substitutable and flexible in price. Central in theory: beyond a specific level of input, further input will result only through decreases in the additional marginal output of the product per unit. These effects are similar on national as well as on regional level.

That is why territorial disparities are also the concern of the neo-classical theories. The main reason is the variations in the growth of the main factors of production. So the growth should be same in regions with similar production factors (Genosko 2011). At the same time regional disparities are only temporary since in long run spatial inequalities set in motion the self-correcting movement in prices, wages, capital and labour to underpin the eventual convergence of economic and social conditions between regions (Martin, Sunley 1998). Neo-

¹⁵ It is also known as Solow-Swan model. It tries to explain economic growth based on three main factors: capital, labor or population and technological progress. At the same time in Pike et al. (2006) it is mentioned that the first inventor of neo-classical assumptions should be seen Frank Ramsey from Cambridge University

classical economists classify two different types of convergence (Pike et al. 2006, pp. 62–69): a) Conditional – movement towards a steady state growth rate resulting in constant capita incomes, consumption levels and capital/ labour ratios, b) Absolute – when the growth model parameters are equal. Thus convergence seems not always to appear - which is also a research concern of the neo-classic theory.

The main driver of growth along other production factors in the long term is technological progress, as innovation and technology can influence the productivity. Theory considers that knowledge has no limits and is equally available in all places. Herewith, the capital-rich territories should grow faster than capital poor one, as the growth rate caused by technological progress is similar all over (Kleinewefers 2002).

Neo-classicists also tend to recognize in the short and middle term the influence of investment/ savings on the economic growth (Kleinewefers 2002). This happens through their correlation with technological progress. The real GDP per person growth occurs because the technological change includes a level of saving and investment, which further makes capital per hour of labour grow (Parkin 2005). That is why the relation between economic growth and technological progress is seen as a one-way street, because based on the neoclassical theory – economic growth doesn't influence technological development. Although technological progress is a necessary driving element of the growth per capital, neo-classical economists fail to explain it. That is why the cause of technological progress is considered as chance. Technology is considered to be exogenous (Barro 1997) and was excluded from the model by calculations (OECD 2009).

The models of economic growth, which explain routes to equilibrium, are developed under the conditions of perfect competition and decreasing returns to capital (Solow 1956, 1957). Furthermore the equilibrium within the economic system itself is seen as a static one (Pike et al. 2006).

Within the neo-classical perception of economic growth and development public interventions can take place, thus they are not mandatory as convergence will happen anyway due to the causal mechanisms of the growth model that move regions towards equilibrium (Pike et al. 2006). This is a representation of a free-market vision in terms of policy action. Thus when intervention takes place it should increase the process of convergence. The target for action should be the correction of market failure.

Mentioning possible areas for policy action, there is almost unity in terms of policy targeting education, especially at the primary and secondary level. At the same time there is a big discussion on supporting innovation. The problem arises mainly from the difficulties in explaining the sources of technological progress in the model (Klenewefers 2002). Considering that the other two production factors are difficult to explain and accumulate, the transfer of additional capital can be considered as a policy tool for the transformation or improvement of economic growth (here it has some common ground with Keynesian theories) (Klenewefers 2002). This aspect is later strongly criticized, as not the lack of capital, rather the knowledge is observed as the main reason of growth differences (Easterly, Levine 2001). However, it is also argued that the spread of knowledge is not equal and is predominantly present in capital intensive rather than in capital poor territories.

With time the traditional model has also started to be highly criticized primarily due to incoherence with the existing system developments. This led to the creation of new arguments, which have been grouped under either extended neo-classical or new growth models. This led to further evolution of the neo-classical theory over time.

Several core assumptions of the neo-classical models, which have stayed the same and have been strongly criticized, are (Pike et al. 2006; Genosko 2011):

- Perfect accessibility and mobility of factors of production across and between regions
- Perfect market competition and information about factor prices and the economically rational choices of buyers and suppliers in the response to market signals
- Economic returns to scale are constant
- Firms look to the most profitable locations and labour seeks the highest wages
- Based on the static economic system

One of the main extensions of the traditional neo-classical model was the inclusion of concept developed from R&D theories (Barro and Sala-i-Martin 1995; OECD 2009). The influence of human labour on growth was also one of the extensions of the original neo-classical assumptions. It came out during the search for solutions to model the technology, which was later seen as a result of learning by doing (Arrow 1962). Based on some sources (OECD 2009; Stimson et al. 2002; Parkin 2005), other critics refer to their support of global convergence. This happens due to the assumption that all countries can access the same technologies, which at the end would lead to the establishment of the same income rates and

growth. However based on the productivity curve it seems that even if convergence appears, it is very slow, and the difference in the growth rate between more and less developed territories is not significantly diverse (Kleinewefers 2002). Therefore, won't be imminent for all countries.

2.5. Endogenous growth theory

Endogenous theory is constructing a new line within theories of economic developments by seeking to observe and justify endogenous elements of economic development of the territory. The main assumptions, although revolving around the core principles of neo-classical approach, are dissatisfied with external or exogenous treatment of factors of production (Pike et al. 2006). This brings their research focus toward the endogenous treatment of market mechanisms, especially of technological progress and innovation. The main developer is Paul Romer (1986, 1990) from Stanford University. Among other researchers Barro and Sala-i-Martin (1990), Grossman and Helpman (1991) are also worth mentioning. Furthermore, in contrast to neo-classical theory they see knowledge as a public good¹⁶ due to its non-competitive character and the inventions developed by one company have positive influence on another one (Genosko 2011).

There is also an attempt to introduce increasing returns into the neo-classical production function to determine long-term growth rates within the model of economic growth (Pike et al. 2006). Endogenous growth is possible through an increase of productivity, which happens by unlimited accumulation of production factors due to an introduction of increased returns of scale.

Similar to the neo-classical approach, in the endogenous approach growth is strongly affected by capital accumulation. Furthermore, in terms of growth it highlights the importance of such production factors as knowledge and human capital. In addition it also places importance on place-based characteristics, technological progress and innovation (OECD 2009; Gardiner et al. 2006). Representatives of endogenous theories don't see mechanisms, which would stop growth, as they assume that there will always be incentives to innovate and herewith receive higher profits.

¹⁶ Public goods are goods and services, which are accessible to other, meaning that nobody can be excluded from using it. Discoveries turn to be a public capital good, when they loose their profits while being replaced by the another discovery

In reference to OECD (2009) in endogenous models the economic growth is mainly driven by the stock of the human capital. The question of the importance of human capital is also connected with its influence on productivity increase through positive spillovers. The bigger it is the higher chances that the territory can be innovative, increase economic growth and prompt to catch up with more advanced ones. Alternatively the human capital can also be externally accumulated and in this way increase growth rates. Basically the difference in growth is a difference in human capital stock.

Another contribution of the theory is the introduction of the R&D concepts and imperfect competition. It was integrated in the modeling. In addition to human capital, attention was also on focused on technological change and innovation and by seeing the relation to economic growth as two sided (both causing and effecting) (Pike et al. 2006).

As such representatives of endogenous theory explicitly seek to explain causes of technological progress. Therefore technological progress comes from externalities, which can be generated by capital investment or human capital and “the learning by doing¹⁷”, spillovers. As such technological progress is not a coincidental effect of other activities, but rather the outcome of deliberate choices and actions and is determined by the human desire to look for profit. Due to competition profits are squeezed and thus in order to increase profits the people are constantly looking for lower-cost methods of production or for a better product, which can be achieved through innovation.

Another aspect within technological progress is connected with the human ability to innovate, which can be reflected as knowledge, which is intended to be integrated into the growth model. For this, the number of workers in knowledge producing industries, existing stock of knowledge and technological transfer, are used in order to measure technological progress and innovation in growth models (Gardiner et al. 2006; Pike et al. 2006).

Based on the endogenous theory both divergence and convergence can take place. Convergence can be resulted from the un-proportional growth in peripheral regions due to imitation of innovation. Furthermore, by attracting more labour forces rich regions can produce negative externalities due to urbanization and as a consequence reduce economic growth. Finally the sharing of knowledge may also lead to the decline of comparative advantages and economic decrease. On the other side the causes for divergence might come

¹⁷ Increase of productivity can be obtained more through self-improvement and practice, rather than innovation

from the sector specific knowledge, which appears in the regions, reduced transaction costs along the inter-regional trade of intermediate goods or sufficient offer of public goods. Disembodied technological progress contributes to regional growth disparities independently of capital stock (Pike et al. 2006).

Within endogenous models economic development is viewed as a reduction of disparities among the territories. The focus is made on sub-national and regional level.

The main input for the public policies is provided by showing that the conditions for economic development can lay within localities and regions (Pike et al. 2006). Furthermore, the sub-level of regional development is significant for strengthening the national one especially as there is a possibility for underdeveloped regions to contribute to the national economy. Moreover it is possible to redirect growth from growing to lagging regions. Finally, endogenous theory denies the possibility of market mechanism to regulate differences among the regions or territories, herewith once again justifying the right for public intervention into the market.

The central critical argument toward endogenous theories is partially similar to neo-classical one. First of all it is connected to its focusing on the supply side and giving only little attention to the demand one (Pike et al. 2006). Furthermore, it addresses neither historical change nor institutional context of the economic growth. Beyond that the models don't pay attention to the structural problems in the less-developed regions. Finally, there is still limited empirical evidence in respect to the way increasing returns evolve within different industries and locations.

2.6. New economic geography

The models grouped under new economic geography, further denoted as NEG, have evolved on the basis of the classical ones, labeled as just economic geography. Its main focus is on the study of uneven local and regional development and its contribution to national economic prosperity and trade (OECD 2009). NEG has given fresh insights into the concentration and dispersion of economic activity. (Genosko 2011) views endogenous theory as a "sister genre" of NEG. Thus in order to understand it, we will give a brief insight in perceptions of traditional economic geography models.

Traditional economic geography was concerned with observing the role of regions in dividing the trading performance of different industries at the state level (Pike et al. 2006). Here the concept of economic development was also broadened towards seeing it as an increase of income and prosperity through enhanced regional and national competitiveness.

The main critical points in regard to the original economic geography models were based on unrealistic assumptions like perfect information, economically rational individuals and profit maximizing firms (Pike et al. 2006). Herewith by strong simplification of the assumptions in the mathematical modelling, the results turn to be less reliable. Furthermore, the approach tends to neglect people and places in their real historical, social and cultural settings (Martin, Sunley 2002). Additionally, regions were seen as recipients of benefits, rather than being a motor of economic activities itself (Scott 1998). The models, which were eager to reduce the limitations and introduce additional aspect the original concepts, have been grouped under the NEG.

The NEG has not only extended the original models of economic geographers. The core introduction of NEG to the theories of economic development, growth and trade together with the broadening of the new trade theory (NTT) by explaining the reasons for geographic specialization, clustering (Harris 2008, p. 12), highlighted the importance of “space” for the enhancement of welfare and growth (Krugman 1991, Krugman and Venables 1990, 1995, Baldwin et.al. 2003, Genosko 2011). The second core introduction of the NEG model in comparison to previous groups of theories (neo-classical and endogenous) is the appearance of the scale effect.

In contrast to traditional ones and similar to NEG, NTT is also concerned with development of spatial structures by considering the increasing returns to scale, monopolistic competitiveness and intra-industrial trade. The last element (intra-industry/sectoral trade) is especially possible to introduce into the models due to application of non-perfect competition.

The core research line within the NTT is their observation of the relation between regional specialization and trade, which are inter-effected (Martin and Sunley 1996). Specialization is a result of increasing returns to scale – the Marshallian externalities of market and labour pooling, availability of special supply and technological knowledge spillovers - which appear at regional rather than national level (Pike et al. 2006; Krugman 1995) and are not perfectly mobile (in contrast to the neo-classical view). Geographic concentration effects the

economics of firms and industries and herewith the regions and states as well (Krugman 1991).

Based on Krugman and Venables (1990) trade is history dependent. This means that the established patterns of specialization gets locked in by the cumulative gains from the trade. These patterns once established, can be strongly persistent over time, and determine the regional development and growth over time. Regional development is likely to be characterized by unevenness (Krugman 1995). Divergence of output and multiple equilibriums are likely (in contrast to the idea of long term convergence offered by neo-classical theories) (Pike et al. 2006)

New economic geography, similar to the NTT also uses the following assumption in the basis of its models, namely imperfect competition, increasing returns to scale and imperfect information (OECD 2009).

First of all the extension of NTT was possible due to considering labour as a mobile element within the model. The “home market effect¹⁸” elaborated by NTT has been turned to be endogenous and as such allowing for an increase in productivity through allocation of firms and labour. Furthermore, in combination with falling trading costs and increasing returns to scale this should lead to more productivity and an enhanced process of cumulative causation (Harris 2008).

NEG basically goes deeper and places at the center of its discussion the desire to explain specialization and the will of companies to aggregate in the same places, creating agglomerations or clusters (OECD 2009). Referring to OECD (2009) the main cause of agglomeration economies is the increasing returns to scale, which are beneficial for firms. It can happen due to existing natural advantages, monopolistic protection, political reasons or any other reason. Gardiner et al. (2006) also argues that the existence of localized spillovers may be due to locally embedded socio-cultural, political and institutional structures. Returns to scale external to firms are the main incentive for workers and firms to agglomerate. Based on Duranton and Puga (2004, cited in OECD 2009) following elements also could cause agglomeration. These are gains for the companies, which would influence their choice to situate close to each other are due to several factors. Firstly sharing which is reflected through having access to specific facilities, existence of broader number and variety of the suppliers,

¹⁸ Company chooses its location with the higher domestic demand in order to minimize transportation costs

narrow specialization and sharing risks. Secondly matching conditions, due to which expected quality of workers is improved, probability of finding specific workers is increased and delays are alleviated. Finally it is the facilitation of learning, due to facilitated access to diffusion and accumulation of knowledge.

Furthermore, by the NEG models two reciprocal forces appear and lead to (de)agglomeration. They are centripetal (enhancing) and (redundant) forces, reflected by migration of labour, forward & backward linkages and/ or elasticity of labour supply (OECD 2009). The influence on the strength of enhancing or discouraging forces has been argued to come from differences in transportation costs. Krugman (1991) described the situation with transport costs in the following ways:

- In the case of high transport costs the production is divided between two locations
- The reduction of transport costs leads to 5 possible options of equilibrium (three of them could be stable)
- Further drop in transport costs forces production to allocate in one place

In such the dispersion of economic activities is possible depending on the interaction of two sets of opposing forces underlying levels of transport costs (OECD 2009). Thus as Krugman (1991) predicts such effects of transport costs can lead to a core-periphery equilibrium pattern of productivity. Previously existing studies, especially Polarization theory and growth pole (further in Chapter 1), has shown similar correlations, especially in regard to transport costs. Herewith economic growth and development of the region is connected from both sides with the agglomeration and clustering, which are strongly resulted by transport costs. In particularly as mentioned by Gardiner et al. (2006) growth happens as a result of the same forces, which are attractive to the companies and leads to their agglomeration, namely localized increasing returns arising from specialized economic activity, external economies and endogenous effects such localized specialization generates.

Regarding the policy NEG supports state interventions, especially due to the need to correct market failures. However these interventions are not unlimited and should take place under particular conditions. Public policies can effectively stimulate growth, but at the same time they can also lead to increase of disparities between territories (Genosko 2011).

There are some key policy recommendations, which can also be driven from the models of **NTT**. First of all, it gives space for strategic trade policy for the protection of a particular

sector. This is especially possible through non-tariff barriers. Furthermore, the selection of industrial specialization is particularly important. First of all, while once established patterns in the regions tend to be locked and secondly, there is a risk in establishing an inadequate level of specialization. Although specialization provides externalities and potential for productivity and output growth, the main concern is connected with possible regional instability and structural changes through over-concentration in a narrow range of industries. Although strong regional diversification may not be able to offer dynamic externalities, it can protect the region from structural crises and boost export growth and productivity (Pike et al. 2006).

NEG models have also fallen under some criticism mainly with respect to their superficial understanding of technological progress. In particular, the relevance of the factors and their influence on technological progress are only basically explained. Furthermore, in reference to OECD (2009) NEG doesn't specify a clear understanding of the links between economic concentration and growth.

2.7. Agglomeration and location related theories

2.7.1. Growth pole and polarization theories

Growth pole theory arose from viewing the technical progress as an endogenous effect. Here economists accept that the process of capital accumulation and free trade do not always lead to the re-balancing between regions. But the model also shows the possibility for both concentration and divergence. The father of the theories is considered to be French economist Francois Perroux (1950).

Growth pole theory stresses that the production factors are non-homogenous, markets imperfect and price mechanism is disturbed by externalities and economics of scale. The growth takes place in specific sectors or areas, which are then perceived as growth poles. The growth of the sector happens due to cumulative causation, namely through potential inter-industry linkages (Hirschman 1958; cited in Genosko 2011). Under such conditions the sector, which is considered as a dominant one should lead to the growth of the region. The growth trends will be bigger, the bigger the sector is within the economy or the closer it cooperates with other actors in the society (Genosko 2011). Thus strategy for regional development should be focused on the enhancement of a particular sector.

The main critics of the theory are connected with assumption of the unevenness in spreading the benefits from the successful implemented strategy. The core of the problem is that, first of all the benefits and the advantages are going into the selected sector (growth pole) and only later spread among the rest of the economy. As such many other industries and regions might become impatient. Therefore, this concept, despite being well backed by the argument on the “spread effect¹⁹” is more often used for targeted development strategies such as, e.g. picking industry winners. Also it sometimes intersects with some later concepts of networked or multi-centered polis.

2.7.2. Location theory

The main objective of this theory is to explain factors that play a key role by companies’ decision regarding their allocation. These concepts are important for economic growth as the realization of these factors will assist territories in creating them and in attracting more companies. Hoover (1948) and Smith (1776) are considered to be the classics of the location theory.

In the perception of these economists location is been seen as a place where the relationship between different units is established. Herewith while speaking about industrial location, the spatial distribution in relation to the society is to be considered.

The argument of the theory referring to Pike et al. (2006) is the following: companies select location based on their self-interests, namely the desire to minimize costs and maximize the profits. Transport costs, labour costs, other product costs, scale of operation, and agglomeration effects are the ones that strongly vary and influence on the decision-making. The location theory also provides a lot of practical information for building a regional development strategy.

2.7.3. Central place theory

The builder of the central place theory is considered to be Christaller (1933). In his work he tracks the rules that influence size, number and distribution of core centers. Central place is an urban settlement. Thus the hierarchy level of central places can be determined by the rank of the goods and services, and this relationship is direct. The higher rank of products and

¹⁹ Growth in main industry (or center) through prices, innovation or investment is transmitted to the rest sectors (periphery)

services is determined by those which are more expensive and infrequently consumed (Genosko 2011; Pike et al. 2006).

The model's conditions are an isotropic place with homogenous density of people, purchase power and consumer preferences. The later representative of the theory Lösch (1940) developed an alternative model with variety in the density of the purchasing power.

The main benefit of the central place theory for the regional development lies in the information on the way urban location patterns together with its size and industrial character influence the economic growth (Stimson et al. 2002).

2.8. Institutional theory

The theories and concepts belonging to the category of institutional in reference to Pike et al. (2006) highlight the difference of available local factors and assets, which are particularly characteristic for selected location, reflected through institutions. The concepts here are also often split into old and new ones. The new institutional theories in order to develop a more quantitative oriented framework for their argumentation adopt assumptions of neoclassical models.

Under institutions on the macro level “the rules of game in a society” are seen (North 1990). Here is the political, social or legal grounds for economic production are meant. The micro level is represented by the institutional arrangement form of contracting between the agents on the market (Williamson 2000). Institutions matter as they shape the relations between the agents and as a result influence their economic behavior and shape the historic development of the territory. These economic relationships leading to the definition of institutions can be formal and informal (Pike et al. 2006). Under formal ones economist representing this theory see organizations and administrative systems, while others are viewed as traditions or customs. The established institutions impact differently on the pattern of regional economic development. This happens through the capacity of institutions to affect the production factors, especially technological progress and capital. The main influence based on institutional theory appears through the costs of exchange and production (North 1990). This influence happens under the assumption of self-seeking individuals by taking their economic decisions. At the same time not only institutions influence economic growth. This reaction can be also reverse, meaning that the economic performance can also lead to institutional

change (Kherallah, Kirsten 2001). Above that, institutional influence can also negative affect for economic growth.

The cause of the market failure and herewith the target of the public policy under the perception of this theory are institutions in all their recognized formal and informal structures. The main contribution of this theory is in its potential to integrate institutions into the economic models and analysis. A further significant feature of these models is their intention to integrate other sciences into the explanation and understanding of different patterns of economic behavior (North 1990).

3. Summary

The review of the theories and notions of economic development and growth pointed out that the economic environment together with factors influencing growth and economic development steadily changes. This leads economists to follow regularly the evolution of economic, technological, political and even social conditions of our environment and through analyzing them, derive arguments on factors and reasons leading towards economic change. Analyzing the processes of inter-dependences between different factors of production significantly contributes to our understanding of ways to improve or enhance the desired targets of our economic development, the perception of which also changes over time.

After reviewing arguments on what **regional economic development** is we have defined it as **application of economic processes, factors and resources in a region that results in economic growth and makes the local actors competitive with the demands of the global market over a long period of time**. Seeing growth as an object of economic development was our deliberate choice as, despite other relevant concepts, we still see growth as the most desirable one and as a pre-condition for further changes, e.g. sustainable development, happiness, etc. Furthermore, it remains the principle issue for developed countries and regions, which have been chosen for our empirical case study analysis.

At the same time we are aware that the perception of its nature changes not only over time but also within different territories and is closely related with current social needs. However, despite differences, there are still common aspects, which can be generalized and applied in numerous locations of the world. This is the core aim of existing economic thoughts, models and theories. Table 6 below summarizes the key assumptions of the aforementioned theories.

Table 6 Selected economic growth theories

Theories	Key summary points
Classical	<ul style="list-style-type: none"> - Growth is permanent - Convergence - Main growth driver is technological progress, which through capital investment increases productivity - Division of labour
Keynesian	<ul style="list-style-type: none"> - Demand side driven - Development- reduction of disparities - Convergence - Capital, labour and technological development are one of the main factors
Export-based	<ul style="list-style-type: none"> - Demand side driven - Growth is determined by export - Exogenous approach towards export
Neo-classical	<ul style="list-style-type: none"> - Strong supply side view on the effects of the growth - Economic growth is determined by accumulation of capital (generated in & outside), labour force & technological progress (outside) - Focus & key driving role for economic growth is related to technological progress, which comes out in long term - Exogenous theory, mainly due to difficulties in explaining the sources of technological progress & considering it exogenous - Short term economic growth both on regional and national level, herewith convergence - Perfect mobility, competition, information & accessibility of the production factors
Endogenous	<ul style="list-style-type: none"> - Stick to core principles of neo-classics with endogenous treatment of some factors of production - Economic development is reduction of disparities - Driver of economic growth, technological progress is under particularly strong research focus - Growth is determined by place based characteristics, which are knowledge, human capital and innovation - Accumulation of working production industries is applied as measurement variable - Regional convergence should appear
New Economic Geography	<ul style="list-style-type: none"> - Integration of space into the models - Imperfect competition, increasing returns to scale and imperfect information - Agglomeration contribute to the regional development and growth - Agglomerations & growth can be determined by external effects - Transportation costs effect the allocation of economic actors - Both, coherence and disparities can appear - Policy interventions can take place - Production factors have endogenous element
Growth-pole	<ul style="list-style-type: none"> - Technical progress seen as an endogenous - Concentration and divergence - Development through enhancement of a particular sector, which forms so called growth pole
Location	<ul style="list-style-type: none"> - Studies the reasons influencing the way of distribution of economic activity - Actors within the territory are guided through their own interest
Central place	<ul style="list-style-type: none"> - Products & services have certain ranks and based on these they are distributed within urban location, this influence the pattern of companies allocation
Institutional	<ul style="list-style-type: none"> - Institutions (formal & informal) result in different growth patterns - Effect on growth can be circular an reverse - Self-seeking individual - Prim influence on production costs

Source: Author's development based on reviewed sources

The review of the growth theories forms a solid but not sufficient informational base in order to develop the framework for the empirical part of our research. From the above mentioned theories several are of particular interest for our further studies. In particular, theories, especially related to agglomeration economies have identified a positive correlation between regional development and established agglomerations, clusters or networks. These relatively new notions can bring significant benefits to improve regional development and enhance national competitiveness. Cluster concept is to be addressed in the next Chapter 2.

CHAPTER 2 INSIGHTS IN CLUSTERS AND CLUSTER THEORY

In the previous chapters the importance of sub-national and regional levels in generating countries' economic strengths has been stressed (Shearman 1997; Storper 1997; Porter 1998b; Scott 1998; Krugman 1991; Fujita et al. 1999; Baldwin et al. 2003; Morgan 1997; Pike 2007; Benner 2012). Furthermore, we reviewed the key theories dealing with promotion of regional economic development. Along with traditionally observed factors such as human resources, technological progress or capital, increasing attention has been given to industrial agglomerations or clusters. These emerged economic structures have been argued to have significant advantages not only for local firms but also for the well-being increase of the whole region (Pitelis et al 2006; Karlsson 2007; Maskell and Kebir 2005). Here we aim to address these issues in further detail. First of all we will present different typologies for various notions of agglomerations. It will be followed up by a broad review of the developed theoretical concepts around cluster relevant issues. Finally we will summarize with the definition of cluster, its categorization and nomination of benefits for the companies' and regional level.

1. Cluster theory from industrial districts to learning regions

The first reference to agglomerations, industrial districts, etc. is traditionally attributed to Alfred Marshall (1882), who described it as a sensed "industrial atmosphere" in "industrial districts" of British cities. A renewed interest was sparked in the 1980s in the context of experiences in the Emilia Romagna region that is often referred as a Third Italy (Piore and Sabel 1984; Becattini 1991; Asheim 2001; Panizza 2002; Isbasoiu 2006). Since then different streams and theoretical concepts explaining such spatial concentration have been developed. For example, in California Allen Scott (1998) highlighted the rise of new industrial spaces, while others have preferred to talk about industrial complex (Czamanski and Augusto 1979), socio-territorial industrial system (Courlet and Pecqueur 1991), innovative milieu (Camagni 1995), local production systems (Crouch 2002), local high-tech milieus (Keeble and Wilkinson 2000), local and regional innovation systems (Asheim and Gertler 2005; Cooke and Morgan 1998), or learning regions (Asheim 1996, 2001; Morgan 1997). In Table 7 several typologies of agglomeration related types are presented.

Table 7 Categorizing different types of agglomerations

Researcher	Type	Description
Malmberg, Solvell, Zander (1996) in Boja (2011, p. 36)	Urban agglomerations	Typology is developed based on the type of the field the firms come from and the form of innovativeness or creativity. Herewith, they consider that industrial districts and clusters definition to be develop based on having firms from same field, thus the first one is more focused on economic efficiency and creativity, whereas the last one on the innovation.
	Innovation agglomerations	
	Industrial districts	
	Clusters	
Linzenberger (2007, p. 156)	Regional cluster=industrial districts	First level in the hierarchial structure, Konzentration von den Unternehmen; innerhalb desselben oder verwandten Wirtschaftszweige in einem begrenzten geographischen Gebiet
	Regional innovation network	Unternehmen beginnen mit ein ander zu kooperieren; das über marktwirtschaftliche Austauschbeziehungen hinausgeht
	Regional innovation system	Co-operations between companies and other institutions, R&D establishment, technology centers, unions, banks, political institutions
Blien, Maier (2008, p. 3f)	Pure agglomeration	Geographical concentration is important; limited case, which is often not regarded as cluster; tracked back to arguments introduced by Alfred Marshall: labour market pooling, use of non-traded inputs, and knowledge spillovers between firms
	Industrial complex	Geographical concentration is important; to economize on transaction costs and to satisfy the demands of just-in-time production of spatial concentration more "organized" nature
	Social network	Geographical concentration is important; more informal nature normally not as asymmetrical as are relationships between firms of an industrial district; the most modern type of clusters; helps firms to save transaction costs; it facilitates finding solutions on all kinds of difficult technological problems by moving along the connections between network nodes

Source: Author's development based on the referred sources

Indeed there are numerous ways of categorizing agglomerations, networks, clusters or innovation spaces. In order to get a better grasp of the forces that cause their building and growth, we will review the main research lines addressing these issues in the following parts of the chapter. It starts with more traditional arguments that are based on the cost minimization strategy. After the massive influence of globalization on the economic production and organizational structure of companies, the focus was shifted to the importance of knowledge.

1.1. Marschall's industrial districts

Marshall (1982) is the first economist who observed and tried to explain spatial agglomerations, which he named as industrial district. He emphasized that these districts have a special industrial atmosphere, which drives companies to locate there. The observations

were made based on the research of the industrial districts in Britain (Sheffield, steel industry) (Mackinnon, Cumbers 2007; Benner 2012, p. 11). Marshall (1982) stated that these agglomerations represented regions, which were very creative and dynamic. They consisted of companies from similar or interconnected sectors situated close to each other, and where identified several factors would influenced such firms' location. Based on his works these externalities arose primarily form the following three reasons:

- **Availability of intermediate and subsidiary industries.** This refers to the development of close links between manufacturers and suppliers of particular components and services. This helps both parties reduce search, risk and transportation costs
- **Pool of skilled labor in specific industrial field.** For companies this means easy access to skilled labor workers, who have knowledge of a specific local industry, and for workers it gives the possibility to find suitable employment. As such both sides can reduce search costs
- **Environment with additional collective resources** (e.g. transport, education). This may include specific transport, communication or education services, which are common but have a specific thematic or industrial focus, and are accessible to all actors in the area. These common facilities also serve to reduce different costs depending on the type of resource offered

These advantages and factors represent so called “local industrial atmosphere”, by which Marshall (1982) meant shared knowledge about how to do things, common business practices, tacit knowledge, and a supportive social and institutional environment (Asheim et al. 2006). These factors, through producing externalities, create cost advantages which can't be created by the firm itself. Thus the benefits arising from these externalities are attractive to firms and enforce them to concentrate in specific locations, creating agglomeration. They are called externalities due to their location outside of the companies inside area. Apart from externalities, which are consequently called as localization advantages of the agglomeration, there are also urbanization advantages, which can also lead to the creation of clusters on (Mackinnon, Cumbers 2007). Furthermore, Marshall (1982) agreed that there are also other factors that lead to the localization of industries. Among them physical conditions (e.g. climate, easy access by land and water) are the ones, which are also worth extra mention.

Despite not having considered the social relation between actors within the agglomeration (Boja 2011), the Marshall's factors leading to industry and regions specific externalities have been preserved the fundamental rationale for agglomeration (Mackinnon, Cumbers 2007).

1.2. Extending Marshall's agglomeration factors

After Marshall (1982) numerous studies analyzing the concept of industrial districts have appeared. Among several of the prominent ones were Italian economists - Giacomo Becattini and Sebastiano Brusco. Both of them have done a broad range of empirical research on the bases of the region in the north-central part of Italy, which later has been called as the "Third Italy" (Kraft 2006). The outcomes of their studies have shown significant results on the existing benefits for firms within allocation in these industrial districts (regions).

Regions and not the agglomeration centers are at the heart of their research. Referring to Zeitlin (1992) this focus is one of the main differences to Marshall's works. Herewith these researchers try to specify the characteristics certain territories include a) in order to get the category of industrial districts and b) in order attract more and more companies. Although, up to now it is still an open issue, several core conditions have been identified (Kraft 2006, p. 19):

- **Flexible specialization** – which comes from the existence of horizontal and vertical allocation of SMEs. This leads to a high level of work division and specialization and furthermore, to faster adaptation to market changes
- **Social embedding** – which is represented by having strong ties with the history and peculiar characteristics of the regions, this results in the bringing up of the same culture and traditions. This creates better understanding and trust among business units. Furthermore, it can also minimize risks due to their sharing
- **Cooperation and competition** – which eases the search of the partners due to increased number of companies in similar or relative industries, at the same time also leaving the place for competition. This should develop transparency, rotation of workers and strengthen innovativeness of the company

Further advantages such as better conditions for obtaining credit, easiness by the common presence on the new markets, increase of the export quote, sharing of R&D facilities, etc., arising from the allocation in such industrial districts have also been noted.

However, criticism of the validity and reliability of the selected variables, based on Staber and Morrison (1999, cited in Kraft 2006) as well as concentration of the studies on only mature phase of the industrial districts is also worth adding. This means that studies do not explain why and how do industrial districts or agglomerations appear. Despite that, this concept has the broadest empirical evidence and statistic confirmation of arising benefits.

1.3. Innovation and trust in the creative /innovative milieus

After a while due to intensive internationalization the competition between companies changed from being based on price to quality. More than ever the product / service started to be innovation and learning driven (Mackinnon, Cumbers 2007). In 1980 the research group “Groupe de Recherche Européen sur les Milieus innovateurs” (GREMI School) started to discuss knowledge enhancing agglomeration, which was called “innovative milieu”. They stressed the importance of socio-institutional aspects for economic activities and emphasized the significance of regional context for the enhancement of innovation and interaction between innovative economic actors (Benner 2012). Although here the issue of proximity is very important, Genosko (1996) sees the concept of innovation milieu more as a cultural rather than geographical approach.

In reference to Genosko (1996) innovation in innovative milieu is a collective process, which is based on the division of labour among big and small companies, private and public research and education institutions, suppliers and supporting organizations. Core features of innovative milieu in reference to Schätzl (2001, p. 231 - 232) are:

- **Formal and informal networks** among numerous regional actors, such as companies, NGOs, government, enable more connected trade, collective learning, and reduce risks, especially at the time of the technological changes. As a result, new solutions, synergy effects and reduced transaction costs can arise
- **Regional enclosing of networks** is decisive for the innovative dynamics. Here face to face contacts, mobilization of interregional human capital, responsible cooperation, flexible supply relations and cooperation between economy and policy actors play an important role for the development of agglomeration
- **Actors’ identification** with their own region, which stands for the feeling of belonging through shared cultural values. Due to this developed spirit the territory is able to strengthen its inside and outside positioning. The first is possible through trust

and cooperation building and the latter is reflected in a strong and clear external picture

In addition to the above mentioned advantages, there is a number of others, which are indicated by Genosko (1996), namely better market access, specialization and with them connected know-how advantages, cost reduction based on the learning and reduction of fixed costs through sharing some core research institutions, positive effects on management, reputation and internationalization of negative externalities.

One significant contribution which has been brought by the studies within GREMI School lies in the acknowledgement of non-economic, social or cultural, factors. Although Marshall (1982) seemed to also have agreed on this point, he never mentioned it explicitly (Morgan 1997). Here these factors are seen as the combination of functional and territorial logic, where the social factor, so called tacit knowledge, plays a central role. The way it develops can not only determine the evolution of the network but also has a strong influence on the locations growth (Bathelt et al. 2004; Blöcker 2009). Finally the main difference of innovation milieus to Marshall's industrial districts was not only in acknowledgement of externalities for the reduction of transport costs, but also in speeding up information, face to face contacts, learning and innovation flows.

1.4. Porter as a conventionalist in the formation of the classical view on clusters

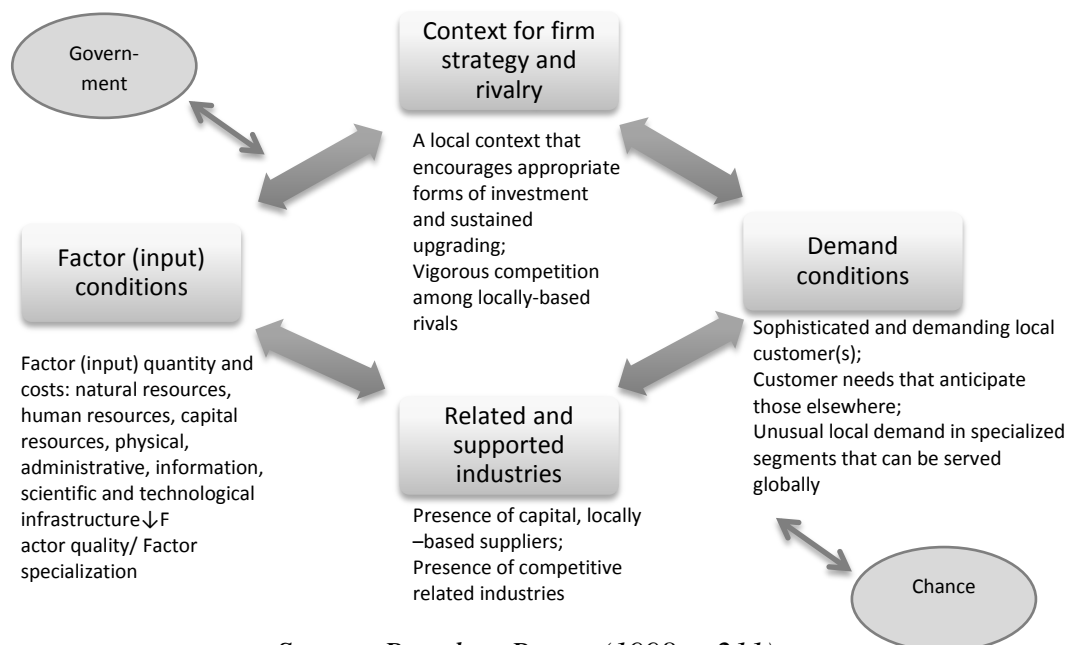
In the beginning of the 90s another economist Porter (1993; 1998) makes an important contribution for the spreading and making popular cluster concept. He developed the view on geographical agglomerations through the microeconomic approach. The concept developed has some elements of institutional and socio-economic theories. Apart from that, Porters' attention to clusters shows a strong connection to earlier, already mentioned, agglomeration theories. He also stresses the role of the regions for the strengthening of national competitiveness and introduces the Diamond model as an analytical tool to study it.

Underlying Porter's concept (1993) is the idea of national/ regional competitiveness. By this he means that some territories, due to specific conditions, have developed competitive advantages for their sectors and within them companies to compete and trade on the global market. The existing competitive advantages develop from a set of specific factors and conditions, which are both available and/ or can be created or enhanced (Pike et al. 2006).

These quantitative and qualitative factors Porter (1998) suggests to analyze through the set of categories, which are later known as Porter's Diamond (Bathelt, Glückler 2002; Linzenberger 2007). The diamond (Graph 2) shows four groups of factors, whose composition significantly influences the competitiveness of the region or the nation (depending on the level of analysis)

One of the pillars reflects on the qualitative and quantitative character of input factor conditions within the territory. The second one describes the existing context for firms' strategy and rivalry. Here the main attention is set on the legislation, market conditions and character, competitors, which strongly influence on the behavior of the companies. The third pillar is environment with related and supporting industries. Here is where the role of clusters becomes clear. Not only the industry itself influences the development and competitiveness but rather its character within the economy and connectivity or relation with other relevant sectors. Finally territorial competitiveness is also influenced by the demand conditions. Along with these four core diamond elements, later two others have appeared. The first refers to the role of the government and its policies and the second one – chance or accident, which leads to a certain trend in development.

Graph 2 Porter's Diamond - Sources of Locational Competitive Advantage



Source: Based on Porter (1998, p.211)

In such under the notion economic development Porter (1998, p. 246) sees the enhancement of competitive advantages of firms, clusters and national economies. This competitiveness is

achieved through productivity increase, where the contribution of **clusters** is strongly highlighted (Porter 1990, 1998). These sectors with cluster characteristics are bringing core contributions for national competitiveness and wealth. Referring to Porter (1998) clusters are formed by “a system of interconnected firms and institutions, whose value as a whole is greater than the sum of its parts” (p. 213f) and are “broader than industries, capture important linkages, complementarities, and spillovers of technology, skills, information, marketing, and customer needs that cut across firms and industries” (p. 205). As already mentioned, the prosperity of the location depends on the productivity of the companies, sectors and clusters. (Porter, 1998) There are three main advantages that stem from companies’ location in clusters (Porter 1998): productivity, innovation and new business formation.

Now we will discuss in detail some factors arising in clusters, which attract companies to locate here. At the same time some factors causing e.g. innovation, can also influence the creation of new business gains or reflect the benefits rather than factors.

- **Access to specialized inputs and employees**, which has already been earlier mentioned by Marshall (1982). First of all it enables local companies to outsource for cheaper, due to close connections (geographical proximity and trust) with suppliers companies may reduce search, risk and transportation costs.
- **Local outsourcing**, which actually flows out from the first point. These factors primarily attract companies due to minimizing the need for inventory, lower costs of production and establish trustworthy long-term relations. Moreover, due to either previous involvement in some earlier projects or shared training, local specialists might already have the knowledge on the processes taking place within the firms in their region, thus time, cost reduction and efficiency of results are improved.
- **Complementarities** between firms is referred to certain institutions or service infrastructure, which is accessible to more than one company, and while bringing similar values to all it reduces their costs in accessing to these services. Porter (1998) calls them scale benefits and divides complementarities into marketing and product related.
- **Access to information** can be in the form of publication about buyers and sellers from relevant industries and sharing knowledge with colleagues due to proximity and similar industrial focus, which later can be used to enhance companies’ productivity.

Here the information on new products, marketing strategies, development trends of competitors as well as suppliers is also meant

- **Incentives and performance measurements** arise due to the competitive pressure coming from the increase of the companies within the cluster. Companies search for ways to perform better or indicators in order to stand out among others. It can be connected with the desire of a positive image
- **Proximity between customers and suppliers** leads to enhanced interaction between them. This as a result can lead to new ideas, creativity and innovation increase, which at the same time highlights the interactive rather than lineal process of innovation. Furthermore, here the proximity to research centers is also meant. Such proximity facilitates not only the product's development but also its testing, etc.
- **Commitment and trust** arise among numerous actors within the cluster. These two factors can often have a very significant influence on the way of doing business with others, e.g. banks, research institutions, etc.

Summing up the factors one can notice that based on Porter (1998) many cluster-related advantages/ factors are similar to Marshall's and those from the Italian and French schools, which also rest on external economies or spillovers across firms and industries of various forms. Porter's competitiveness concept gave local and regional institutions the rationality to intervene based on cluster development and support (Pike et al. 2006). The diamond concept serves policy makers as a tool to understand the factors which are at the bottom of regional strength and growth.

This approach also faces criticism. Despite the significant role in policy making, which was given by clusters, there is confusion in regard to the notion's term specification. In particular the level of cluster analysis and type of links between firms are questioned. Furthermore, the concept is concentrated too much at the firm and industry's level. Herewith, although Porter promotes regional competitiveness, there is no direct specification on how exactly it should lead to economic growth and welfare increase. Finally economists (Pike et al. 2006) argue that this theory gives limited attention to the social dimensions of cluster formation and dynamics.

1.5. Intensification of globalization and the learning regions

Lately another theoretical line within the research on industrial agglomeration and clusters has appeared. It highlights the importance of knowledge for territorial development and innovation. As it is quite a recent aspect and still has little empirical proof (Mackinnon, Cumbers 2007). The concept is labeled as learning regions and explains factors of agglomeration by emphasizing the role of knowledge as a driving force for the agglomerations. This is significantly different in comparison to Marshall's main argument on cost reduction. Here the key differences is seen in terms of having different forms of relationship between key institutions such as government agencies, large corporations, small firms, university research, technology institutes and training organizations (Cooke and Morgan 1998)

Within learning regions four core factors leading to companies' agglomeration have been identified, which at the same time can be seen as benefits. These factors also, through spill-over effects, lead to further development and economic growth within the regions. They are **1) codified / tacit knowledge, 2) effects of the local "buzz"²⁰, 3) trust and 4) informal relations and conventions**. Thus this concept goes along the general trends on recent increased interest towards social, network and institutional theories within development studies.

1.6. Networks as mediators between market and hierarchy

Within the development of the concepts around the agglomeration and cluster building another important element that must be considered is the notion of networks. It is assumed that the main difference to others is in the network's irrelevance in geographical proximity for the collaborative actors. Another core difference lies in the type of communication or relationship among actors. While there is no membership obligation for a cluster, there is a restricted one for a network. In addition, networks require a more formal way of partnership, whereas clusters have an informal one. The Table 8, which is developed based on Rosenfeld (1997), reflects key distinctions between clusters and networks.

²⁰ The "buzz refers to the information and communication ecology created by face-to-face contacts, co-presence and co-location of people and firms within the same industry and place of region" (Bathelt et al., 2004, p. 38)

Table 8 Key distinctions between networks and clusters

Networks	Clusters
Small scale, inter-firm	Large scale
Restricted membership	Open membership
Competitive through cooperation	Competitive with cooperation
Formal partnership	Informal interaction
Interdependence	Input-output linkages
Agreed objectives	Mainly exchange relations

Source: Based on Rosenfeld (1997)

Based on Genosko (2006, p. 64) if looking on networks from formal and systematic side, they consist of so called notions of “nodes” and “edges”. Under nodes the projects or events are understood and under the edge – relations or connections between these nodes. Elsner (2000, cited in Wrobel 2008, p. 246) goes further and suggests when the functional interdependence between firms and institutions develops into a strategic one, it can lead to clusters transformation into a network. That is why based on Elsner (2000, cited in Wrobel 2008) regional networks are “regional clusters which develop an intensive, lasting and comprehensive multilateral cooperation, which utilize specific infrastructures and which, therefore, cooperative with relevant public, semi-public and social agents” (p. 246). In other words, in practice this definition of network could be referred to a cluster association.

Similar opinion is also expressed by Porter (1998). He is convinced that due to the characteristics of clusters and networks, cluster theory bridges “network theory and competition” (p. 226). There are three main theoretical concepts that argue the emergence and evolution of networks:

- a) The transaction costs, where the development of the networks is associated with the changes in the market needs
- b) Game theory is the approach that tries to explain the existence of the networks due to classical case of the “prisoners’ dilemma”. There due to “Nash-equilibrium” cooperation between two actors presents a better outcome for the both participants
- c) Neo-fordism approach is connected with the companies’ desire to be flexible and use the benefits of the scale through mass production whilst at the same maintaining their level of security.

These connections in networks have different types and forms, e.g. they can be social or economic based; strong or weak. All types of the nodes and edges can have advantages and

disadvantages. As such e.g. Genosko (2006) mentions that although strong ties might be good and provide trust and commitment to the actors, from another side they can be too robust and limit the appearance of new ideas. Similar to the concept of clusters or agglomerations, there are also many typologies to systemize networks, e.g. Mandell and Keast (2008) suggest grouping them based on type of the relationship between actors they establish, namely

- **Cooperative**, where the exchange of knowledge and communication is at the heart of the relations between involved actors; there is no significant changes in the insider structure of the partner; the resources are not divided between the actors and the education identity is limited
- **Coordinative** or intensive cooperation. Here the individual process between involved partners are being matched; although the partners stay independent, there might be some internal structural changes
- **Collaborative**, where the goal is in the creation of a collective network service; strong alignment of the structures of involved partners and the appearance of strong dependency between the actors

Within all existing types, in the opinion of Genosko (2006) regional networks should be specially highlighted, in particular due to combining network features and having geographical proximity. Together with Wrobel (2008) it can be considered that the decline of the industry within the regions can be connected not only with structural problems, but with the lack of cluster and network structures in the region. It can be further connected with Porter's (1998a) argument that clusters strengthen the diamond and herewith the competitiveness of the territory. Finally the biggest advantages of networks for companies and territories lie in increase of the flexibility, due to the possibility to rely on your partners; ability to concentrate on the strong parts of your activity due to access to similar resources in know-how and technologies and finally risk-sharing through partners (Genosko 2006).

2. Core cluster characteristics

2.1. Defining cluster

In the above presented theoretical concepts we have found a multitude of different terms, which in one or another way reflect agglomerations of economic agents. Moreover, although they have shown some differences due to the blurred boundaries and the absence of non-unified theory between them, they all have similar ground - **externalities** (Martin and Sunley

2003; Sugden et al. 2006; Bruch-Krumbein and Hochmuth 2000) Furthermore although researchers representing various scientific fields have contributed to the development of the concept, Karlsson (2007) argues that one of the most essential contributions has come from economic geographers in addressing the spatial issue. Indeed, all of the concepts rest on theories of agglomeration, which have primarily developed due to three empirical observations (Sölvell et al., 2003, pp. 18–20):

- 1) regional concentration, which is reflected in companies' preference for certain locations despite globalization;
- 2) spatial clustering, which is reflected in companies from the same industry tending to locate close to each other;
- 3) path dependence, which is observed in the robustness of these formations once they have been initialized.

Under these conditions two kinds of the agglomerations have been defined, one explained by urban or scale economics and the other by location economics (Sölvell et al., 2003). The first arises purely due to geographical proximity and the second from the more specific advantages generated by agents from the same industry. Their constellation in each case varies, which respectively leads to deviations in existing formations and types of agglomerations.

Among numerous contributions made by different researchers, Michael Porter's (1998a, 1998b) notion of industrial or business clusters is considered to be one of the most influential in terms of popularizing the cluster concept (Asheim et al. 2006; Martin and Sunley 2002). This is largely because Porter has not only promoted clusters as an analytical concept, but also as a policy tool for strengthening regional/national competitiveness (Martin and Sunley 2002), which has resulted in "a world-wide fad, a sort of academic and policy fashion item" (p. 4). We will also focus our attention on the **cluster concept**. As to Porter (1998a) "**clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate**" (p. 197). A number of other cluster definitions are listed in Annex 2.

While we adopt the definition of Porter (1998a) for the purposes of this paper, two main critical comments should be noted. The first deals with the property of the definition itself, and comments from some researchers (Linzenberger 2007), who consider that it doesn't belong to Porter, and rather comes from the works of Lasuén (1973), who referred to Perrou's (1964; 1955) theory of growth poles. The second is more theoretically and empirically important and refers to the blurriness of two important elements of the cluster concept (Martin and Sunley 2002; Coulander 2010), namely "geographical scale and internal socio-economic dynamics" (Martin and Sunley 2002, p. 9). Mackinnon and Cumbers (2007) mention that Martin and Sunley (2003) also point out two main characteristics in Porter's cluster definition: the linkages between enterprises (of any kind, e.g. trade or services) and geographical concentration generating proximity for intense contacts between actors.

Taking first "internal socio-economic dynamics", confusion lies in the precise definition of the origin of those actors needed to constitute a cluster. This is essentially due to difficulties in setting the activity boundaries of particular clusters, which usually don't fit with traditional industrial classifications. Thus some more specific clusters can fall within "big clusters" and/or some actors can be left out from consideration (Martin and Sunley 2002), an issue that is exacerbated by the inherent dynamism of economic activity as new activities emerge in the intersection of existing ones. With regards to "geographical scale", there is little clarity around the limits of proximity, in which sense clusters can and are defined at a whole range of scales, from towns/cities, through to regions, countries and even up to international extent.

2.2.Cluster diversity and their main benefits

Such openness in the definition results in the attribution of clusters of different types depending on their structure, sizes, forms, industries, regions and countries (Porter 1998). Existence of such a variety of possible clusters can often lead to overlap with other agglomeration types and explains the blurriness of the concept. Unsurprisingly this has given rise to different cluster typologies, and in Table 9 we present a selection of these.

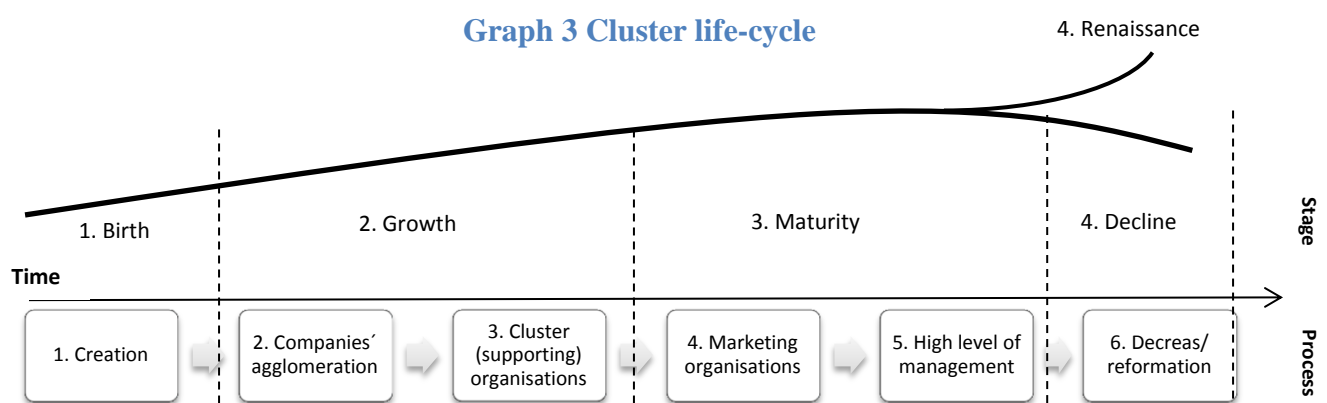
Table 9 Different typologies for cluster differentiation

Researcher	Type	Description
Gulati (1997)	Modern urban clusters	Serve for metropolitan areas and export markets
	Artisanal rural clusters	Serve only local/rural demands
Sandee (2002)	Dormant clusters	Production for only local/rural consumption
	Dynamic clusters	Deep cooperation and will to enter global markets
Schmitz, Nadvi (1999)	Incipient clusters	In an early stage of industrial development; located in poor areas; production mainly for local demand
	Mature clusters	Production for global markets; vulnerable to global change
Altenburg, Meyer-Stamer (1999)	Surviving clusters	Production is primarily conducted for local needs
	Advanced mass production clusters	Production is to serve the local market but there is strong external influence/competition
	Clusters of transnational corporations	Based around foreign companies, which settle in particular locations but have weak ties with local actors
Markusen (1996)	Marshallian	Small and medium sized local firms; substantial inter-firm trade and collaboration; strong institutional support; dependent on synergies and economies provided by cluster
	Hub and spoke	One or several large firms with numerous smaller suppliers and service firms; cooperation between large firms and smaller suppliers on terms of the large firms (hub firms); dependent on growth prospects of large firms
	Satellite platforms	Medium and large sized branch plants; minimum inter-firm trade and networking; dependent on ability to recruit and retain branch plants
	State-anchored	Large public or nonprofit entity and related supplying and service firms; restricted to purchase-sale relationship between public entity and suppliers; dependent on region's ability to expand political support for public facility
Duque, Rey (2008, p. 42)	Regional industry clusters	The spatial location of industries is the important characteristic; clusters whose elements share a common regional location, where the region is defined as a metropolitan area, labor market, or other functional economic unit
	Functional clusters	Matters what companies produce; companies offering or producing similar services or products belong to the same cluster
	Value-added industry clusters	Focuses on products/services flows through companies, rather than location or activity; "a subset of industries of the economy connected by flows of goods and services stronger than those linking them to the other sectors of the national economy"

Source: Author's development based on Rosenfeld (1997), Isbasoiu (2006) and own extension

Principally the distinctions between different types of cluster develop around previously mentioned issues, such as a) the type or b) character of the linkages between the industries and other actors, furthermore, between c) the types of these companies and institutions and finally their d) geographical scale.

Clusters can also be different with regards to the stage of their development. Each cluster usually goes through all four stages of the life-cycle reflected in Graph 3. While a particular territory (city, region, country) can include clusters from all evolutionary stages simultaneously, some studies indicate that the level of countries development can strongly influence the number of existing clusters from a particular stage (Europäische Kommission 2002). Identification of a clusters life-cycle's stage is later decisive for the elaboration of effective cluster-based policy (Brenner, Schlump 2011).



Source: Based on Europäische Kommission (2002, p. 15)

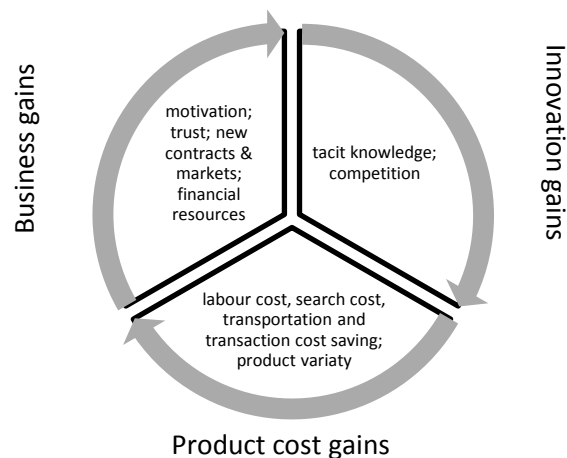
Clusters can be also established in different types of industries and sectors, e.g. aerospace, restaurant, tourism, retail, etc. They are present in large and small economies, in rural and urban areas, and at several geographic levels (for example, nations, states, metropolitan regions, and cities). Clusters occur in both advanced and developing economies, although clusters in advanced economies tend to be far better developed (Porter 1998). Some clusters center on research universities, while others have no important university connections. These differences in the nature of clusters reflect differences in the structure of their constituent industries (Porter 1998).

Despite significant ambiguities and differences of perspective around the cluster concept, it is seen as a very effective basis for policy oriented towards enhancing regional competitiveness.

Nadabán and Berde (2009), for example, highlight positive effects of clusters for companies in terms of **production, innovation and new business opportunities**. The sources of these benefits emerge basically from the special environment created inside the industrial agglomeration and characterized by the simultaneous existence of strong competition and cooperation among actors.

Exploring these positive effects in greater detail, under **production gains** we can specify advantages such as: the enhancement of the quality of human capital and labour cost savings due to access to specialized skills; search cost savings for the buyers of complementary products offered in proximity due to privileged opportunities for co-operation with nearby suppliers; transport cost savings, especially just in time contracts, due to geographic proximity; transaction cost savings due to an environment of cooperation and trust; greater product variety due to access to the local supplier base; and other broad-based opportunities from collaboration (OECD 2007; Sölvell et al. 2003;). **Innovation gains** on the other hand arise essentially from knowledge spill-overs, which are formed through close interaction with specialized customers and suppliers and result in unintended learning, new innovative products and services (Rosenfeld 1997; Isbasoiu 2006; Sölvell et al. 2003; OECD 2007). Finally, **business gains** rest mainly on: greater options to broaden contacts and herewith develop new products and/or open up new markets through collaboration; strong motivation and creativity due to the sophisticated demand of highly competitive local customers in close geographic proximity; and easier access to financial resources due to an environment of trust and collaboration (OECD 2007).

Graph 4 Cluster advantages for companies



Source: Authors' interpretation based on mentioned sources

The positive forces within clusters tend not to lead to only one particular advantage, but rather are fundamentally inter-related as illustrated in Graph 4. In this sense, clustering positively **affects the development of the territory as a whole**. First of all, clusters increase the overall level of **innovativeness** through knowledge generation and technology transfer due to resource leveraging, spill-overs and face-to-face contact (Isbasoiu 2006; Sölvell et al. 2003). This is especially likely given that large parts of regional knowledge generation systems typically have collective characteristics, and thus investment in R&D in one industry/cluster has knock-on effects in others (Karlsson 2007). Secondly, the **productivity** of regions is noticeably bigger where firms are spatially concentrated (Isbasoiu 2006), with higher wages in clusters and associated higher income levels in general (Isbasoiu 2006; Karlsson 2007). Finally, due to openness to cooperation and trust among actors, as well as higher productivity, such regions tend to **respond better to changes** in global markets (Isbasoiu 2006).

3. Summary

The objective of the above presented theoretical arguments was to give an overview of existing concepts regarding the notion of industrial agglomerations, in particular clusters, and their character, logic behind emergence and possible benefits for regional development. It has been observed that the main reason behind their existence is the possibility to offer companies benefits, which cannot be created by companies on their own. Later, one can also subscribe further factors such as social, trust or shared vision and knowledge sharing. From our opinion, it is a mixture of all above mentioned factors. The role of each of them is different and is shaped by the characteristics of the territory. Below we present a summary table, which includes the core aspects of above mentioned concepts. The idea and some core lines of the table are taken from the OECD (2007a, p. 33). At the same time despite differences among these concepts it seems that they **all can be roughly referred to as clusters, due to showing key similarities, like geographic proximity, agglomeration of companies from specific or related industries, externalities, etc.** Moreover, all are widely assumed to be effective for **strengthening both companies' and regions' competitiveness** and should also **lead to economic growth within the regions**. The popularity and presumed benefits arising from these policies has led to their spread and integration in many regions and states. While **adopting Porter's (1998a) definition of cluster, we focus our attention on this concept** within the factors influencing regional economic growth.

Table 10 Overview of the listed theoretical concepts

Concept	Factors	Benefits
Marshall (Marshallian externalities)	<ul style="list-style-type: none"> • Labour market pooling; • Greater variety of specialized international goods and services • Tacit knowledge spillovers 	<ul style="list-style-type: none"> • Labour cost savings access to specialized skills, especially in the environment where quick turnaround is important; • Access to local supplier base that has more product variety and a high degree of specialization • Access to tacit knowledge in geographical proximity by means of both formal processes as well as informal channels as knowledge leakages made possible by casual inter-firm interactions
Industrial districts (extended)	<ul style="list-style-type: none"> • Market structure • Specialization • Social embedding • Cooperation • Competition 	<ul style="list-style-type: none"> • Adaptation to market changes and benefiting from scale economics • Bringing up of the same culture and traditions, which as a result leads to better understanding by business, negotiations, creates trust. Furthermore, it can also lead to risk sharing or minimization • Enables easier search of the partner, at the same time some of the firms are in the direct competition. should develop transparency, rotation of the workers and strengthen innovativeness
Porter`s market conditions	<ul style="list-style-type: none"> • Demanding customers • Rivalry • Complementarities 	<ul style="list-style-type: none"> • Motivation effects due to demand of highly competitive local customers that improve quality, costs, etc. • Motivation effects related to social/ peer pressure • Better sale opportunities of firms due to search savings for the buyers of the complementary products offered in proximity and preveledge opportunities for co-operation. Between nearby suppliers of complementary products
Cost advantages	<ul style="list-style-type: none"> • Transportation • Trust 	<ul style="list-style-type: none"> • Transportation cost savings due to geographical proximity, especially in the case of just in time delivery contracts • Transaction cost saving due to an environment that encourages trust
Learning regions	<ul style="list-style-type: none"> • tacit knowledge • trust • informal relations and conventions 	<ul style="list-style-type: none"> • The main factors that create tacit knowledge and herewith attract companies to locate close to each other are: proximity of the companies, constant face-to-face contacts. • Helps companies to develop their common language for communication, attitude towards technology and new interpretation and knowledge schemes. • Trust enhances the cooperation & knowledge creation among firm as it offers confidence of the work that their customers, suppliers, etc. Provide; Trust brings as well commitment, long term planning and supports collaborations.
Networks	<ul style="list-style-type: none"> • Transaction costs • Cooperation due to Prisoners´ dilemma • Scale economics 	<ul style="list-style-type: none"> • Network is developed as a special mixed form between hierarchy and market, the first two mentioned economist consider network more as a hybrid form.

Concept	Factors	Benefits
		<ul style="list-style-type: none">• Due to “Nash-equilibrium” cooperation between two actors presents a better outcome for the both participants• Connected with the companies’ desire to be flexible and use the benefits of the scale through mass production but at the same time the need to stay secure.

Source: Author’s development based on OECD (2007a, p. 33)

CHAPTER 3 CLUSTER POLICIES AS A NEW TOOL FOR STRENGTHENING REGIONAL ECONOMIC DEVELOPMENT

In the previous chapters we reviewed growth theories and the concepts explaining industrial agglomerations, innovation districts, etc. Within all these notions the term **cluster** is of particular interest to us. The location-based advantages, which arise in clusters, are claimed to be much bigger than those arising from flexible mobility or economic liberalization (Benner 2012; Porter 1998a). The widespread attention paid to the benefits arising from clusters made building them as a natural condition for reinforcing regional growth, innovativeness and welfare of territories (Karlsson 2007). This assumption has made the formation of clusters a fashionable policy among both regional and national governments. This popularity was also caused by limitations arising in application of other already existing policies, especially at the regional level (Feser 2008).

In this context, regional cluster-based approaches have filled a gap in terms of providing a focal point for analysis of local economic structures and the attractiveness of territories. Clustering started to be not only a reflection of spatial formations, but also a new and complementary way of interpreting and analyzing the advantages of regional economies and of constructing effective public policy for enhancing regional development and growth. **Cluster policies**, labelled as such, began to be implemented in the early 1990s, and until now in reference to information from Europe INNOVA (2012, 3.47 m) have passed through three main stages in their development:

- 1) **In the early 1990s** pioneer countries and regions attentively studied the cluster approach and have taken steps to develop competitiveness or innovation orientated policies based on it. E.g. Scotland was among pioneer regions in the application of cluster policies (Asheim 2006)
- 2) **The period from the mid-1990s to the mid-2000s** is known as “cluster policy entrepreneurs”. First results from pioneer countries are being gathered and strong impulses for spreading the cluster policy have been set down
- 3) **From the mid-2000s onwards** cluster policy is increasingly mainstream as more and more regions and countries start to introduce it due to successful results of previous implementations

Indeed, over time, a wide range of local and national stakeholders have started to realize the benefits of cluster policy and have turned to its application for the enhancement of regional development. Despite a relatively short history of around 20 years of cluster policy application as a tool there is a huge amount of different programs and activities that have been, and are being, applied in different places, at different administrative levels (Andersson, 2004; Europe INNOVA, 2008). This diversity in policy approaches, considering the challenges of policy evaluation, attracted increased interest from numerous researchers in trying to analyze, systematize and evaluate specific cluster policies towards how to implement them in order to achieve the most effective results, especially towards enhancement of regional economic development (Uyarra, Ramlogan 2012; Aranguren et al. 2008; Schmiedeberg 2010; Aragón et al 2014).

To set some clarity Chapter 3 will deal in detail with such issues as cluster policy, its key characteristics, benefits, and propose key components for cluster policy leading the region to economic development. Moreover, we will look at the process of cluster making in depth. Most of the principle ideas are the outcome of the cluster policy evaluation studies. Thus many findings, which will be reviewed below have been already presented earlier by Konstantynova and Wilson (2014).

1. General characteristics and rationales for a cluster policy

1.1. Rationales behind the cluster policy

First of all before addressing different types and forms of cluster policy it is highly important to clarify the reasons for government intervention. Understanding the rationales behind cluster policy helps to build a clear vision with respect to its goals and the required policy instruments. Partially the justification of public interventions has been already addressed in the Chapter 1 of this thesis, while reviewing theories of economic development. Here we will highlight the rationales deeper. In this regard, referring to cluster policy as part of regional structural policy enables us to identify the following justifications for public actions (Bénassy-Quéré et al. 2010; Heimpold 2011; Ketels 2009; Andersson 2004; IRE 2005):

- a) **Allocation argument.** This primarily builds on microeconomic concepts of market failure, namely when specific conditions restrict the ability of normal market processes to lead to optimal outcomes from an overall welfare perspective (Sharp

1997; Ketels et al. 2012; Folmer 1986). Possible forces behind a reduction of market efficiency are:

- a. Lack of perfect competition, which is reflected in the existence of monopolies or collusion between firms, in turn leading to pricing and resource allocation that diverges from the social optimum;
 - b. The existence of positive or negative externalities such that the private costs/benefits of activities do not accurately reflect the costs/benefits to society, leading to underrepresentation of certain activities and a sub-optimal social allocation of resources;
 - c. Information asymmetries, which create uncertainty and distort the ability of agents to make optimum decisions;
 - d. Incomplete markets, under which the absence of all possible transactions at all existing levels can lead to the distortion of market equilibrium and reduce social benefits.
- b) **Stabilization argument.** In contrast to the allocation argument, this has a short-term influence on market equilibrium and provides a weaker support for intervention due to differences among experts' opinions. It is rooted in the arguments of Keynes (1936, cited in Bénassy-Quéré et al. 2010, p. 30) regarding:
- a. The “animal spirit” notion of human nature, which materializes in “spontaneous expectations leading to excessive optimism followed by the excess of pessimism, thus causing instability in behavior of private actors;
 - b. The nominal rigidity of wages and prices, which hinder markets self-correcting mechanisms and herewith prevent the economy from being at, or returning to, equilibrium.
- c) **Redistribution argument.** This rests on the concept of social justice rather than market inefficiency (given that Pareto-optimum can't guarantee the equitable distribution), and can be partially attributed to the political and legislative roles and responsibilities of the state. It refers to the goal of equality or the right of inhabitants to have more or less equal opportunities to reach a desired level of welfare.

With regards to cluster policy it is market failures (the allocation argument), that are typically used to justify intervention, particularly with respect to the existence of externalities and spillovers to agglomeration (Glaeser et al. 1992; Audretsch and Feldman 1996; Greunz 2004; Spencer et al. 2010). However the last two decades have seen the rise of complementary

'**evolutionary**' rationales for policy intervention that are particularly appropriate for cluster policy. These perspectives question the linearity of knowledge generation implied by neoclassical approaches and justify intervention as a response to problems that inhibit innovation (Edquist 2001, 2008). Laranja et al. (2008), for example, identify three groups of systemic problems: network failures; institutional failures; and lock-in failures. Each of these bears strong relation to the theoretical rationales underlying the cluster concept and alongside market failures are typically used to justify cluster policy.

Regardless of the justification for policy by theoretical rationale, the expected benefits must be weighed against the effects of possible **government failure** (Andersson 2004; Hospers 2002; Kiese 2008; Ketels 2009; Meyer-Stamer and Harmes-Liedtke 2005). Indeed, due to lack of experience or resources government actions can have the effect of further inhibiting innovation and damaging competitiveness. Thus the rationale for government involvement is only one element of justification, and more important is their ability to undertake interventions that respond effectively to the specific needs of the cluster actors based on those rationales (Ketels et al. 2012).

1.2. Defining cluster policy

The most common cluster policy definitions are extremely broad in their scope. Kiese (2008) or Hospers (2002), for example, see cluster policy as **all state measures** towards the support and development of clusters. Ketels (2011, cited in Benner 2012) developed a broader view and says that cluster policies contain not only **governmental** but also **in collaboration with activities of private actors** that are oriented to stimulate the cluster's efficiency. This is in line with Fromhold-Eisebith and Eisebith's (2005, cited in Benner 2012) definition of cluster policy as "**any coordinated set of measures, in whatever constellation and style of implementation, that supports the development of regional industrial agglomeration towards ideal features of a cluster in terms of a specialized, competitive, collaborative and collectively innovated set of sector related industries, research/education and other organizations**" (p. 84).

In order to grasp the existing differences in practice, Borrás (2008, pp. 16–19) has suggested grouping different existing perceptions of cluster policies into several categories:

- a. **Creationist** - a narrow approach to the understanding of cluster policy as a "policy for the creation of new clusters" (Swann et al., 1998). The target of policy is to address

problems and issues connected with the specific cluster dynamics. This involves state-society-economy interactions.

- b. **Narrow** – this approach is mostly presented in the work of Andersson (2004), who sees it as actions being implemented exclusively by public authorities. Here unintended or indirect actions are excluded from the definition.
- c. **Top-down** – a contextual approach seeing cluster policy as “programs and schemes developed at state and then at cluster level” (Boekholt and Thuriaux 1999b; OECD 2007).
- d. **Evolutionary** – here cluster policy is seen as a "public-private interaction in the territory (...) when, policy maker tries to upgrade the knowledge base, the competencies, and the learning abilities of the territory as much as the commercial exploitation of those in order to improve the competitive position of cluster as a whole"
- e. **Network** – in this case "policy links with the contemporary approaches to the traditional regulatory command-and-control at arm’s length approach, but a closer relationship between private and public actors in the territory trying to solve problems collectively" (Raines 2000; Asheim 2001). It is a kind of strong and efficient state society interaction, which is also reflected in the work of Cooke and Morgan (1998). This approach has become popular due to acknowledgement of the effectiveness of collective forms of public action in terms of implementing and developing cluster-related programs, such as public-private cluster initiatives.
- f. **Multi-level governance** – an approach developed by Borrás (2008) herself, in which cluster policy is “associated with public action and involves all series of public and semi-public actions” (p. 1). This concept reflects a kind of inter-governmental and cross-level dimension to public action. In order to better understand the targets, objectives and tools of policy Borrás (2008) suggests to follow below policy related questions:
 - Object (what?) - cluster policy is a set of direct and indirect initiatives for enhancing cluster capabilities and adaptability
 - Subject (who?) - policy is not confined to the activities of public authorities, but includes those activities designed and carried out by semi-public and/or private actors as well

- Tools (how?) - specific instruments used by public and semi-public actors to reach the objectives of the cluster

All these concepts and approaches make the definition of cluster policies even more blurred. At the same time Benner (2012) is convinced that no matter, what is seen or understood under the cluster policy, it is of greater importance to realize the **difference between it and any other existing policy**. This distinction lies in the main targets of the cluster policy, which are not exclusively tailored towards the development of one specific industry but rather **towards the whole value chain** in which it is constituent. Indeed, this division is very useful for grasping the main distinction.

In this paper we adopt the following broad vision of cluster policy: **all governmental actions in collaboration with other public and private institutions, which are targeted towards cluster formation and/or development and efficiency strengthening**. This basically correlates with the cluster policy definitions of Asheim (2001), Raines (2000), Fromhold-Eisebith and Eisebith (2005), and Ketels (2011, cited in Benner 2012, p. 84)

1.3. Illustrating diversity of cluster policies

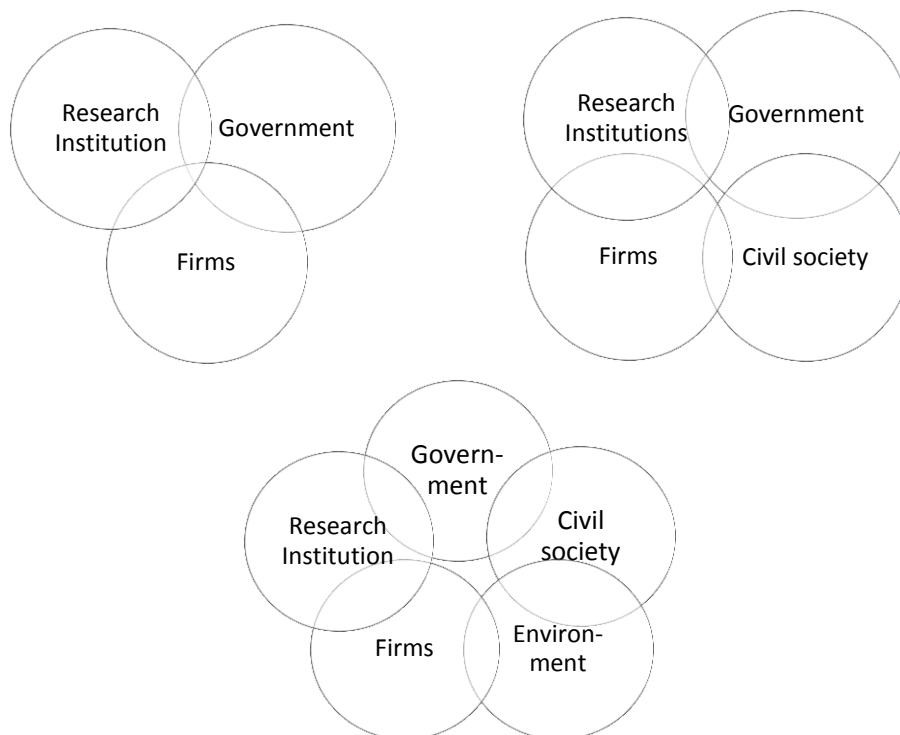
One of the main reasons for the existing confusion within cluster policies is the broadness in the definition of its main term: cluster, which has been already highlighted in the earlier chapter. This brought different actors in different places to develop their own understanding of the cluster concept and herewith policy actions, which could be based on it. Additionally, it was complicated by the complexity of the policy issues themselves. Finally, the broadness of policies is also connected with the desire to try out different ways of cluster-supporting activities, in order to find the most appropriate method. This brings us to the **multitude of policy tools**, which are labelled as cluster policy.

We will start with the **level of the application** of cluster policies. For example, Sölvell (2008) sees three main levels of cluster policy: national, regional and local. In Oxford Research AS (2008) only two implementation levels: national and regional are mentioned, whereas Kiese (2013) refers already to European, federal (national), state (regional) and regional (sub-state) and local levels. Policies can be also taken on each level of implementation. As such what Kiese (2013) does in his paper is to analyze the existing

measures on each administrative level. The current focus of research in this field now lies in the study of multilevel relations (Magro, Wilson 2013).

The level of cluster implementation is closely related to the **type of actors** (Graph 5), which can, and should, be involved in cluster policy development. Andersson (2004) thinks that independently from the type and instrument applied, the realization of effective cluster policy has to involve three core actors: government, firms and research institutions, named as a “**triple helix**” (Europe INNOVA 2008, p. 31). The application of such multi-actor approach should lead to the creation of clustering. The triple helix model as an instrument for innovation was first discussed by Etzkowitz (2002). Each of the elements not only influences, but also depends on the other. The actors are similarly equal, independent and overlapping. In particular, the existence of this trilateral cooperation ensures the “self-reinforcing dynamic of knowledge-based economic development” (Etzkowitz 2002, p. 12) of the territory. Later on the model has been extended first to “quadruple” through adding the influence of the civil society and later to “quintuple” helixes by summing the natural environment (Carayannis, Campbell 2012, pp. 14, 18). The consideration of especially civil society or as also called third sector is essential for the stimulation of clustering processes within innovation system.

Graph 5 Elements of triple, quadruple and quintuple helixes



Source: Author’s interpretation based on Etzkowitz (2002, p. 12); Carayannis, Campbell (2012, pp. 14, 18)

Furthermore, depending on the prime initiator of the organized collaboration towards the development of the cluster, the nature of policies can be divided into **top-down, bottom-up or mixed** (OECD 2007). Different types of policy are likely to be more or less appropriate depending on the nature of local, regional needs and/ or character of institutions. In most of the cases while speaking about cluster policies reference to public cluster policies is made. It doesn't mean that government should always be an initiator of the actions towards cluster support, although it is always an important participant within them, active or passive – depends on its earlier experience, objectives and planned actions.

The main **goals** for the choice of the cluster policy can be connected with the desire to strengthen innovativeness, competitiveness, welfare or growth of the territory. Depending on the goal, the main sources for funding or responsible authorities, the policy can be linked with industrial, science, regional or educational ones. E.g. Christensen et al. (2011, p. 4) divides public programs into following four groups:

- a) regional economic development programs
- b) programs for the development of national industries
- c) research and development based cluster programs
- d) network programs that support rising or new clusters

In order to understand the character of the developed policies, a review of its main **activities**, which are typically reflected in its programs, is needed (Andersson 2004, p. 61; Europe INNOVA 2008, p. 31). Andersson (2004) distinguishes between the following types of cluster policies:

- Broker policies: measures to develop a framework of consultation and cooperation between businesses, the public sector and NGOs
- Demand side policies: measures by which the public authority encourages new ideas and innovative solutions. The public authority's own expenditure in the region is important, even though tendering procedures are subject to regulation
- Training policies: improving skills and competences that are essential for effective clustering of SMEs
- Measures for special promotion of international linkages: removing trade barriers and strengthening the transport and communication systems, combined with equalization of rules and regulations

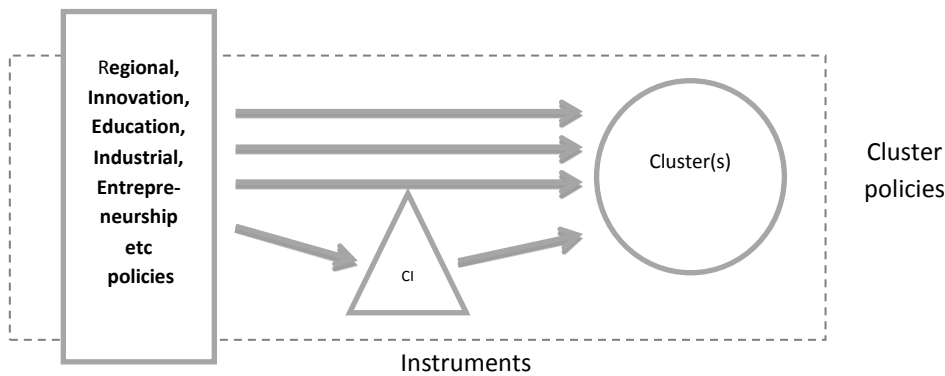
- Framework conditions: the preconditions that influence the success of clusters and innovation, such as macro-economic stability, properly functioning product markets and factor markets, a good educational system and physical institutional and legal infrastructure

Along with Andersson (2004), Brenner and Schlump (2011) also divide cluster policies into similar categories – education, public research, supporting R&D and innovation culture, support of start-ups, network organisation and cooperation, infrastructure and local conditions - thus stressing the need to adapt them depending on the stage of the cluster life-cycle (Maskell, Kebir 2005). Empirical cases show that the application of specified activities can not only assist clusters in their development, but can even help to escape the lock-in resulted by downfall of the core sector (Elola et al., 2012).

In reference to what was already mentioned one of the possible actions, which can be applied to cluster policies for the development of clusters, is the establishment of **cluster initiative**. It is a platform that can be launched, as well as coordinated, from either the local/ regional/ national private or/ and public side (World Bank 2009). These are a kind of a mediator/enhancer in clustering processes, defined by Sölvell et al. (2003) as "an organized effort to increase growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community" (p. 9). The scale or organizational structure of this association can strongly differ, dependent on the number, type of participants and cluster. The majority of cluster initiatives have very similar tasks or activities, which primarily center on issues such as strengthening cooperation and common vision among actors working in related economic activities.

Strong clustering processes can also be developed without institutionalized support, especially in the existence of sufficient environmental conditions. Indeed many places with appropriate factor conditions do possess features enhancing clustering processes (for example, Silicon Valley). Thus, often particular cluster initiatives are proven to be extreme contributors in cluster policy development and implementation. We can interpret cluster (CI) initiatives therefore as a type of (public, private or mixed) policy instrument, that in practice is likely to exist alongside other types of policy instruments oriented towards strengthening clusters (Graph 6).

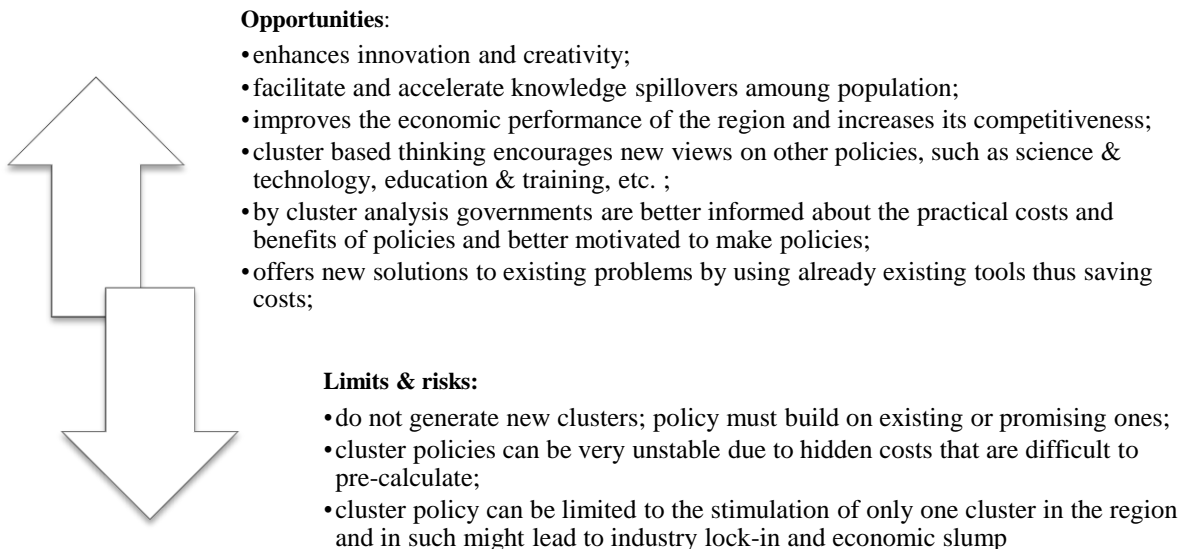
Graph 6 Positioning cluster initiatives within cluster policies



Source: Author's development

Furthermore cluster policy, as any type of policy, has its own mix of benefits and costs, some of which are collected in Graph 7.

Graph 7 Advantages and disadvantages of cluster policy application



Source: Author's development based on Genosko (2006), Porter (1998), Karlsson (2007)

Perhaps the main advantage is that cluster policies often don't require the implementation of something completely new. Rather, it can be a new way of organizing strands of existing policies. With a few extra resources it can therefore generate the further development of externalities, whose effects can be high in comparison to other policy options (Ketels et al., 2012). Furthermore, the development of clusters works alongside and strengthens existing

competitive market conditions, labelled “hyperdynamic competition”²¹ by Bieger and Derungs (2006). Cluster policy can therefore provide a complementary focus to other national/regional policies oriented towards generating these conditions.

Finally it should be agreed that there is considerable heterogeneity in the specific forms and approaches that cluster policies can take. Thus the main question nowadays is not whether to apply cluster policy or not but rather how to develop an effective cluster policy leading to economic development that fits the specific context.

2. Building cluster policy

2.1. Determining the steps of cluster policy process

Despite all these types and forms of cluster policies, there is now a strong drift towards clusters support. However, not every policy is effective, especially as there are numerous things that must be considered during its development. Brakman and Marrewijk (2012) goes so far as to state that if cluster policy is wrongly applied it “may do more harm than good” (p. 1), as some of the policy makers think that the only big challenge in cluster policy is the right identification of sectors for clusters, but cluster policy is not only about it.

Based on the opinion of Bryner (2007) and Geurts (2011) apart from institutional setting or political structure, an important role for effective cluster policy lies in its **administration and organization capacities** (further in text mostly referred as: **policy making**). Moreover, referring to Aubyn (2007) there is a link between level of policies’ administration and economic growth. The issue is especially relevant considering the possibilities of government failure (Andersson 2004; Hospers 2002; Kiese 2008; Ketels 2009; Meyer-Stamer and Harmes-Liedtke 2005), which we mentioned earlier. Moreover, good administration is especially relevant considering the importance of context in cluster policy development and the need to tailor policies in contrast to following a ‘blind-copy’ approach from other locations. Finally, looking at the process of cluster building in depth will assist us in realizing its key components instead of going along such a popular trend in searching for a perfect cluster policy.

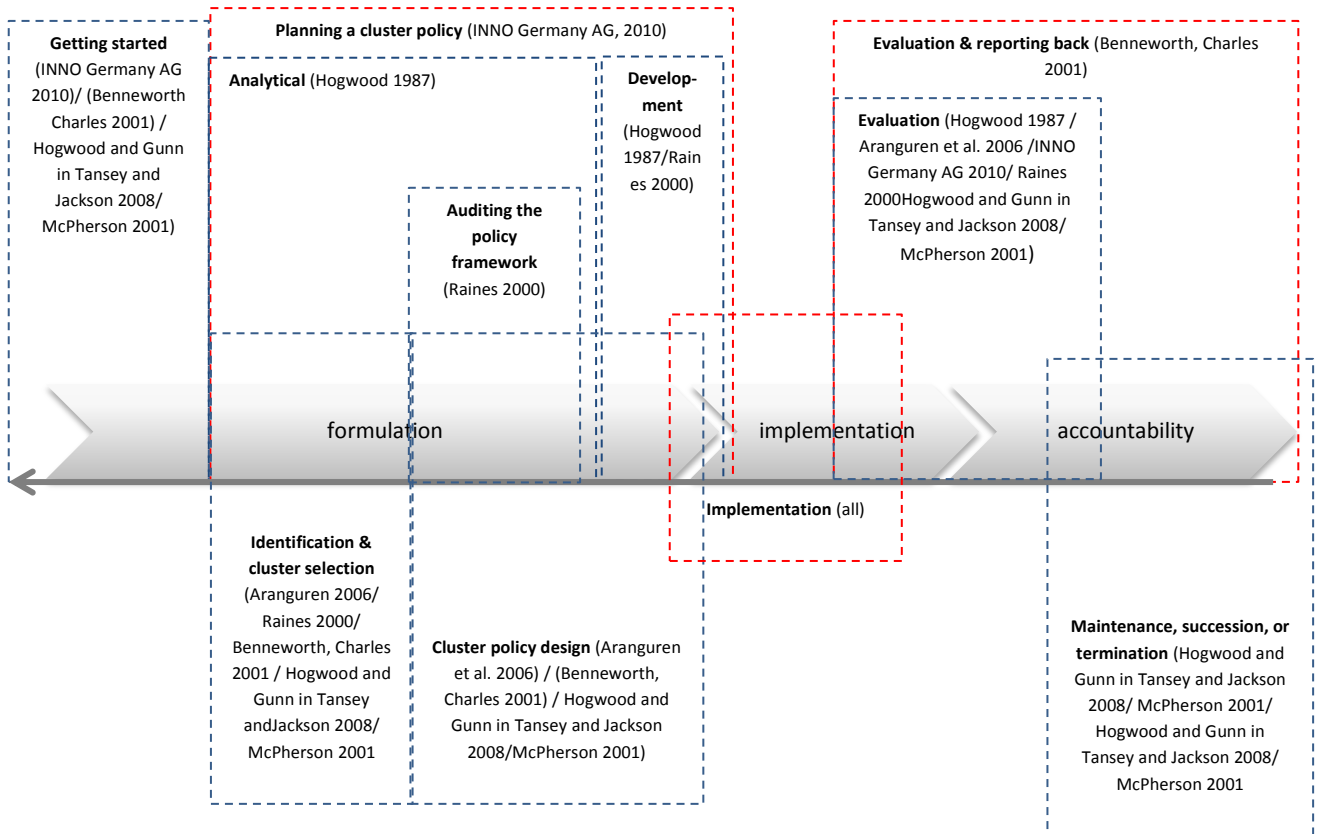
²¹ In the conditions of “hyperdynamic competition” companies are looking for a location that can offer the possibility to adapt fast and effectively to different changes, to access and upgrade their learning capacities, and to enhance their innovativeness and development possibilities.

Herewith first of all we have to specify our interpretation of cluster policy administration/ making. The making of cluster policy is not a static issue, but rather a process formed of different stages. This opinion on the policy process is reflected by Lindblom (1968, cited in Bryner 2007, p. 190), who sees it as a “complex analytical and political process, to which there is no beginning or end, and the boundaries of which are uncertain”. Geurts (2011) also sees public policy making “as a complex, dynamic, constantly evolving interactive and adaptive system” (p. 4). **In our study we see administration/ making of the cluster policy, as a process or a composition of different activities, which are being undertaken in different stages in order to achieve the policy goals setting.**

Herewith the next important issue is the identification of **stages in policy process**. While starting to identify them, we face the problem of having different number of stages, which have been highlighted or identified by various researchers. Annex 12 makes a brief review of the selected authors (on public policy and cluster policy) and their view on policy process. There it can be seen that cluster policy stages show strong similarities with public policies in general, containing different variations of three key policy stages: formulation, implementation and evaluation. However it is important to account for the distinctions that emerge in the cluster policy literature.

The scheme in Graph 8 allows us to see clearly the common stages in the cluster policy process, which intersect, distinguish or repeat among the previously listed typologies. The biggest similarity in studied occurs at the ‘implementation’ stage. Further similarities arose in the final ‘accountability’ stage of the policy process. Here there is a general acceptance of the necessity for the monitoring/evaluation stage. The biggest differences across typologies were observed in the stages required before the implementation of the policy. Several key distinctions were identified in the literature, namely the existence of a stage of economy and cluster analysis and a further division into review of the old policies and development of the new one. Finally, the first stage, labelled “getting started” and based on INNO Germany AG (2010), Benneworth and Charles (2001) and Hogwood and Gunn’s model of the policy process (cited in Tansey and Jackson, 2008), was also explicitly highlighted several times. This stage is often left out of analysis of the policy process, but the above indicated sources show that it can often play a determining role for the successful outcome of the policy.

Graph 8 Similarities and distinction of different policy process typologies

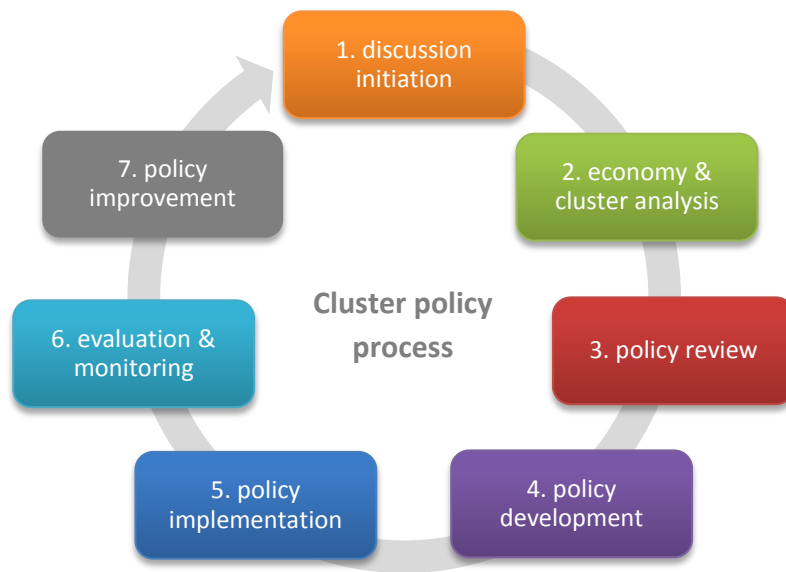


Source: Author’s development based on the reviewed sources

After reviewing the main typologies of the cluster policy process and considering their similarities and differences, **we propose to see the cluster policy making process as a reflection of seven stages.** These are: 1) discussion initiation; 2) economy and cluster review; 3) policy analysis; 4) policy development; 5) policy implementation; 6) evaluation / monitoring; and 7) policy improvement. They are set out in graphical form on Graph 9.

The first stage of **‘discussion initiation’** refers to the idea that at the very beginning of the policy process the idea of the policy has to be brought to the discussion among different stakeholders. The conversation might include the explanation of the main ideas behind the policy, the goals, actions, outcomes, advantages and disadvantages. Moreover, the reasons for starting the discussion can have different origins – economic slowdown, mandate from higher administrative levels, international popularity of the concept, etc. – and depending on the administrative structure, division between authorities and grade of civil participation, the actor first bringing up the topic and form of discussion can vary widely.

Graph 9 Defined stages of cluster policy



Source: Author's development

The second and third stages of the cluster policy process are **analytical**. Stage two concerns the analysis of the economy as a whole and of existing/nascent clusters in particular. Again, the approaches taken to conduct the studies identify the clusters, and highlight current gaps can be diverse depending on regional structure, financial resources and existing knowledge. This step provides policy-makers with a solid information base for further stages of the policy process. In such a way the time period for this stage can last from several months to years. Stage three – ‘policy review – is conceptually very similar. Here policy makers are reviewing existing policies and trying to determine in what way they stimulate/hinder defined regional opportunities and strengths or are closing existing gaps. The review of the existing policies can also take quite a long time because regional economic development and clusters can be linked to multiple instruments and programmes in a scenario of policy complexity (Magro and Wilson 2013).

The ‘**policy development**’ stage is the most saturated in the policy process. At this point the actors are building the foundations for further actions intended to improve the economic environment, enhance clustering processes and stimulate economic growth. Different actors from research institutions to companies are likely to take part in this development, although much of the burden and the final say typically rest with the government authority responsible for public policy within the region. This stage of policy development materialises in concrete programmes, activities, task division among actors and actions at the ‘policy implementation’

stage. Here the responsibilities are typically divided among different actors, although again the number of actors and the implementation mechanisms (policy instruments) vary strongly depending on regional context, financial resources, organizational structures, etc.

The final two stages refer to ‘**monitoring and evaluation**’ and ‘**adaptation to changes**’. These appear after the implementation stage, but in practice many of the associated actions are set down in previous stages and are already in process by this point. It should be mentioned; however, that while different types of evaluation (ex-ante, ex-post...) and ongoing adaptation to change can take place at any time in the policy process, monitoring typically happens during and after the implementation stage. The main idea of monitoring and evaluation is to analyse, understand and learn whether the planned actions are working or going to work in order to achieve policy outcomes. The main aim of policy improvement stage is to be responsive to the results of these learning processes, and to general politico-economic changes, and introduce alterations to the policy where needed.

Finally, it should be emphasized that all stages are considered equally significant and important for the effective cluster policy making. Thus the exclusion of one might result in a reduction in policy performance. On the graph they are presented sequentially, but it shouldn’t always be the case, especially as Geurts (2011) thinks that “policy making is a dynamic process of interaction with the involvement of administrative and other bodies” (p. 9).

2.2. Key components of an effective cluster policy process

At the same time having set out a policy stages, it is not enough for the cluster policy to achieve its objective. **We consider that following the recommendations derived from the best cluster practices will give us the scheme to build cluster policy leading to economic development.**

As we consider policy making as a process, we consider important to group these recommendations into each defined policy stage. Assigning main recommendations to different stages of the policy process gives a coherent view on these **key components**, the presence/absence of which at particular steps can strongly determine the policy outcome. Furthermore it corresponds well to the nature of the policy life-form and offers a structured approach for policy development for the target audience.

The main recommendations were gathered mainly from empirical (and in some cases theoretical) literature around cluster policy published over the last 20 years. The search was done using mainly electronic publication databases such as IDEAS²², ECONBIZ²³ and the European Cluster Observatory²⁴. Different recommendations were identified and listed, repetitions were noted, and then grouped into corresponding cluster policy stages.

The results of this work are presented in Table 11, which consists of three columns: the first specifies the stages of the policy process; the second details the key components based on main recommendations; and the last one lists the literature sources. During the course of the literature review some aspects were seen as exclusively generally important, making it impossible to sort them to only one stage. We therefore added a further process category that refers the policy process as a whole. Despite the clarity of the key components presented in Table 11, the process of their grouping can be considered as quite complicated and ambiguous, especially due to occasional blurriness of authors' attitudes towards factor characteristics and position in policy. Thus there is an element of subjectivity and we recognize that there may be some inconsistencies or omissions of factors. Nevertheless, we suggest that this systematic exercise reflects the major recommendations presented in the principal sources on cluster policy analysis and thus justifies the use of key components for building an effective cluster policy process. **Effective cluster policy is seen the one leading to economic development of the region.**

Table 11 Key components of an effective cluster policy

Policy Stage	Key components	Authors
1. Discussion initiation	Established forum/ network for communication between all affected actors	IRE 2005; Andersson 2004; Christensen et al. 2011; Ketels 2009; Rosenfeld 2002a; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008
	Awareness of the cluster issue and its potential advantages/disadvantages for the region between main regional participants	Andersson 2004; Brenner, Fornahl 2003; Wolfe 2008; Sölvell 2008
	Trust building	Andersson 2004; Rosenfeld 2002; Cluster Navigators Ltd. 2001
	Existence of previously adopted "trendy" policy	Benneworth, Charles 2001
2. Economy & cluster analysis	Organized group for managing economy & clusters analyzes	Aranguren et al. 2006; Andersson 2004; Benner 2012; Cluster Navigators Ltd. 2001
	In-depth cluster-based analysis for evaluation & understanding of current	Raines 2000; Aranguren et al. 2006; Brown 2000; Benner 2012; Rosenfeld 2002; Meyer-Stamer,

²² For more information see <http://ideas.repec.org/>

²³ For more information see <http://www.econbiz.de/>

²⁴ For more information see <http://www.clusterobservatory.eu/>

Policy Stage	Key components	Authors
	situation and perspectives of regional economy	Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Application of a variety of methods for cluster analysis, emphasizing the combination of qualitative and quantitative approaches	Raines 2000; Andersson 2004; Benner 2012; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001
	Clear understanding of cluster-based approach to analysis	Raines 2000; Andersson 2004; Benner 2012
	Clusters have been chosen from existing or promising ones	Aranguren et al. 2006; Ketels et al. 2012; Andersson 2004; Porter 1998a; Council of competitiveness 2013 ²⁵ ; Christensen et al. 2011; Brenner, Fornahl 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008; Karlsson 2007
	Choice of clusters is based on unique regional characteristics	Raines 2000; Aranguren et al. 2006; DTI 2001; Benneworth, Charles 2001; Europe INNOVA 2008; Ketels et al. 2012; The High Level Advisory Group on Clusters 2006; Brown 2000; Andersson 2004; Benner 2012; Porter 1998a; Kleinhardt-FGI Corporate Advisors 2002; Ketels 2009; Brenner, Fornahl 2003; Martin, Sunley 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Chosen clusters (their sectorial orientation) overlap and have good market connections	Raines 2000; IRE 2005; The High Level Advisory Group on Clusters 2006; Christensen et al. 2011; Ketels 2009; Brenner, Fornahl 2003; Martin, Sunley 2003; Cluster Navigators Ltd. 2001
	Choice of clusters is done based on the opinions of internal and/or external expert analysis, actors within clusters and then combined with instincts of policy makers	Raines 2000; Andersson 2004; Brenner, Fornahl 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008
	Political fairness and publicity in choosing clusters	Raines 2000; Benneworth, Charles 2001; Ketels 2008; Andersson 2004; Benner 2012; Brenner, Fornahl 2003; Meyer-Stamer, Harmes-Liedtke 2005
	Chosen clusters have consensus within public and private sector actors	Raines 2000; Europe INNOVA 2008; IRE 2005; Andersson 2004; Brenner, Fornahl 2003; Meyer-Stamer, Harmes-Liedtke 2005
3. Policy review	Cluster policy developers demonstrate competence through existing policies	Raines 2000; Aranguren et al. 2006; Benneworth, Charles 2001; The High Level Advisory Group on Clusters 2006; Christensen et al. 2011; Rosenfeld 2002; Brenner, Fornahl 2003; Wolfe 2008
	Strong engagement of private sector in review of the existing policy	Raines 2000; Aranguren et al. 2006; Christensen et al. 2011; Cluster Navigators Ltd. 2001; Wolfe 2008
	External organizations participate in the policy analyzes & development	Brown 2000; Christensen et al. 2011; Rosenfeld 2002
	Understanding & defining key reasons/rationales for the choice of using cluster policy	Raines 2000; Ketels et al. 2008; Andersson 2004; Martin, Sunley 2003; Wolfe 2008
	Strong commitment to the cluster concept by key actors	Raines 2000; Andersson 2004; Cluster Navigators Ltd. 2001; Wolfe 2008
4. Policy development	Cluster policy has a clear defined strategy & vision	Andersson 2004; Benner 2012; Ketels 2009; Rosenfeld 2002; Martin, Sunley 2003; Wolfe 2008
	Cluster policy is directed toward more than one cluster	Ketels et al. 2012; Andersson 2004; Genosko 2006; Christensen et al. 2011; Wolfe 2008

²⁵ For more information see p.4 www.compete.org/nri/clusters_innovation.asp

Policy Stage	Key components	Authors
	Cluster policy aims at creating spillovers &/or developing networking, agglomerations, reducing market failures and enhancing fair competition	Raines 2000; Aranguren et al. 2006; Ketels et al. 2012; Ketels et al. 2008; Andersson 2004; Benner 2012; The High Level Advisory Group on Clusters 2006; Council of competitiveness 2013; Kleinhardt-FGI Corporate Advisors 2002; Christensen et al. 2011; Brenner, Fornahl 2003; Martin, Sunley 2003; Cluster Navigators Ltd. 2001; Wolfe 2008
	Cluster policy highly considers the peculiarities of clusters (especially their evolution stage) and the region	Raines 2000; Aranguren et al. 2006; DTI 2001; Benneworth, Charles 2001; Europe INNOVA 2008; Ketels et al. 2008; The High Level Advisory Group on Clusters 2006; Brown 2000; Andersson 2004; Benner 2012; Porter 1998a; Kleinhardt-FGI Corporate Advisors 2002; Ketels 2009; Rosenfeld 2002; Fornahl, Brenner 2003; Martin, Sunley 2003; Cluster Navigators Ltd. 2001; Wolfe 2008; Karlsson 2007; Brenner and Schlump 2011
	Cluster policy fits (political resources) in within existing responsibilities and powers of the regional policy making authorities	Raines 2000; Andersson 2004; Christensen et al. 2011; Fornahl, Brenner 2003; Martin, Sunley 2003; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Ultimate goal of cluster policy is strengthening regional competitiveness	Ketels et al. 2012; Porter 1998a; Christensen et al. 2011; Cluster Navigators Ltd. 2001; Wolfe 2008
	There is a good mix of existing other policies, which also address clustering & stimulate the development of business environment in general	Raines 2000; The High Level Advisory Group on Clusters 2006; Aranguren et al. 2006; Benneworth, Charles 2001; Ketels et al. 2012; Brown 2000; Andersson 2004; Europe INNOVA 2008; Porter 1998a; Ketels 2009; Brenner, Fornahl 2003; Martin, Sunley 2003; Wolfe 2008; Sölvell 2008
	Engagement in cluster policy appears at different administrative levels	Raines 2000; The High Level Advisory Group on Clusters 2006; Brenner, Fornahl 2003; Martin, Sunley 2003; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Policy makers realize the advantages of the concept and are willing to adopt the change	Benneworth, Charles 2001; Brown 2000; Benner 2012; Cluster Navigators Ltd. 2001; Wolfe 2008
	Development of cluster policy is conducted in dialog between different affected actors	Raines 2000; Europe INNOVA 2008; Ketels et al. 2008; IRE 2005; Brown 2000; Andersson 2004; Christensen et al. 2011; Ketels 2009; Brenner, Fornahl 2003; Cluster Navigators Ltd. 2001; Wolfe 2008
5. Policy implementation	Implementation is done by efficiently using/combining already developed programmes and institutions	Raines 2000; Ketels et al. 2012; IRE 2005; Ketels 2009; Brenner, Fornahl 2003; Wolfe 2008; Sölvell 2008
	Understanding the reasoning for cluster policy	Raines 2000; Ketels et al. 2012; Andersson 2004; Benner 2012; Brenner, Fornahl 2003; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Following aspects of cluster are highly taken into consideration: a. Spatial proximity; b. Critical mass (number of actors); c. Cluster life-cycle; d. Nature of cluster actors; e. Dynamics and linkages within the cluster: Connection between cluster actors, Mutual trust, Common vision and strategy, Institutionalization, Balance between cooperation and competition	Raines 2000; DTI 2001; Aranguren et al. 2006; Benneworth, Charles 2001; Ketels et al. 2012; Ketels 2009; Brown 2000; Christensen et al. 2011; Ketels 2009; Rosenfeld 2002; Martin, Sunley 2003; Cluster Navigators Ltd. 2001; Wolfe 2008
	Methodological indicators for evaluation has been defined and are collected during the implementation by	Raines 2000; Andersson 2004; Cluster Navigators Ltd. 2001; Sölvell 2008

Policy Stage	Key components	Authors
	affected actors	
	Early action	IRE 2005; Ketels 2009; Cluster Navigators Ltd. 2001
	Multilevel cooperation	IRE 2005; Andersson 2004; Brenner, Fornahl 2003; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Existence of leader or leading organization	Benneworth, Charles 2001; IRE 2005; Andersson 2004; Christensen et al. 2011; Cluster Navigators Ltd. 2001
	Implementation is institutionalized in a form like a cluster initiative, whose aim is to increase the clusters competitiveness	Raines 2000; DTI 2001; Ketels et al. 2012; Europe INNOVA 2008; IRE 2005; The High Level Advisory Group on Clusters 2006; Brown 2000; Andersson 2004; Christensen et al. 2011; Ketels 2009; Rosenfeld 2002; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Cluster organization has a clear & sizable vision for the participants	Ketels et al. 2006; IRE 2005; Andersson 2004; Christensen et al. 2011; Rosenfeld 2002; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Timeframe of the funding is formulated	Raines 2000; IRE 2005; Meyer-Stamer, Harmes-Liedtke 2005
	Clusters are primarily supported by public money with constant reduction over time	Raines 2000; Europe INNOVA 2008; IRE 2005; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001
	Cluster initiatives are led by representatives from industry	Raines 2000; Ketels et al. 2012; Nauwelaers, Wintjes 2008; Ketels et al. 2006; IRE 2005; The High Level Advisory Group on Clusters 2006; Andersson 2004; Cluster Navigators Ltd. 2001; Wolfe 2008
	Cluster management has highly qualified personal with multiple competences and very strong motivation	Raines 2000; Ketels et al. 2012; Christensen et al. 2011; Rosenfeld 2002; Martin, Sunley 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Sölvell 2008
	Cluster participants are motivated & interested to participate	Raines 2000; DTI 2001; Aranguren et al. 2006; Europe INNOVA 2008; Ketels et al. 2006; Andersson 2004; Rosenfeld 2002; Brenner, Fornahl 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008
6. Monitoring & evaluation	Monitoring and evaluation is an integral part of the cluster policy (2 levels: on the regional by general policy makers and on the level of cluster association)	Raines 2000; Ketels et al. 2006; Andersson 2004; Cluster Navigators Ltd. 2001
	Evaluation has clear idea about the results that must be reached	Raines 2000; Andersson 2004; Meyer-Stamer, Harmes-Liedtke 2005; Sölvell 2008
	Key stakeholders are involved in the evaluation process	Raines 2000; Andersson 2004
	Evaluation has a long-term perspective	Benneworth, Charles 2001; Andersson 2004
	Policy makers have developed a balanced range of methodological approaches to be used for cluster evaluation	Raines 2000; Andersson 2004; Meyer-Stamer, Harmes-Liedtke 2005
	Control indicators are formulated	Ketels et al. 2008; Andersson 2004
	The results increase the awareness of the cluster situation and policy approach	Andersson 2004; Meyer-Stamer, Harmes-Liedtke 2005; Sölvell 2008
7. Policy improvement	Lessons driven from the evaluation are considered and integrated in cluster	Benneworth, Charles 2001; Meyer-Stamer, Harmes-Liedtke 2005; Sölvell 2008

Policy Stage	Key components	Authors
	policy	
	New assessments are explained and understandable, and correlate with participants needs	Benneworth, Charles 2001
During the whole process	Political support	IRE 2005; Andersson 2004; Rosenfeld 2002; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Presence of strong regional government/authority	Ketels et al. 2012; Andersson 2004
	Political stability	Raines 2000; Andersson 2004
	Participation of all actors from the triple helix: companies, research institutions and policy actors	Raines 2000; Europe INNOVA 2008; IRE 2005; The High Level Advisory Group on Clusters 2006; Rosenfeld 2002; Fornahl, Brenner 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008
	Long term commitment of actors & motivation	Raines 2000; Ketels et al. 2012; Europe INNOVA 2008; Ketels et al. 2008; Christensen et al. 2011; Brenner, Fornahl 2003; Cluster Navigators Ltd. 2001; Wolfe 2008
	Collaboration & dialog	Ketels et al. 2012; Ketels et al. 2008; IRE 2005; Andersson 2004; Rosenfeld 2002; Brenner, Fornahl 2003; Martin, Sunley 2003; Meyer-Stamer, Harmes-Liedtke 2005; Wolfe 2008; Sölvell 2008
	Trust between actors (achievement & sustaining)	Europe INNOVA 2008; Ketels et al. 2008; IRE 2005; Andersson 2004; Rosenfeld 2002; Brenner, Fornahl 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Sölvell 2008

Source: Author's development based on the reviewed literature

Several general trends have been identified while allocating key components. The first concerns the diversity in the number of sources that can be attributed to each key component, which may indicate their perceived relevance influencing cluster policy outcome. The second relates to the unevenness in the dispersion of these components among stages. The explanations for this can likely include: the different amounts of time and resources dedicated to each stage in practice; the difference in scientific attention afforded to each stage; and the large regional or national diversity in effectively conducted actions in certain. A third general trend concerns the different levels of precision across key components. The main reason behind this is the spatial and regional differentiation among the studied cases or developed approaches.

To reflect the main findings in a better visual overview of the identified key components, a more structural scheme has been developed and is presented in Table 12 below. It is built up of three parts, reflecting key components that were seen as: 1) **unique** for each particular stage of policy process; 2) **common for several stages** of policy process; and 3) **common for**

the whole process of the policy. This highlights a number of further conclusions. Firstly it shows that all stages of cluster policy except ‘policy analysis’ have exclusive key components contributing to achieving the outcome of the policy. Their exclusiveness indicates their decisiveness in effectiveness of the policy as they can’t be covered in any other policy stage. A similar degree of importance could also be attributed to the components that were revealed as significant for all policy stages. The necessity to be applied in all stages of policy process indicates that their overall exclusion could lead to the creation of a missing link and thus brake or significantly reduce the effectiveness of the policy results. Herewith if some of the actors from the triple helix are not involved in one of the stages, e.g. monitoring & evaluation, it might reduce the integrity of achieved results and as such cause an information failure. This in turn could lead to misinterpretation of findings and misleading policy making.

Table 12 Matrix of key components of an effective cluster policy

Key success components/ Stages	1. discussion initiation	2. economy & cluster analysis	3. policy review	4. policy development	5. policy implementation	6. evaluation & monitoring	7. policy improvement
A. Components, which are unique for each policy stage							
	Existence of previously adapted trendy policy	Existence of an organized group for managing analysis; Clusters are chosen from existing or promising ones; Chosen clusters overlap, have good market connections & consensus from private & public side; Political fairness and publicity by choosing clusters;		Cluster policy considers each cluster evolution stage;; Ultimate goal of policy is strengthening competitiveness; Cluster policy is directed toward more than one cluster; Cluster policy fits within existing powers of the policy making authorities;	Existence of leader or leading organization; Timeframe of the funding is formulated; Clusters are primarily supported by public money with constant reduction over time; institutionalized; early action; peculiarities of each cluster(s) are taken in the consideration	Monitoring & Evaluation are integrated in the policy making; Evaluation has a clear idea about results to be achieved; The results increase the awareness of the cluster situation and policy approach; existence of control indicators	Lessons driven from the evaluation are considered and integrated
B. Components, which are common for several policy stages							
Awareness on the cluster issue and its advantages/ disadvantages for the region							
Choice of cluster(s)/ policy is based on unique regional characteristics							
Engagement of an external organization/ experts							
Application of variety of research methods							
Clear understanding for chosen policy approach							
Strong participation of private sector							
Leading & developing personal is highly competent in region & cluster issues							
Multilevel cooperation & coordination							
Strategy & vision is clearly defined							
Good mix of existing policies & programmes is developed							
Measuring indicators are well defined and long-term integrated in the policy							
C. Components, which are common for the whole process							
	long term commitment & motivation; establishment of network for communication; trust between actors; participation of all actors from triple helix; political stability & support; strong regional government						

Source: Authors' interpretation

3. Summary

Despite some ambiguity arising from cluster analysis, the potential gains from cluster policy implementation at the firm and territorial levels have been widely embraced by governments, firms, and other institutions (Karlsson 2007). This has encouraged more and more territories towards a cluster-based approach to their economic development, innovation creation and reinforcement of competitiveness.

Today's popularity of cluster policy is employed at multiple levels around the world. The theory around cluster policy has evolved around empirical cases, which are quite numerous and has left us with a wide range of approaches, which can be interpreted as cluster policy. In reality the applied instruments and measures are very diverse and range from direct financial support for cluster initiatives, to creating platforms for communication, to wider measures to enhancing the business/cluster environment. Moreover the type and form of the intervention is strongly regionally specific, responding to the unique context of each territory.

Such broadness in cluster policies, while giving the flexibility for action, can on the other side bring deep confusion and lead to policy failure. Starting from the mid 2000 increasing numbers of researchers (Kleinhardt-FGI Corporate Advisors 2002; INNO Germany AG 2010; Bühler 2009; Brown 2000) have been involved in the analysis and outcomes of new policies. The ongoing search for a perfect cluster policy seems to be elusive, as there is no "one size fits all" policy.

Nevertheless within the policy making process we consider that there is a room for an **effective cluster policy leading to economic development, which is built around the key components attributed to stages of policy process**. In particular, it is recognized (2007; Bryner 2007; Geurts 2011) that the outcome of the cluster policy can be connected to the level of its administration/ policy making. Herewith, we reviewed and grouped existing key components in 7 identified policy stages (1) discussion initiation; 2) economy & cluster analysis; 3) policy review; 4) policy development; 5) policy implementation; 6) evaluation / monitoring and 7) policy improvement. After summarizing our main findings we developed a generalized scheme based on identified key components and stages. Finally we want to stress that despite all existing recommendations and studies while analyzing cluster policy it is especially important to consider the "given period of time and a given context" (Geurts 2011, p. 15) of policies' making.

PART 2 METHODOLOGICAL PART

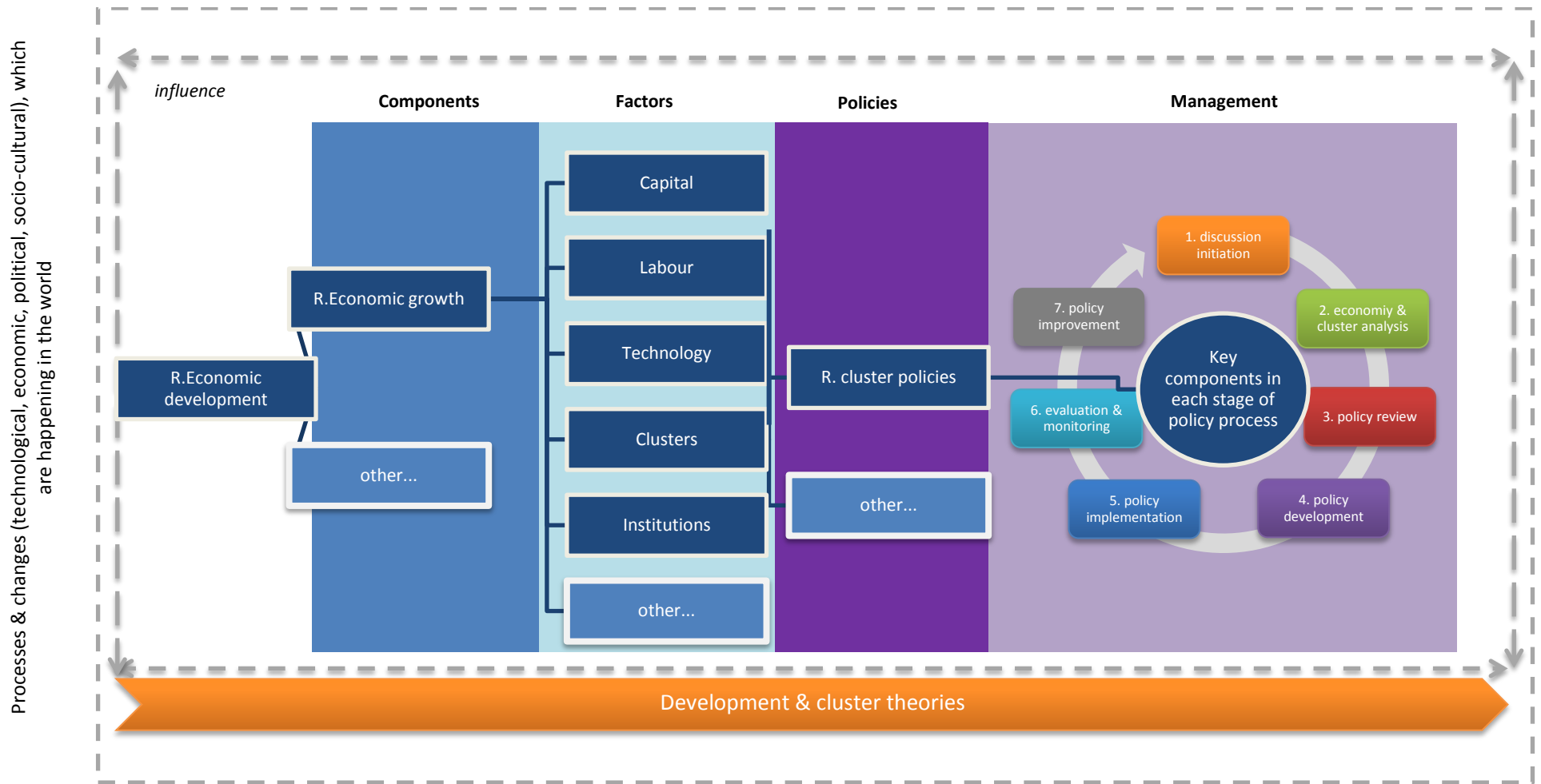
CHAPTER 4 OUTLINING THE THEORETICAL FRAMEWORK AND HYPOTHESIS

In the previous chapters we have performed an in depth literature review on the main concepts dealing with regional economic development, industrial agglomerations and public cluster policies. In this chapter we develop **theoretical framework** and specify our core hypothesis, which will guide us along the empirical part of the research.

Framework In summary of the theoretical concepts and notions reviewed in Chapets 1 to 3 we propose the **theoretical framework** presented in the Graph 10. In our theoretical framework, we define **economic development through its main target, economic growth**. Furthermore, we propose **five core factors that influence economic growth** and at the same time **reflecting the development of the region as well**. They are **capital, labour & human capital, technological progress, clusters and institutions**. **Regional cluster policy influences economic growth primarily through cluster factor and indirectly through other factors**. However, not all cluster policies have the same influence on economic development. Thus we think that **policy making plays an important role in determining economic growth**. **The making of regional cluster policy is seen as a multi-stage process**. **Each stage includes main common recommendations, viewed as key components of policy building**. Here we assumed that the closer resemblance with the developed policy scheme is present, the higher growth rates and clustering should be shown. The detail reflection on each aspect within the theoretical framework is reflected later in the chapter.

Although in our research we focus on the above specified factors and policies, due to the importance of the specific context **we also acknowledge that there is a room for “other” factors and policies, which can also effect regional economic development**. Herewith a certain attention will be given to them as well. At the same time economic development as well as its main factors and policies are also influenced by other processes and changes in the society. Therefore we consider it as an important issue to highlight and to keep in mind while deriving conclusions from our findings.

Graph 10 Theoretical framework



Source: Author's development

Based on this theoretical framework we expect to investigate the **implications of cluster policy on the regional economic development**. Furthermore, by viewing cluster policy as a process consisting of different evolution stages we can see the way **cluster policies have evolved** since the first years of their implementation. Considering that developed framework is based on the most common recommendations we can trace resemblance with implemented ones and thus get deep insights into key **components of an effective regional cluster policy**. Finally, the case study of two best practice policies enables us to see the fitting of our framework and consequently answer the question on **how to build cluster policy leading to economic development of the region**. Specification on the research design to address these research objectives is to be reflected in the next chapter.

Further we present in detail the rationale behind developing of the aforementioned theoretical framework. In particular we explain our motivation behind defining such notions as: regional economic development, economic growth, factors of influence, regional cluster policies, management/ making of cluster policies.

Regional economic development While building the theoretical framework we started our literature review with the definition of regional economic development. Under region we see the sub-national administrative level. In reference to Chapter 1, the definition of economic development is broadly classified from “regular progress” or “rising prosperity” (Eatwell et al. 1987, p. 818) over “the process of improving the quality of all human lives” (Todaro, Smith 2012, pp. 2:5) to the “qualitative change and restructuring in a country's economy” (World Bank 2014). The understanding of economic development is not unique, as in different locations, under various internal and external conditions, as well as time periods, the perception of economic development differs. Nevertheless we recognize it similarly to Meier and Baldwin (cited in Somashekar 2003) viewing it as **a process and improvement of regional economy over a long period of time**. It is to this understanding of economic development that we are to refer in our further research.

Economic growth as object of economic development Economic development can be seen as competitiveness or as economic growth, sustainability or welfare. Although economic growth, as the main target of economic development, is traditionally associated with developing countries or territories, it is still highly relevant even within developed countries²⁶ or industrial regions. In particular in one of the latest packages of recommendations²⁷ provided by European Commission for its member states, it was highlighted that growth, along with stability and jobs, was one of three

²⁶ Developed countries – based on World Bank (2014) there are the ones which are considered as high-income economies namely having a GNI per capita of \$12,746 and above, <http://data.worldbank.org/about/country-and-lending-groups>

²⁷ Package of recommendations for 23 EU countries, as well as the eurozone, which offers guidance on budgetary and economic policies for 2013-14 in http://ec.europa.eu/news/economy/130529_en.htm

main targeting issues for 2013 - 2014. As our main focus is on the regions of the European Union member states we have chosen **economic growth as the main component/ object of the economic development**. The rate of GDP per capita growth is used as an indicator for economic growth. Nevertheless, as economic growth is not the only object of economic development, supplementary indicators within the observation of the regional economic development will be also taken into consideration in the case study analysis.

Factors After a revision of the key theories on economic growth, agglomeration and clusters (Stimson et al. 2002; Parkin 2005; OECD 2009; Rainer 1996; Harris 2008) in Chapters 2 and 3 of this thesis we have observed that the performance of regional economic development is influenced by a different set of factors, which in turn can also be affected by a change in economic development itself. In order to specify the conditions needed for economic growth we have developed our core factors influencing economic growth based along neo-classic, endogenous, institutional, NEG, agglomeration and cluster concepts. Based on the identified factors influencing the economic development we suggest that economic growth is shaped by such **factors as institutions, capital, labour and human capital, technological progress, agglomerations and clusters**. At this point it is relevant to explain these factors in further detail.

A) Capital is considered to be one of the most significant factors. Referring to Somashekar (2003) it can be seen as a “stock of physical reproducible factors of production” (p. 10). Key indicators of this factor are “a) the existence of real savings and rise in them, b) the existence of credit and financial institutions to mobilize savings and to divert them in desired channels, and c) to use these savings for investment in capital goods” (Somashekar 2003, pp. 10–11). The relationship between capital and economic growth is considered to be positive, especially through the increase of sectorial productivity and raising effective demand. Gross capital formations can be used as an indicator of this factor. Neo-classical representatives also tend to recognize the influence of investment/ savings on economic growth in the short and middle terms (Kleinewefers 2002). This happens due to the correlation of capital with technological progress. In keeping with the neo-classical view, in the endogenous approach, growth is also strongly affected by capital accumulation.

B) Labour is an important factor for economic growth as it reflects the fraction of the population that is actually able to be involved in the production of goods and services and thus influences the regional / national income formation. The relation with economic growth has to be positive. At the same time, together with labour factor **human** resources are also included. The change in the population influences the supply of the labour force. In reference to OECD study (2009) in endogenous models economic growth is mainly driven by the stock of the human capital. The

importance of human capital is also connected with its influence on productivity increase through positive spillovers. At the same time the growth of population shouldn't be extreme, as after a certain level it might restrict economic development. Herewith, referring to classical theorists (Parkin 2005) no matter how advanced the technological progress is the explosion of population will always appear and lead to the reduction of GDP per capita. Apart from the scale, the quality level of the labour force, in other words educational level, is also relevant. Referring to Somashekar (2003) "a good quality of population is a very important in determining the rate of economic progress" (p. 12), this is similar to the labour force.

C) The significance of **technological progress** with respect to economic development has been highlighted by theoretical frameworks beginning from the classical approaches. The main problem has always been to identify its sources and the way of integrating them into the models. It is generally difficult to define technological progress, as it is seen as a new or improved technique in dealing with products or services. At the same time it is also connected with research. It is assumed that it has a positive influence on economic growth, particularly through increases in productivity, effective use of natural resources, etc. Another aspect within technological progress is connected with the human ability to innovate, which can be reflected by knowledge (endogenous theories). For this in order to measure technological progress and innovation in growth models the number of workers in knowledge producing industries, existing stock of knowledge or technological transfer and diffusion are often used (Gardiner et al. 2006; Pike et al. 2006).

D) The perception of **industrial clusters and agglomerations** as a significant factor influencing economic growth has grown in importance especially after Marshal's description of the special atmosphere within industrial districts and Porter's promotion of clusters as a possible policy instrument. Clusters are seen as "geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions in particular fields that compete but also cooperate" (Porter 1998, p. 197). The benefits of clusters are seen through their possibility to influence productivity, increase new business formation and innovation. Through spill-overs arising within clusters and their subsequent spread over the whole territory, the region or country can strengthen its competitiveness, which could lead to economic growth. There are numerous indicators²⁸ to measure cluster(s) in the territory, e.g. based on employment share, total number or growth or exports, etc. E.g. transport costs as of Krugman (1991) are seen to be a significant factor influencing cluster-building and thus leading to economic

²⁸ Other common cluster measurement indicators (Stimpson, p.258) could be: 1) Export per sector & cluster, 2) GDP per sector, 3) employment; 4) employment change; 5) annual average wage; 6) rate-of-change in the annual average wage; 7) establishments; 8) rate of change in the number of establishments; 9) wage level relative to the national industry wage level; 10) rate of change in relative wage; 11) inter-industry dependency; 12) productivity; 13) rate of change in productivity; 14) contribution to gross state product; 15) rate of change in contribution to gross state production; 16) location quotient; 17) change in location quotient 1992 to 1998.

growth. Moreover, referring to Gardiner et al. (2006), growth is enhanced due to similar forces, which are being attractive for doing business to the companies in the agglomeration, especially under current conditions of globalization. These forces are localized increasing returns arising from specialized economic activity, external economies and endogenous effects such as accumulation of skilled labour, local knowledge spillovers, specialized suppliers and services.

E) Institution theories at the macro level see institutions as “the rules of game in a society” (North 1990). Here the political, social or legal grounds for economic production are meant. The micro level is represented by institutional arrangements between the agents on the market (Williamson 2000). Institutions matter as they shape the relations between the agents and, as a result, influence their economic behavior and shape the historic development of the territory. Institutions can be based both on formal and informal relationships (Pike et al. 2006). Under formal ones economists representing this theory see organizations and administrative systems, while others are viewed as traditions, norms or customs.

Regional cluster policies Finally an important role is also given to regional public policy as a determinant of economic growth. Referring to neo-classical views - public interventions can take place, but it is not mandatory, as they assume that due to the causal mechanisms of the growth model the regions will always move towards equilibrium (Pike et al. 2006). At the same time endogenous theories provide us with more solid arguments in rationalizing policy intervention, especially at the sub-national level, as they deny the possibility of market mechanisms to regulate differences among the regions or territories. Finally within NEG representatives interventions are supported, especially due to the need to correct market failures.

Although we recognize the certain influence of all existing regional policies, we concentrate on only one – **regional cluster policy**. The main argument for this choice is the current strong interest in clusters and in their suggested impact on economic development. Herein, we adopt **the definition of regional cluster policy as all governmental actions in collaboration with other public and private institutions, which are targeted towards cluster formation and/or development and efficiency strengthening within the region**. This correlates strongly with the cluster policy definitions of Raines (2000), Asheim (2001), Ketels (2011, cited in Benner 2012) and Fromhold-Eisebith and Eisebith (2005). Finally based on the four rationalities for regional policy intervention, namely allocation, stabilization, redistribution and evolutionary argument, we claim that regional cluster policies can have a positive influence on regional development primarily through cluster enhancement and indirectly on other aforementioned factors.

Management/ Making of cluster policies At the same time these policy interventions in order to stimulate clustering and subsequently enhance economic growth should take place only under certain conditions. It is for this reason that in the last decades more and more researchers have been searching for the perfect cluster policy. Based on the opinion of Bryner (2007) and Geurts (2011) an important factor in implementing an effective cluster policy lies in its **administration and organization capacities**, referred as **policy making**. Under an **effective cluster policy we understand the one that makes positive changes in the economic development of the region by achieving the policy goals**. Moreover referring to Aubyn (2007) there is a link between the level of policies' administration and economic growth. Herewith, good administration is especially relevant considering the importance of context in cluster policy development and the need to tailor policies in contrast to following a 'blind-copy' approach from other locations.

The administration/making of the cluster policy, we define as a process or a composition of different activities, which are being undertaken in different stages in order to achieve the policy goals setting. The process is composed of 7 stages: 1) discussion initiation; 2) economy and cluster analysis; 3) policy review; 4) policy development; 5) policy implementation; 6) evaluation & monitoring and 7) policy improvement, which repeat and evolve over time. In order to define activities, which should take place during the cluster policy process, we looked for main, common recommendations provided in the earlier cluster policy related studies. We propose that defining the policy's activities based on the key components generates a cluster policy that enhances clusters and also improves aforementioned factors leading to the economic growth. The identification and systematization of policy components is explicitly designed by us in the Chapter 3.

CHAPTER 5 RESEARCH DESIGN

In the introduction we have already mentioned that we follow a **qualitative approach** and apply **multiple case study analysis** as a selected research strategy. In this chapter we further specify our methodological approach to gathering, analysing, interpreting data and drawing conclusions to respond to our research questions. We will summarize by presenting the general research design and specify some possible limitations.

1. Gathering data and sources of evidence

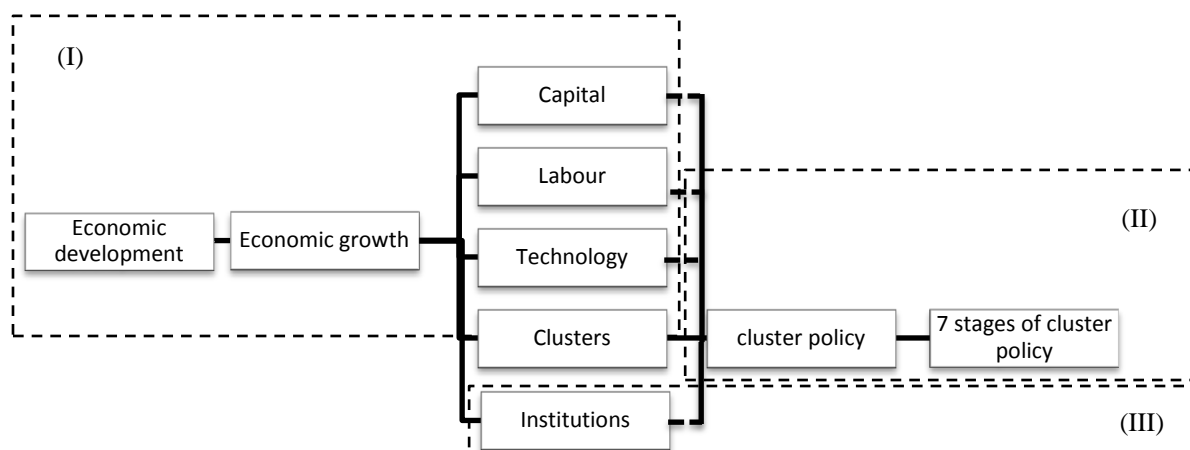
In our research we gathered the data from both primary and secondary sources: 1) semi-structured interviews, 2) online statistical databases and 3) documents reviews and revision of already existing empirical literature on our regions and cluster policies.

1.1. Primary sources: interviews

The interviews were conducted in both regions, in Upper Austria and the Basque Country. They were semi-structured interviews, mainly in person, although, some were conducted via telephone. In order to organize a personal or phone interview first an email with the inquiry was sent. It was followed then by a personal call if no email response was received. In both regions the targeted actors were eager to respond to the questions and set a date for the interview. The interviews were conducted in the period from **October 2013 to July 2014**, to be more precise in Upper Austria during October –November 2013 and in the Basque Country during February – July 2014. With agreement of the interviewee, most of the interviews were recorded while using the iTalk mobile application. The **focused interviews** were developed based on the prior review of existing secondary sources. Herewith we followed an **inductive coding structure** to get more specific data from the interview (Hammond, Wellington 2013).

The interviews consisted of the pre-defined groups of key points, which dealt with three areas of interest: I) regional development and its main factors, II) process of cluster policy building III) cluster policy relevant institutions, and which correspond with our theoretical framework (Graph 11). The detailed overview of the questions, can be found in the Annex 5.

Graph 11 Aspects of the framework, which were addressed in the interviews



Source: Author's development

The groups of regional actors for interview were selected based on pre-defined categories. The objective was to include different actors groups involved in the process of cluster policy building and the regional development. The selection was based on the approach of the triple – centuple helix (Graph 5), which highlights the need to involve diverse groups for policy making. Table 13 below indicates selected groups and number of interviewed local experts. In both regions the intention was to select actors which have similar functional and historical roles in the region. The majority of experts are the representatives of regional authorities or cluster associations, which are related to the cluster policy making. The full list of the interviewed people is in the Annex 3. Interviews in each of the regions were conducted in the official language of this territory, herewith in German in Upper Austria and Spanish in the Basque Country. The transcripts were made in the original language, thus the quoting inserted in the reports is translated.

Table 13 Groups and numbers of interviews

Regional actor group	Number per each region
regional state/ government authority	2
local developing/ cluster supporting institutions (agencies)	8
companies (all in/ outside cluster)	2
research institution	1
universities	1
Total per region	15
Total for two regions	30

Source: Authors' development

In total **30 interviews** were conducted. Initially, two extra groups were included in the list: regional parliament representatives and financial institutions. Both fell out in the process of interview conduction: financial institutions primarily due to low participation in the process, as they engage only as sponsors of the events; parliament representatives, due to strong alignment with the

government's opinion and absence of big discrepancies in terms of approving the budget financing for the programmes or activities.

Due to practical purposes while writing the dissertation the researcher has spent several months in both regions (& countries). This has also provided the opportunity to observe indirectly the cluster policy process, work of companies in clusters and economic performance in the regions. Some aspects from these **observations** are also integrated into the data interpretation.

1.2. Secondary sources

Within the secondary data sources we used available empirical studies and newspaper articles. Other obtainable and valuable types of archival records were also considered including:

- a) actuarial records (statistics)
- b) judicial and other official records (budget decisions)
- c) governmental and quasi-governmental documents (programs)
- d) reports (news, editorials)

The statistical data, used for descriptive and regression analysis, is primarily based on the data offered by the statistics offices of OECD and Eurostat. From the OECD database data on the regions were collected on the TL2 level, which corresponds to NUTS 2 level in the Eurostat database. Some of the missing or additional data was also collected from the national or regional statistic offices: Statistics Office of the Republic of Austria, EUSTAT, Instituto Nacional de Estadística (INE) and databases of cluster initiatives (Annex 7 and Annex 8).

2. Methods and techniques of data analysis

In our research we employ the “**cross-case synthesis**” (Yin 2003, p. 133) technique, which is considered to be the most suitable in the case of multiple case studies. Under this technique each study is treated independently. For this the gathered information is reviewed and sorted along the conceptual structure (Table 14). Table 14 is based on the developed framework (Chapter 4) which is aimed to study the building of cluster policy leading to economic development in the regions. In each case we will group information based on two aspects: I) cluster policy and II) economic development. Within these aspects we will then sort information reflecting the theoretically identified categories and connections. We assume that studying a single case could already provide us with valuable insights into building effective cluster policy and its evolution. Nevertheless, in order to strengthen our assumptions we will try to look for cross case patterns, which will be the result of similarities and differences driven from the review of the two cluster policies and the regions within the uniform frameworks.

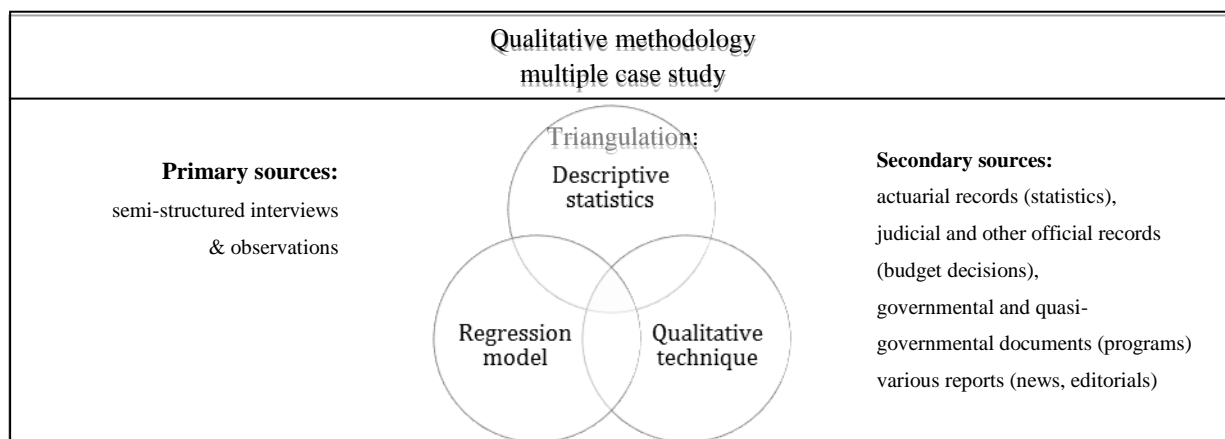
Table 14 Conceptual uniform framework for each case study

Cluster policy leading to economic development in the region							
I. General overview of the region and cluster policy	II. Cluster policy				III. Economic development		
	Overall policy framework	Institutional participation in cluster policy making	Evolution of cluster policy	Each stage of cluster policy process	Economic growth	Factors of influence	Composite influence of selected factors on regional economic growth
				Discussion initiation		Capital & industrial focus	
				Economic & cluster review		Labour & human capital	
				Policy review		Education, technology, innovation	
				Policy Development		Clusters	
				Policy Implementation			
				Monitoring & Evaluation			
				Policy improvement			
			During the whole process				
	Conclusions cluster policy				Conclusions Economy		
IV. Case conclusions							

Source: Authors' development

The development of arguments within each of the cases will be processed by means of different techniques. The triangulation (Yin 2003; Clarke 2005) of techniques as well as methods, and sources for data analysis serves for better convergence in results. While referring to simulation triangulation, we mean answering qualitative and quantitative questions at the same time. It is also important to mention that the results of the qualitative questions are reported separately and would not necessary relate to, or confirm, the results of the quantitative study. The advantages of the quantitative methods are in their preciseness and possibility to give us concrete numeric information, whereas the benefits of qualitative methods are in their overall richness and possibility to establish direct contact with the observed unit.

Graph 12 Data sources and techniques within each case study



Source: Author's development

As such each of the cases incorporates the following **data processing techniques: 1) qualitative: typology, analytical inductive and deductive framework analysis, 2) descriptive statistical analysis, 3) regression model.**

2.1. Qualitative techniques

The qualitative data was gathered through direct or telephone interview. The recorded information was later on transcribed with help of **Listen N Write** programme. Further the text versions of interviews based on previously developed framework was coded and interpreted using **Weft QDA** computer programme.

The qualitative data provides us with the information on the stages and evolution of the cluster policy. It has primarily to do with the kind of information itself. At the same time qualitative data is also available for such aspects as economic development and its factors.

We have applied following methods towards **qualitative data analysis: analytical inductive & deductive framework analysis, typology setting and pattern matching.**

While analysing the information we follow both **deductive and inductive framework analysis approach.** We deduced conclusions through the initial premises set in our theoretical framework. At the same time in term of driving generalized conclusion from the cases, an inductive component is also present.

Typology setting was applied to identify and group new information, especially in terms of studying of cluster policy evolution in the last 20 years. Each identified period of the cluster policy (which was labelled as a result of undertaken activities) is marked by the change in the role of the clusters in the regional development (seen from the point of view of regional cluster policy makers) and is accompanied with completing 7 stages of the cluster policy process. This method was also

exercised by e.g. the identification of regional cluster policy instruments, such as cluster initiatives and collaborative projects.

Finally **the pattern matching** method was mostly applied for identification and observation of key components within the cluster policy stages. Within each case study we grouped information based on the key policy components developed in the Table 11. After that we marked the components, which were missing in one or more periods (earlier defined based on typology setting) within each stage of the cluster policy process. The detailed results of this exercise are reflected in the stages of the cluster policy and are presented briefly in Annex 9 and Annex 10, where we marked with “orange bullets” components which were missing or not fully presented in the process of cluster policy development. Moreover, we summarized our findings based on the Graph 9 from Chapter 3. The outcome of this activity is Table 46 and Table 47 presented in the Chapter 8 and builds the basis of our conclusions on the character of cluster policy in each studied region.

Examining cluster policy in general, its key components in each stage and indicators of economic development we tried to identify certain patterns on effective cluster policy making. We **expect that the more key policy process related components are present within the cluster policy, the more effective it should be in terms of higher rates of economic growth / development.**

Our observations and conclusions from each of the case were then cross-case compared, analyzed and generalized.

2.2. Descriptive statistics

Descriptive statistics analysis is important for getting quantitative equivalents of our information. It will include different forms of presenting data, from time-series to static cross-sections of data. For our analysis it is important to consider dynamic change of statistical indicators in order to identify long- and short-term trends inherent to cluster policy in general and/or some of its stages. Also we will compare the indicators of our regions with other regions of their origin and national ones.

The descriptive statistics will provide the information about the main identified factors, such as capital, labour, technology process and clusters. Note the legend for NUTS codes on Spanish and Austrian regions can be found in Annex 13.

Although the influence of institutions on the economic growth/ development is assumed within our theoretical framework, we do not quantify it in our research and thus reflect it only qualitatively.

2.3. Regression analysis

Application of quantitative regression analysis allows us to identify and observe the existence of linear dependence between the economic growth and factors specified below. This especially goes along with our interest to find out what are the relations between economic growth and main factors. Note although regression analysis is a solid technique, in our case it is used only as a supporting tool due to the lack of data available for analysis.

In our framework we build multiple linear regression model that attempts to explain GDP growth via exogenous factors. The prime motivation for composing the following model was driven from the review of OECD reports for years 2009 and 2012 on economic growth across European regions. Furthermore, in order to specify regressors in our model we refer to the neo-classical economic theory (Parkin 2005), that suggests that GDP can be explained via aggregate production function $Y = F(L, K, T)$, where (F) is a function of capital (K), labour (L) and technology (T). Although this model observes GDP in relation to the above factors, we will use them, factors, to interpret GDP growth. Also we use endogenous, NEG and agglomeration concepts, as motivation to extend the list of factors by cluster performance (C). As a result our assumptions for multiple linear regression analysis is following: "*GDP growth*" = $L(K, L, T, C)$, where the factors are

- K – capital factor
 - L – labour factor
 - T – technology
 - C – industrial clusters
- } neo-classical & endogenous theories
- NEG/ agglomeration & cluster theories

In later to build a regression model(s) we will define quantitative indicator or group of indicators, which represent each factor. They are independent variables within our model(s). Additionally, based on theoretical findings we have made some prior assumptions in terms of the indicators' impact on the economic growth. We summarise our expectations in Table 15, where by "+" we mean a positive correlation, while "-" means that increase of corresponding factor's indicators will lead to decay of growth.

Table 15 Indicators representing factors

Factors	Variables	Indicators	Expectation
Capital	<ul style="list-style-type: none"> Regional income²⁹ 	<ul style="list-style-type: none"> GDP per capita 	-
Labour	<ul style="list-style-type: none"> Employment 	<ul style="list-style-type: none"> Rate (%) of labour employment 	+
	<ul style="list-style-type: none"> Population 	<ul style="list-style-type: none"> Population density, total number of population per square km 	-
Technology	<ul style="list-style-type: none"> Education 	<ul style="list-style-type: none"> Third and upper second education as share (%) labour force 	+
	<ul style="list-style-type: none"> Patents 	<ul style="list-style-type: none"> Count of PCT patent applications per mill. inhabitant 	+
	<ul style="list-style-type: none"> R&D expenditures 	<ul style="list-style-type: none"> Share (%) R&D expenditures total of GDP 	+
Clusters	<ul style="list-style-type: none"> Co-patenting (cooperation) 	<ul style="list-style-type: none"> Count of co-patents within the region per mill inhabitant 	+
		<ul style="list-style-type: none"> Count of co-patents with foreign regions per mill inhabitant (option 2) 	+
	<ul style="list-style-type: none"> Infrastructure (transport costs) 	<ul style="list-style-type: none"> Count of motorways per inhabitant 	+
	<ul style="list-style-type: none"> Specialisation (industry focus) 	<ul style="list-style-type: none"> Location index (industry general) based on employment data 	+
	<ul style="list-style-type: none"> Selected cluster(s) 	<ul style="list-style-type: none"> Share of employment in one cluster (automotive) to total employment in the region Share of establishment in one cluster (automotive) to total employment in the region (option 2) 	+

Source: Authors' development

We first consider a temporal model for the two regions independently and then a merged (temporal) panel model. The benefit of the second one is a bigger set of yearly observations, which potentially improves the credibility of regression analysis. To incorporate countries specific effects we add a deterministic time homogeneous “dummy variable” and assume our model to be fixed effects one.

1) Temporal model for regions

$$\begin{aligned}
 GrRate_t &= \ln\left(\frac{Y_t}{Y_{t-1}}\right) \\
 &= \alpha + \beta_1 \ln(Y_{t-1}) + \beta_2 EmplRate_{t-1} + \beta_3 Edu_{t-1} \\
 &\quad + \beta_4 \ln(Pop_{t-1}) + \beta_5 \ln(Pat_{t-1}) + \beta_6 R\&Dexp + \beta_7 \ln(CoPat_{t-1}) \\
 &\quad + \beta_8 \ln(Infr_{t-1}) + \beta_9 Spec_{t-1} + \beta_{10} Clustx_{t-1} + \varepsilon_{t-1},
 \end{aligned}$$

where $t = 1996, 1997, \dots, 2011$ and $\ln()$ – is natural logarithm function.

²⁹ Note: Alternative option for the Region Income indicator were tested 1) Gross Capital Formation as a % of GDP and 2) Gross Value Added as a % of GDP, but as the results do not have statistical significance, they were excluded from consideration

2) Temporal panel model:

$$\begin{aligned}
 GrRate_t &= \ln\left(\frac{Y_t}{Y_{t-1}}\right) \\
 &= \alpha + \beta_1 \ln(Y_{t-1}) + \beta_2 EmplRate_{t-1} + \beta_3 Edu_{t-1} \\
 &\quad + \beta_4 \ln(Pop_{t-1}) + \beta_5 \ln(Pat_{t-1}) + \beta_6 R\&Dexp + \beta_7 \ln(CoPat_{t-1}) \\
 &\quad + \beta_8 \ln(Infr_{t-1}) + \beta_9 Spec_{t-1} + \beta_{10} Clustx_{t-1} + \beta_{11} Dummy + \varepsilon_{t-1},
 \end{aligned}$$

where $t = 1996, 1997, \dots, 2011$ and $\ln()$ – is natural logarithm function. For the both models variables are as follow:

- $\ln\left(\frac{Y_t}{Y_{t-1}}\right)$ – growth rate of GDP per capita,
- Y_t – GDP per capita
- $EmplRate_t$ – rate³⁰ of labour employment
- Edu_t – share of labour force with third and upper second education degree
- Pop_t – population density, total number of population per square km
- Pat_t – number of PCT patent applications per mill. inhabitants
- $R\&Dexp_t$ – share R&D expenditures total of GDP
- $CoPat_t$ – count of co-patents within the region (option 2: with foreign region) per mill inhabitant
- $Infr_t$ – count of motorways km per population
- $Spec_t$ – location index/ specialization of the whole industry
- $Clustx_t$ – Share of employment (Option 2: establishment) in one cluster (automotive) to total employment (Option 2: establishment) in the region
- $Dummy$ – dummy variable

To quantify industry focus (variable Specialisation, $Spec_t$) we use a Location index, that is measured as $Spec_t = \frac{Y_{ij}/Y_j}{Y_i/Y}$, where

- Y_{ij} - total employment in industry in region j,
- Y_j - total employment in region j,
- Y_i - the national employment in industry,
- Y - the total national employment.

³⁰ Rate, share (%) in model enters as fraction, meaning an absolute value as GDP growth rate is calculated in absolute value and not percentage

A value of the index above 1 shows high specialisation in the industry (in comparison to agricultures, services, etc.) and a value below 1 shows low/ non-specialisation.

To measure clustering we use two from the most common indicators:

- Share of employment in the cluster (automotive) to total employment in the region
- Share of establishment in the cluster (automotive) to total establishment in the region

The relation between economic growth and clusters' indicators is central to our research. At the same time in our model we integrate only one cluster. The main reason is low data availability. Motivated by the similarities in the cluster's size, launch of the cluster initiative and data access in both regions, we selected the **automotive cluster** for our study. The automotive cluster in both regions is the biggest in terms of number of members in the cluster association and turnover volumes as such its evolution is very significant for the regional economy. Furthermore, in both cases the automotive sector was under cluster policy support from the first years of its implementation. Also this cluster belongs to the sector which was identified as a potentially important in the studies prior to the first cluster policy in both regions. It is especially relevant while we are assuming that this cluster is an accurate reflection of the cluster policy in the region. Finally, by nature the sectorial composition of the automotive cluster tends to be similar across different regions.

The European Cluster Observatory provides structured data on clusters. However this data is not complete. Therefore we used other databases in order to calculate indicators for the automotive clusters in the studied regions. To be more precise, our automobile cluster is composed of the following NACE industry codes: DK, DM, G40 for 1995 – 2007 period, and C28, C29, C30, G45 since 2008, which we gathered from Eurostat database.

In reference to OECD (2009) some factors might show influence on economic growth not directly but with some time lag. Hence for both temporal and temporal panel regression model some indicators might have this effect in medium, 3 years, and long, 5 years lags. These indicators are listed in the Table 16.

Table 16 Selected variables for time lag observation

Variable	Indicator	Period
Population	- Population density, total number of population per square km (optional)	1990-2011
Patents	- Count of PCT patent applications per mill. Inhabitant	1990-2011
Co-patents (Option1 &2)	- O1. Count of co-patents within the region per mill inhabitant - O2. Count of co-patents with foreign regions per mill inhabitant	1990-2011
Infrastructure	- Count of motorways per inhabitant	1990-2011
Education	- Third and upper second education as share (%) labour force	2000-2011
Specialization (industry)	- Location index / specialization (industry general) based on employment data	2000-2011
Cluster (Option 1 & 2)	- O1. Share of employment in one cluster (automotive) to total employment in the region - O2. Share of establishment in one cluster (automotive) to total employment in the region (alternative option instead of the previous one)	2000-2011

Source: Author's development

Note that for some indicators data wasn't available for the whole period of study. As a consequence in the models including lagged variables such as education, specialization in industry and cluster the regression was fitted to the data starting only from 2000.

3. Limitations of the research

Within any conducted and developed study there are always some limitations, which are highlighted below.

First of all, it is important to note the complexity and subjective nature of **qualitative data and the case study method**. In particular this applies to data interpretation. Herewith stated points or conclusions might be stronger or weaker effected by researcher's personal perceptions. Furthermore along with the main benefits of case study, namely an in depth multiple perspectives of the context and the subject, it possesses some core drawbacks with regard to the generalization of conclusions.

The next limitation is connected with **data gathering**. In particular the selected and limited access to the experts who were directly involved in the cluster policy development in the earlier stages of its implementation should be highlighted. Some of the experts, who have been involved earlier, have changes their position within the institution/ region and thus were not possible to reach. Additionally, as some of the events took place in the past, the information was difficult to recall, which also led to loss of precision of some information.

Another limitation is connected with the **character of the data** itself, e.g. some of the received statistical data was not complete. Furthermore, although the researcher has professional capacities in the interview's languages, nevertheless a language related understanding could result in some data understanding and interpretation.

Finally although the regions were intended to be selected to be as similar as possible in order to create very similar conditions, there are still remaining differences, which might have an influence on regional economic and/ or cluster performance in the cases. Among them are a) geographical: regions role within the country, b) historical, c) institutional & social (traditions), d) political (legislation) e) economic (real estate market).

Nevertheless, we consider that all above mentioned limitation are not significant enough to invalidate the outcomes of our research work.

4. Summary

Table 17 summaries the key aspects of used methodological approach.

Table 17 Key aspect of methodological approach

Aspect	Description
Research objective	Regional cluster policy, its operationalization and its effects on the economic development in the region
Research method	Qualitative: comparative multiple case study
Units of analysis	<ul style="list-style-type: none"> • Cluster policy in general • Phases of cluster policy process • Clusters & cluster initiatives • Regional economic development
Geographical area	<ul style="list-style-type: none"> • The Basque Country (administrative province in Spain) • Upper Austria (administrative state in Austria)
Data gathering	<ul style="list-style-type: none"> • Semi-structured interviews (in person and over the telephone/ skype) • Secondary sources: Databases, documents, empirical studies, etc.
Data analysis	<ul style="list-style-type: none"> • Descriptive statistics • Econometric multiple variables regression model • Qualitative: content analysis
Time period (data gathering in total)	October 2013 – June 2014

Source: Author's development

PART 3 EMPIRICAL PART

CHAPTER 6: THE BASQUE COUNTRY

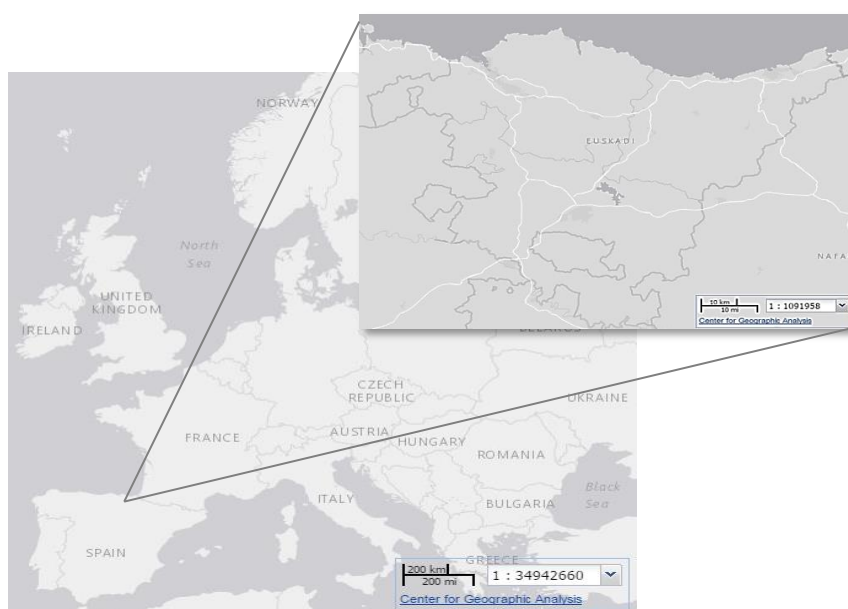
“La Ventaja de Competitiva”

Porter, M. (1991): Ekonomiaz 21, p.156

1. General overview of the region and cluster policy

The Basque Country³¹, also referred as Euskadi (in Euskera, Basque language) and el País Vasco (in Spanish), is one of the 17 autonomous communities and 2 autonomous cities in Spain. The size of this autonomous community is relatively small with respect to the rest of Spain (7,235 km², which is 1.4% of the total area INE 2014). The Basque Country only has around 2 million inhabitants, whereas the population of Spain is around 47 million (INE 2014). There are two official languages, Basque and Spanish. Vitoria-Gasteiz is the capital of the Basque Country. This city is the residence of the Basque Government (Gobierno Vasco) and is seen as the administrative center of the region. There are two more important cities in the province, Bilbao and Donostia - San Sebastián, which are the capitals of the sub-regional community level - provinces, Bizkaia and Gipuzkoa. These cities are well-known but have different regional and international images: Bilbao – as a business center while San Sebastian – as the cultural center of the Basque Country.

Graph 13 Geographical positioning of the Basque Country



Source: Authors' development based on map provided by Center of Academic Analysis, 2014³²

The Basque Country borders with France, in the east. In the north, the region goes into the Bay of the Biscay of the Atlantic Ocean and the rest borders with other Spanish autonomous communities.

³¹ Also could be referred as Euskadi, el País Vasco, ES21 or CAPV

³² <http://worldmap.harvard.edu/maps/>

This geographical location has always favored the economic development of the region. The Basque Country was known as an entrance, “the door to the Iberian Peninsula” (Sánchez 2008, p. 158), in particular by connecting not only with foreign countries, but also the territories within Spain, e.g. such industrial regions as Galicia, Navarra or Catalonia. At the same time there are some factors weakening the natural strengths of the region, e.g. difficult weather caused by strong weather storms and mountainous landscape. Indeed the mountainous landscape of the Basque Country has strongly influenced the location and production of many local businesses and manufacturers.

Although the political administrative system in Spain is not federal, some of its regions, amongst them the Basque Country, have very similar to federal state rights, especially in terms of regulation of their financial resources. The current administrative structure and status of autonomous community of the Basque Country has been received since the Spanish Constitution of 1978. The Statute of Autonomy, called Gernika status³³, precisely defines the legislative basis of the Basque Country and its special rights in terms of tax collection and policy making (Aragón et al. 2010). The Basque Country has its own Parliament and Government. The current (September 2014) Parliament is in the 10th legislation period (4 years), starting from 2012. Since 1980 the party EAJ-PNV³⁴ (Euzko Alderdi Jeltzalea - Partido Nacionalista Vasco) has been in the majority in the Parliament and had a strong influence on the election of the Basque President and the Government (with the exception of the 3rd (1987-1990) legislation – PSE-PSOE³⁵ (Socialist Party of the Basque Country – Basque Country Left/ Partido Socialista de Euskadi-Euskadiko Ezkerra) and the 9th (2009-2012) – PP³⁶ (Basque People's Party/ Partido Popular del País Vasco Euskadiko Alderdi Popularra)). The Basque Government, apart from having a direct control over many social and educational aspects, is also in charge of such core issues as Treasury and Tax Collection, Industry and Economic Promotion, Transport and Public work, Research and Innovation, Agriculture and Tourism, Law and Order, Labour and Insurance. Concierto Económico is assigned to regulate/ transfer some of the powers between national and community levels, in particular taxes. In reference to Sánchez (2008) this agreement (the Statute of Autonomy the Basque Country) enabled to start long-term planning and increase governance over industry/ economy regulation in the region. In each of the three provinces of the Basque Country there is a Provincial council. They have the right to be in charge of tax collection. In addition, they are responsible for some issues in terms of innovation and economic policy.

³³ The Statute of Autonomy the Basque Country, https://www6.euskadi.net/r48-2312/en/contenidos/informacion/estatuto_guernica/en_455/adjuntos/estatu_i.pdf

³⁴ For more information see <http://www.eaj-pnv.eus/eusk/>

³⁵ For more information see <http://www.socialistasvascos.com/>

³⁶ For more information see <http://www.ppvasco.com/>

The infrastructure in the Basque Country is well-developed, and has been significantly improved since the 1990s. Air as well as sea transport communication is also in favor of commerce and tourism development. There are three airports: Loiu (Bilbao), Hondarribia (San Sebastián) and Foronda (Vitoria-Gasteiz), and there are at least two main maritime ports, Bilbao and Pasaia. Referring to Sánchez (2008, p. 158) Bilbao Port is considered to be one of the most important port in Spain due to its connectivity with around 500 other ports and the 15th in Europe based on the volume of freight goods transported and Liquefied natural gas (LNG) Terminal Bilbao.

Especially in recent years the Basque Country has managed to develop a strong and innovation driven economy. Based on the latest report (31st of March³⁷) produced by (INE 2014), the Basque Country has the highest GDP per capita in Spain. It is then followed by Madrid, Navarra and Catalonia. In 2013 (Table 18) the region made more than 6% of Spanish GDP, which is relatively good considering the small scale of Basque Country (4,7% population and 1.4% area of total Spain). Unemployment rate in the 3rd Quarter 2014 was one of the lowest in Spain, with only Navarra having a lower rate.

Table 18 Key economic indicators, the Basque Country and Spain

Indicator	Basque Country	Spain
GDP market price, (thsd EUR) 2013, 1 st est.	62,780,008 (6.1%)	1,022,988,000 (100%)
GDP per capita (EUR) 2013	29,952 (134.4%)	22,279 (100%)
Area (sq.km) 2013	7,235 (1.4%)	505,968.36 (100%)
Population (thsd) 2013	2,177 (4.7%)	46,727 (100%)
Unemployment(rate) 2014 QIII	15.21	23.67
Sector composition (%) 2013, 1 st est.		
- <i>Agriculture</i>	0.6	2.4
- <i>Extractive industries</i>	24.7	15.9
- <i>Construction</i>	7.0	7.2
- <i>Wholesale and retail trade</i>	20.6	23.6
- <i>Other services</i>	47.1	50.9

Source: Authors' development based on INE 2014

The economic strengths of the Basque Country have their roots in the long manufacturing tradition of the region. These industrial strengths can be already seen in the Table 18 above, where more than 24% of Basque income is composed from the industrial sector. It is well above other Spanish regions. From the review of the sectoral composition of the Basque Country (based on A-38) in 2013 activities such as automobile, motorcycle and moped repair services and real estate activities composed more than 20% of GDP (Eustat 2014). In addition the following important activities in the region should be also mentioned (2013 own calculations based on Eustat 2014): Construction (6.54%), Metallurgy and metal products (6.53%), Financial and insurance activities (5.87%), Healthcare activities (5.38%), Public administration and defense (5.32%), Education (5.02%). Similar sector relevance in the economy can also be seen through the defined priority clusters and

³⁷ INE (2014): Spanish Regional Accounts, http://www.ine.es/en/prensa/np835_en.pdf

established cluster associations in the Basque Country, which are in such sectors as automotive, machinery tools, maritime (Table 48).

In terms of trade, since early ages the Basque Country has been able to develop broad national and international commerce linkages due to its geo conditions. At the same time at the beginning of 90s, with the arrival of globalization, Basque products faced severe problems in terms of their international competitiveness, which seems to be recovered with the help of public policy support in the later years. Since 2003 and up to the financial crisis 2008 Basque exports constantly increased, and even after the crisis the economy managed to recover faster. As such, in 2013 the export of goods and services to other countries composed more than the half of the total Basque exports (Eustat 2014). Around 46.3% of exports are the equipment goods within which there are two big product groups: machinery and appliances, and transport materials (Faíña et al. 2010). In the recent decades, especially due to the very pro-active innovation policy, the share of high technology goods within the Basque export market has increased; nevertheless it is still below EU average (Faíña et al. 2010). At the same time the Basque Country buys more than 60% of needed goods and services from other regions of Spain and the rest from abroad (Eustat 2014). In total the region follows a general trend in terms of trade, having imports slightly higher (around 5% more) than exports (Eustat 2014).

In the Basque Country entrepreneurial spirit is considered to have developed due to merchandizing during the middle ages and early years of current history. At the same time, the business sophistication index³⁸ has ranked the Basque Country at only 129th of 261 countries, which is around average (Annoni, Dijksra 2013). The region has a fungible market structure, which is demonstrated by the existence of synergies among several big companies and numerous small and medium enterprises. The corporate tax rate³⁹ is 35% and VAT⁴⁰ - 20%.

The region also has rich cultural traditions and a strong national identity. It has also been marred in recent times due to significant conflicts between radical nationalists, ETA (Basque Country and Freedom / Euskadi Ta Askatasuna) and the national government in the 90th of the 20th century. At this moment the conflict has been mitigated but the fundamental issue has been not fully resolved. On the other hand strong cultural ties have positively influenced the existence of close and trustworthy relations among people and have its effect on the form of local business relations, networking and decision-making.

³⁸ An index composed of variables such as employment, GVA and number of foreign owned firms

³⁹ KPMG (2014): Corporate tax rates, <http://www.kpmg.com/Global/en/services/Tax/tax-tools-and-resources/Pages/corporate-tax-rates-table.aspx>

⁴⁰ Ibid.

Finally in the Table 19 based on the scheme proposed by Porter's Diamond we summarize the main characteristics of the Basque Country's competitiveness presented above.

Table 19 The Basque Country competitiveness overview based on the Porter's diamond, strengths and weaknesses

Context for firms strategy & rivalry	
<ul style="list-style-type: none"> - Businesses and manufacture production is valley based* <ul style="list-style-type: none"> - Medium level of business sophistication - Fungible market structure with dominantly SMEs - Free market economy to foreign investors & companies <ul style="list-style-type: none"> - Credit ranking high, Baa1 (Moody's) & A- (S&P) - Special taxing legislative powers, especially over personal income and corporate taxes <ul style="list-style-type: none"> - High R&D investment and personnel involved in innovation - Government – stable and has long term planning 	
Factor conditions	Demand conditions
<ul style="list-style-type: none"> - Territory – mountainous* - Continental climate driven by the access to the open ocean - Beautiful nature and landscape - Good transport infrastructure, including vehicle and train roads, airports and ports - Strong government institutions* - High urbanization and density* - Highly educated work force with average enrollment in secondary and tertiary - Education system with high number of tertiary degree graduates* - Strong regional Basque identity* 	<ul style="list-style-type: none"> - Small internal market demand but due to geographical position has an ease access to the Spanish, European and global markets - Good social level of living (higher than Spanish average)* - Belong to the country which is EU member and thus simplified access to other EU markets - Certification, international & European
Related & relative sectors	
<ul style="list-style-type: none"> - There are more than ten clusters, at least half of them has members from other communities of Spain and are actively extending their international connections <ul style="list-style-type: none"> - Broadly developed network of innovation and research specialized centers - Strong sectors: machinery, automobile and aerospace, information technology <ul style="list-style-type: none"> - Strong cultural sector and tourism sector <ul style="list-style-type: none"> - Numerous research centers* - Two official languages, Basque and Spanish* 	

Note: Aspect marked with * can be also considered as weaknesses

Source: Authors' development

All the above mentioned aspects in one or another way effect the development of the Basque Country. In recent years the region has often competed with Navarra for the leadership in the communities' ranking for the highest rate of GDP per capita. In reference to Aranguren (2010b) the Basque Government with it strong competence in policy making and governing has had a significant influence on policy making in recent decades.

Although the Basque Country has often been considered as an industrially strong region, at the beginning of the 1990s the region had experienced strong economic decline. In order to find and build new competitive strengths within the region, one of the important new actions of the Basque Government was the introduction of a cluster policy. The basis of this policy was the cluster notion

actively promoted by the American economist Michael Porter. He, along with his consulting firm Monitor Group⁴¹, has contributed to the development of the core pillars of the Basque cluster policy in the first years of its development and implementation of Competitiveness programme, which was launched in 1991. As such, the Basque Country was one of the pioneer regions to apply Porter's methodology to detect potential clusters (Gomez-Larrañaga 2009). It followed up with the development of the cluster policy assisted by the Department for Economic Development and Competitiveness (current name as of 2014) of the Basque Government. Cluster policy was created with the aim of solving the problems existing in the region at that moment (1990s), especially in terms of productivity, R&D and internationalization. Along with this several other Spanish regions have also followed the cluster concept, in particular Catalonia and Galicia.

One of the core elements of this cluster policy was the establishment of public financial support at the beginning of cluster associations, which aimed to provide the role of "facilitators" among their associated firms (Aragón et al. 2014). Creation of the clusters was also driven with the aim to stimulate the demand side of the economy (Torres, Lagendijk 2000). Currently there are 11 priority cluster associations and 11 pre-cluster associations (Días De Alda 2015; Basque Government: Department of Industry, Innovation, Trade and Tourism 2012; Gomez-Larrañaga 2009). Clusters were built on the basis of what already existed. In reference to Aragón et al. (2009, p. 1) the members of these cluster associations dating to 2009 made 6% of firms, 28% of value added and 32% of employment in relation to the total values of the autonomous community. The initiatives are created in the following priority sectors: household appliances, machinery tools, automotive, electronic & information technology, maritime, energy, aerospace, paper and audio-visual. A major part of the priority cluster associations were established by 1998. The pre-clusters appeared later in 2009, with the aim of assisting other export potential industries in the region.

Although in the Basque Country the first cluster programme was finished around the middle of 1990, with some modifications cluster policy is still in place. Moreover Aragón et al. (2010) credit the decision to apply cluster policy directly to the development of the regional economy. As such this policy and its results has been the subject of research of several experts (Raines 2000; Aragón et al. 2009; Aranguren, Wilson 2013) and each time has provided new insights of different value. Nevertheless, the detail stage by stage policy process has not been studied broadly yet, nor its implications towards economic development. This is to be reviewed and analyzed in the following parts of the chapter.

⁴¹ The Company went bankruptcy in 2012 and was acquired by Deloitte Consulting, more information in Healy, B. (2012): "Monitor Group, founded by Harvard's Michael Porter, files for bankruptcy and plans merger", in Globe Staff, boston.com, 11.08.2012

2. Cluster policy review

In this part of the chapter we will focus on the detailed review of the cluster policy building in the Basque Country. We first propose a general overview of the policy interventions taken place during the last 30 years (before and during the cluster policy). It is then followed by addressing the existing cluster related institutions. After that we identify periods of the cluster policy evolution and then conduct a phase by phase review of the cluster policy life cycle. After a short summary on the cluster policy we will review the economic development and its main factors.

2.1. Historical overview of public policy interventions

The autonomous community of the Basque Country has established its current form of regional regulations and rights only in the second half of the 20th century. While sharing the opinion of Orkestra (2013) starting from the beginning of 1980s we tend to divide 4 periods of regional policy interventions and economic development in the region. The core regional policies are presented in the Graph 14. Most of the information is based on such sources as Torres and Legendijk (2000), Aranguren (2010b), Orkestra (2013), Ahedo (2004), OECD (2007a), Basque Government: Departament of Industry, Innovation, Trade and Tourism (2012), Müller (2007), Sánchez (2008) and the Basque Country Competitiveness Atlas (2015).

I. 1980s – Returning economy back to growth, stimulation of supply and implicit research infrastructure development strategy

During the times of Francisco Franco Bahamonde⁴², a high level of protectionism had been established. The negative feature of that was the lack of competition, which resulted in the absence of entrepreneurial spirit and passiveness of business sector. In such, since the 1980s the focus was put on overcoming the spreading economic crises and recession in the region. Later on, policies were more dedicated to building up new innovative and technological strengths within the autonomous community.

The late 70s brought a certain political stability to the region, especially in terms of new planning competences, which had been gained by the government of the newly formed regional autonomous community. However, the policy control over sectors with high level of public ownership, such as iron, steel and ship building was left on the national level, the restructuring of these sectors on the regional level was difficult, and reduced the speed of economic transformation.

At the same time regional authorities in the Basque Country could have been responsible for the technological issues. Referring to Sánchez (2008) started to improve the regional development with “multidimensional strategy, not only aimed to recover industry but also to support innovation

⁴² General and dictator of Spain 1939 - 1975

infrastructural, social and cultural development. (...) and established government supported science network called EITE (1986) that set up the basis for existing technology and science centers of the region” (p. 166). In such the general strategy of regional development since the 80s was built around following core aspects: innovation, cooperation, quality and internationalization, which were reflected in the mix of industry, science, technology & innovation-oriented plans.

The main purpose was to improve quality of products through increase of general R&D infrastructure (Torres, Lagendijk 2000). In parallel to other socio-economic related intervention this should also have lead to economic restructuring and building up of regional strengths. Referring to Orkestra (2013) this phase of regional promotion can be called “reconversion processes” (p. 38). Building up of science and innovation oriented infrastructure was not only through establishing innovation and research centers. The innovation-technology oriented support was also provided at the companies’ level in order to increase their R&D capacities and competitiveness in the internationalization. Technology & innovation policy was targeted towards the support of high tech application both in mature as well as in the emerging sectors and led to e.g. upgrading the new numerical control technologies in machinery tools sector, building technological parks, establishments of Modragon University first regional development agencies (SPRI), etc.

It was also pre-EU entrance period for the whole of Spain, which before and after brought significant positive changes, especially in terms of the market and business restructuring. One significant benefit was in the improvement of the physical infrastructure, especially roads and public transport. The EU accession in 1986 has opened a new market for the Spanish and Basque companies and thus resulting in export increase. On the other side the local companies has also faced strong competition from new companies and an increase internationalization of goods and services (Faíña et al. 2010).

II. 90s – Stimulation of the supply and demand, structural diversification and focus

The policies taken place in the 1980s laid a strong basis for the transformation of the Basque economy by setting innovation system, modernizing and upgrading enterprises. This led to a sustained growth path (Faíña et al. 2010). In the 90s the regional policy referring to Orkestra (2013) was less targeted toward only science and research system development and more oriented toward stimulating the demand side and had a more proactive feature. Herewith the policy was more oriented towards industry and business rather than research and development.

As such for the regional development the Competitiveness programme within the General Framework of Industrial Policy 1991-1995 has been developed. The plan was focused on shifting from direct linear R&D funding towards combining it with companies needs in the clusters

(Sánchez 2008). Clusters have been especially seen relevant for the promotion of region's competitiveness.

Although in this period of policy actions a stronger attention was set on business and modification of industrial structure, Torres and Lagendijk (2000) criticize that no big change took place in the way the business community was approached. In particular they highlight that the large national firms and established middle size firms were still the first to receive attention and financial support from the developed policies while the SMEs were left out again. This was a core hindrance in the way to transforming the industrial diversity of the economy. This will be particularly seen later, when we will speak about the character of support given to the cluster associations in the first years of the cluster programme. Apart from above mentioned activities another important aspect was to make a change in the habits, routines and mindsets of people in the public and private sector.

This double focus on specific industry clusters together with support of R&D centers is referred to as "consolidation of the Basque system for science and technology" (Sánchez 2008, p. 162).

III. 2000 – 2012 – Innovation through knowledge building and sector diversification

Starting from the beginning of the new millennium in the Basque policy a strong attention has been again set on the innovation and research, thus with the knowledge component that has to be embedded in the Basque economy. Referring to Orkestra (2013, p. 38) three phases of the policy focus from 2000 to 2012 can be identified:

- a) Phase 1 on diversification, C&T priorities: ICT, Biotechnology
- b) Phase 2 starting from 2005 on KET within them bio - nano
- c) Phase 3 on crisis resistance and adaptation

By the **beginning of 2000** it was already clear that despite the developed programmes toward the diversification of regional economy through clusters, a full transition wasn't achieved. The main problem was the insufficient incorporation of SME's into these changes. Therefore in this first phase the attention was laid on involving these types of enterprises through government support. At the same time, already on the European level the approach toward regional industrial specialization had appeared. Within this framework under the EU financial support two initiatives for development of industrial sectors based on new nano- (nanoBasque 2015) and biotechnologies (bioBasque 2010) have been launched. These initiatives were aimed to set the bases for innovation driven industrial development and specialization of the region in the 21st century. Application of the EU RIS 3 (Regional Innovation Specialization Strategies) approach was aimed not only at the continuation of sector diversification in the region, but has also played an important executive role for starting the long term strategic planning of regional development.

Apart from this, **since 2006** there has been a unified strategic approach being developed for strengthening industrial regional competitiveness. Herewith all industry relevant programmes are integrated under one competitiveness policy framework, PCTI 2015, which had set 5 strategic areas: ageing, transport and mobility, energy, digital world, science industry and 3 transferable skills: bio, nano (Orkestra 2013, p. 38). Within it the following programmes were developed: the Business Competitiveness and Social Innovation Plan 2006-2009 and the Science, Technology and Innovation Plan 2010. They were very interrelated and had set a long term strategic vision for regional development. All policy activities were result oriented, continued stimulation of entrepreneurial diversification and highlighted the need for increased social competitiveness. Furthermore, in contrast to the previous years many activities were targeted toward spreading the culture of innovation and entrepreneurship among the small and medium sized private sector. The intentions were also set on extracting more opportunities from the globalization opportunities, so that the whole regional innovation system is conducted, connected, balanced and open to globalization (Sánchez 2008).

The **financial crisis** in 2008/2009 hit all developed countries, especially those within the European Union. Among these countries Spain, and within it the Basque Country, was also affected. At the same time, due to the strong knowledge-oriented industrial base, the economy of the Basque Country managed to avert the crisis more than other regions. Nevertheless, due to reduced trade, consumption and bank credit activity, the business sector was strongly affected and was mainly focused on the developing strategies for crisis resistance. As such, the industry and innovation oriented policies continued to stimulate innovation with an active focus on SMEs, crisis resistance and further diversification with specialization.

IV. Since 2013 - 2020 – Innovation and intelligent industrial specialization

In 2012 a new legislation period of the Basque Government entered with the aim to make a deep analysis of the previous policies. Their outcomes resulted in clearer, more integrated and specialized plan for economic and innovation development of the Basque Country. In terms of regional economic and industrial development the plan puts increased attention on the importance of innovation and research for regional competitiveness. Furthermore, the need for multiple level (public, private, research centers) collaboration is also stressed. Finally instead of a pure diversification, the focus is set on intelligent specialization. This is driven by the European push towards the development of regional Strategies for Smart Specialization (RIS3)⁴³ and the main principles within the Cohesion Policy 2014 – 2020⁴⁴. RIS3 especially complements and guides the Basque Governments on the way to smart specialization through the cluster approach in order to

⁴³ For more information see <http://s3platform.jrc.ec.europa.eu/home>

⁴⁴ For more information see http://ec.europa.eu/regional_policy/what/future/index_en.cfm

achieve innovation and competitiveness strengths. This means that economic growth can be secured through knowledge integrated innovation building within several key industrial sectors. Industry development will always remain the basis and the priority for all actions and policies of the Basque Government (Interview, 1B). Especially energy (as it is a transversal topic for all businesses and production) and advanced manufacturing are given high priority. Furthermore the attention in the coming years is set on the creation of jobs and reactivation of economy by the 4i (innovation, industrialization, internationalization and inversion) strategy approach. Our special attention can be set in the Plan of the Industrialization 2014-2016, where reindustrialization of the Basque Country is put in focus. Based on the opinion of numerous interviews industrial focus was, and will always be, the core baseline for all types of policy actions. The role of SMEs and their R&D support by sustaining the transparency of the companies' performance is also assured. At this stage, the Basque Government sees importance of the revamping of a well-developed economy in order to ensure the overcoming of the crisis and enabling a new push for enhanced economic growth.

Since 2014 a new important feature can be added to the strategic planning of economic development of the Basque Country: it is much closer alignment with the programme Europe 2020⁴⁵: European Strategy for Smart, Sustainable, and Inclusive Growth. This alignment gives important inputs and guidelines into the policy and programs implementation and effectiveness in the forthcoming years.

To conclude all the above mentioned periods of regional strategy evolution can be generalized under the 3 core transformation periods.

The **first Transformation** started in the early 80s and lasted until the beginning of the 90s. Here the main focus was on overcoming the crisis of the 80s, bringing the economy back on track by revitalizing its enterprises and setting the understanding for the need to transform the existing state-driven sectors of the Basque Country. Knowledge and innovation based institutions were also first established during this period. Thus, the closer integration of the research institutions into the business sector has happened only in the later transformation stage.

The **second Transformation** took place from the middle of the 90s up to the years of the financial crisis. Based on the previously established ground for innovation based industrial diversification and specialization many programmes and activities were targeted towards identification and support of new sectors. This had to strengthen and enable to explore the opportunities of globalization while simultaneously developing specialization of the Basque Country in certain areas. Here, in contrary to the previous stage (innovation for cost minimization), the desire was to increase and enhance the knowledge potential.

⁴⁵ For more information see <file:///C:/Users/Anastasiia/Downloads/Europe-2020-A-European-Strategy-for-Smart-Sustainable-and-Inclusive-Growth.pdf>

Finally, the **third Transformation** began around 2009. Due to financial crisis 2008 it was hindered and was finally re-defined in 2013. It has stronger alignment with the EU strategic plans and intends to revamp the Basque economy by further focusing on innovation through re-strengthening specialization in sectors, especially in industry, enhancing internationalization and ensuring inversion. Along with the three transition periods, the Basque Country has also managed to pass from having single plans to a complex integrated strategic competitiveness based approach for industrial and technological development of the region.

Graph 14 Main regional development policies and periods of transformation since 1980s up to 2013, the Basque Country

1980s restructure, supply stimulation/ R&D development	1990s supply & demand stimulation, diversification	2000 - '12 innovation and diversification	since 2013 innovation & intelligent industrial specialization
Beg. 80s: Basque Government Policies <ul style="list-style-type: none"> Financial support of large firms in crises 1980 - 1990: Industrial restructuring policy <ul style="list-style-type: none"> Focused on recovering mature and declining sectors Promoted the development of several institutions to improve firm and regional competitiveness 1981- 1989: Industrial and technological policy <ul style="list-style-type: none"> Strong focus on high technology Growth of technology parks 1989 - 1991: Industrial & technological policy	'91 - '95: Competitiveness Programme within General Industrial Policy Framework ('91 - '95) <ul style="list-style-type: none"> Improve competitiveness of firms -> competitiveness of the region Promote active cooperation between firms Incite firms to concentrate on their competitive strategic challenges '93 - '96: Industrial Technology Plan '96 - '99: Industrial Plan/ Industrial policy framework <ul style="list-style-type: none"> Focus on improving cooperation among firms and between government and industry Cluster associations had to develop their plans and have their formal committees on cross-cutting themes '97 - '00: Science & Technology Plan	2000 - '03: Industrial Policy Plan (Inter-institutional Plan for Economic Promotion) <ul style="list-style-type: none"> Align activities at the regional and provincial (sub-regional) level: <ul style="list-style-type: none"> Cluster agreements became annual & included Strategic Action Plans per each of the 3 horizontal themes Development of the organizational matrix of civil servants (by government) '01 - '04: Science & Technology Plan/ Framework (part of EU 4th Framework Programme) <ul style="list-style-type: none"> Systematic approach (regional innovation system) Increase participation of firms and technology centers Stimulate demand driving services '03 – 2015: Competitiveness Strategy Euskadi 15 Forum: <ul style="list-style-type: none"> '06 - '09: Business Competitiveness & Social Innovation Plan / Programme <ul style="list-style-type: none"> Innova Cooperation Initiative '10 - '13: Business Competitiveness Plan	2003 – 2015: Competitiveness Strategy Euskadi 15 Forum (continued) <ul style="list-style-type: none"> Science, Technology and Innovation Plan 2011-2015 Basque the Information Society 2015 The Basque Energy Strategy 2020, Business Internationalization Plan 2014-2016 Plan for Basque Tourism 2020
Separate regional plans (industrial, technology, etc.)		One regional planning combining several policies	
1st Transformation		2nd Transformation	
		3rd Transformation	

Source: Author's development based on indicated sources

2.2. Regional institutions involved in the cluster policy making

At this stage before moving to the study of the cluster policy in detail, we want to highlight the main institutions, which were and are involved in the cluster policy making process. Generally in reference to Annoni and Dijksra (2013) the institutional system in the Basque Country is very well developed and is placed on the 61st place out of 258 other compared regions. The institutions-related indicator (Annoni, Dijksra 2013) includes the evaluation based on such characteristics as corruption⁴⁶, rule of law⁴⁷, government effectiveness⁴⁸ and voice account⁴⁹. The established institutional system in the Basque Country also faces certain critics. The main criticism is related to the strong decision making role of the government authorities (both on the regional, as well as provincial and municipal levels), which is taken by them in terms of policy priorities setting. This leaves little room to participate for other important institutions, as well as many activities and measures can be repeated due to little coordination between these public institutions (Aranguren 2010b).

Based on our study as of August 2014 we identify three main agent groups: government/ public, R&D/ education and firms' related institutions, which are involved in the cluster policy making. This, as has already been mentioned by (Basque Government: Departament of Industry, Innovation, Trade and Tourism 2012), supports the classical triple helix model for the realization of the cluster policy in the region. Within each of the institutional groups, there are several organizations, which play an important role in the policy, namely in the government: Basque Governments and its department(s), in particular Economic Development and Competitiveness, then SPRI - Agency for Regional Development, Local Development Agents; Firms' group is mainly represented by Cluster associations and Chamber(s) of Commerce; and finally the third group: Research institutions, which is reflected by two main sub-groups, Universities, Technology Parks and Network. The Graph 15 reflects these institutional groups.

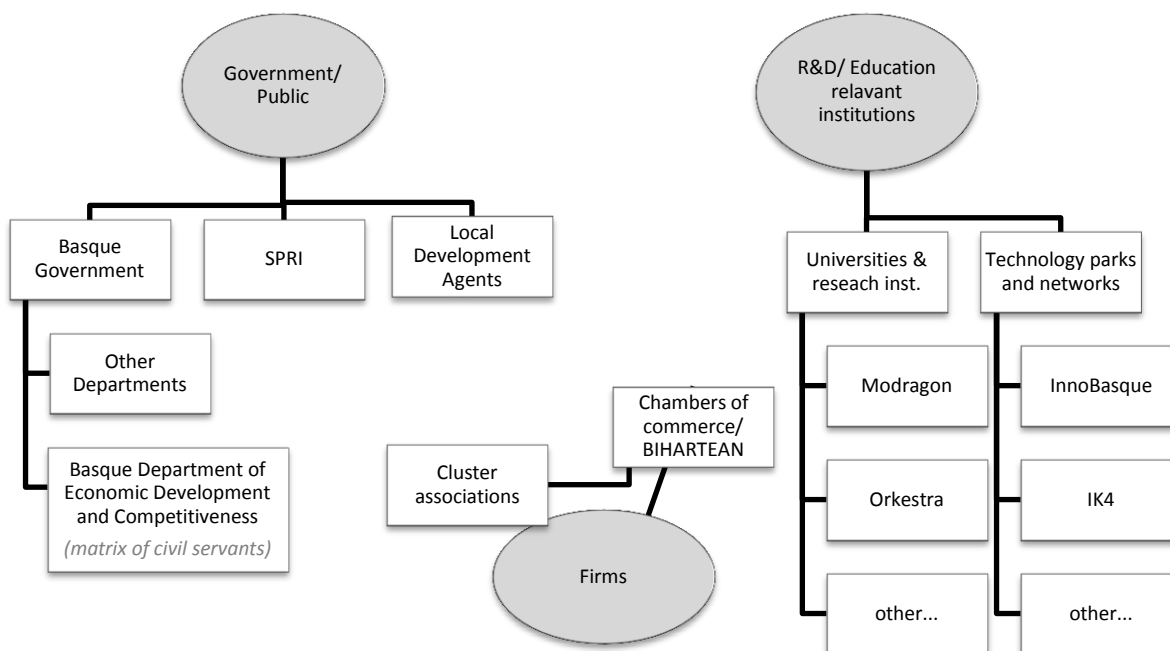
⁴⁶ perception of corruption in public services, especially in the local public school and healthcare systems,

⁴⁷ quality and fairness of local police force,

⁴⁸ quality and fairness of local public school and healthcare systems,

⁴⁹ fairness of elections and neutrality of mass media

Graph 15 Key institutional groups in the cluster policy making, the Basque Country



Source: Authors' development

At the same time it should be kept in mind that the Graph 15 reflects the institutional structure dated to 2014. Over the years some of the organization and their character have appeared/ disappeared. An example of this can be seen from the Matrix of cluster support civil servants, who were fulfilling the role of brokers between the government and firms in the establishment of sector/ cluster organizations. Most of these roles are now transmitted to SPRI. Another example can be given by mentioning the participation of the Chambers of Commerce. In the earlier stages of cluster policy making they have barely participated, whereas in more recent years, due to several cross border initiatives, their role is becoming more evident. We will reflect on these structural changes later while presenting each organization and stage of cluster policy process in-detail.

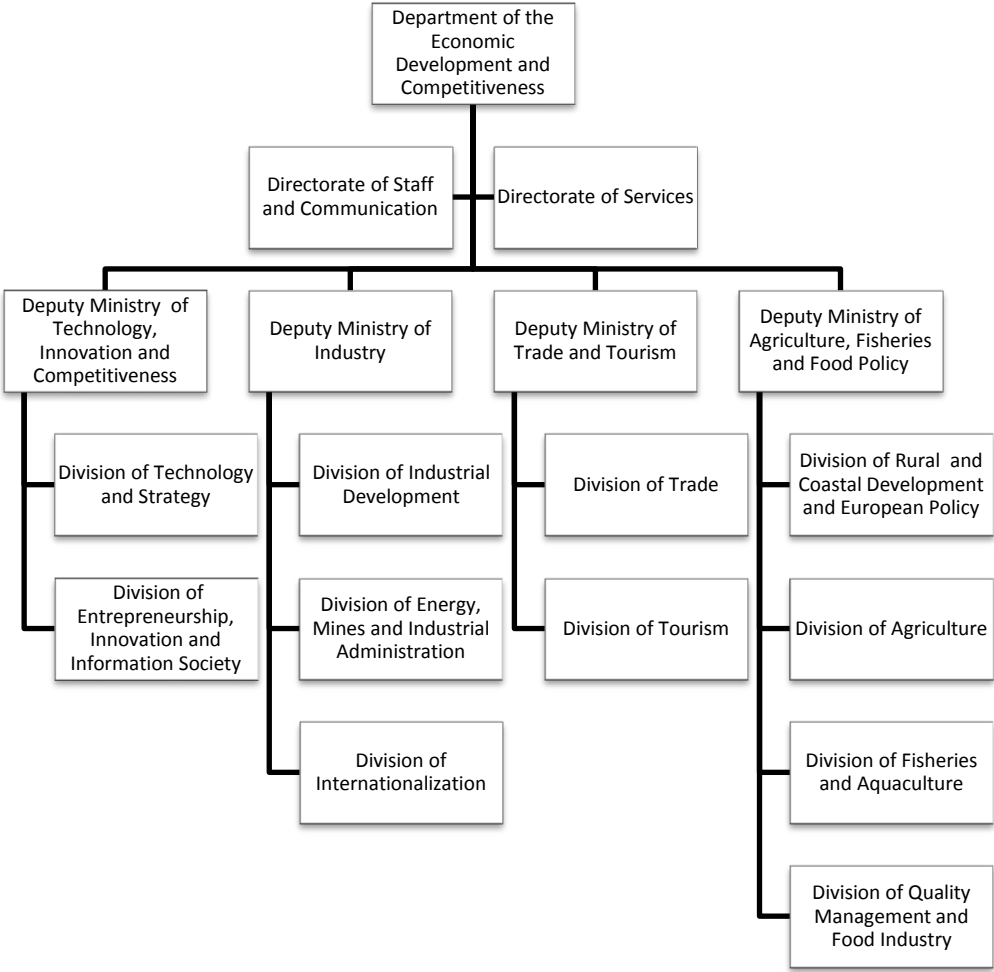
I. Government and public institutions

2.2.1 Basque Government and Administration

The Basque Government has played a very active and important role in the launch and development of the cluster policy. Especially in the early stages the role of some particular people in this institution was very decisive. The main reason for such a strong role of the government in the policy building processes is very closely connected with historical reasons. Within the Basque Administration in particular the Department of Economic Development and Competitiveness (earlier name: Department of Industry, Agriculture and Fishery, then Department of Industry, Commerce and Tourism) is responsible for the policy development. In August 2014 cluster policy is

mainly under the directive of Division for Internationalization. Graph 16 below reflects the main divisions within the Department of Economic Development and Competitiveness.

Graph 16 Organization of the Department of the Economic Development and Competitiveness, the Basque Country



Source: Authors’ development based on Basque Government (2014)

The main tasks of the government officials are in the development of programs or plans strengthening business, regional economic development, innovation and competitiveness and in promoting clusters along the main thematic lines.

Further we will only briefly mention the involvement form of the Basque Government in the cluster promotion. Due to economic decline at the end of 80s and beginning of 90s the ministry and the department in charge of industrial and economic development decided to apply new economic techniques to enhance territorial strengths. This brought the region to the launch of the cluster policy. In the early years the representatives of this department have set up the matrix of civil servants, who were in charge of cluster initiatives development processes. During the first years the government officials were actively involved in the establishment of the cluster associations and the promotion of the policy. Therefore the development of the cluster policy in the Basque Country is

often seen as a top-down approach. Moreover the cluster policy itself was often perceived by other economic agents as a government initiative. With time the influence was reduced.

Along with criticizing the policy making in terms of the strong control and the overlapping of powers, it was also claimed that many decisions were non-transparent, politicized and person related, e.g. the selection of cluster association participants or priority sectors for cluster support (Torres, Lagendijk 2000). This was especially the case in the first years of cluster policy. This often has to do with aforementioned historically established strong decision-making role of the government, but also with the existing competition between different political parties, which exist in the Basque Country.

2.2.2. Business Development Basque Agency

Another important actor related to cluster promotion is a special business development agency named Sociedad para la Promoción y Reversión Industrial⁵⁰ (El Grupo SPRI), which was initiated by the Basque Government in the beginning of the 80s. At the same time its importance with regards to the cluster policy has only been realized in recent years. The main general goal of the agency is to “support, promote and contribute to the competitive improvement of Basque companies, thereby collaborating with generating wealth in the Basque Country and improving the well-being of its citizens by means of sustainable human development, within the scope of the Basque Government Economic Promotion Policy” (El Grupo SPRI 2015). Referring to Aranguren et al. (2008) SPRI fulfils two main important roles: networking and financial. In terms of government programmes it “manages 75% of the budget of the Basque Government Department of Economic Development and Competitiveness and ensures that it is distributed through services, programmes, investments and subsidies” (El Grupo SPRI 2015). El Grupo SPRI is composed of technology parks, industrial parks, Venture Capital Company, entrepreneurs’ incubators and the internationalization network.

SPRI is assigned to the Department of Economic Development and Competitiveness. The President of the SPRI is the Vice-minister of the Department Economic Development and Competitiveness. Since the early years the organization was actively involved in the implementation of different programmes developed by the Basque Government particularly in the framework of the horizontal thematic areas proposed by the Basque Government (Interview 1L). At the moment (2014) SPRI works along the following thematic areas: internationalization, entrepreneurship, technology, innovation, information society, RIS3-Euskadi, financing of local business, attracting foreign investment and businesses to the Basque Country and finally on infrastructure promotion. Their services range from accompaniment for companies as they expand abroad, over provision of

⁵⁰ Society for the Promotion of Industry

information and advice concerning European business policies and opportunities, to preparing business management and companies' employees to different challenges regarding the future related skills and knowledge. Moreover, the assistance of the agency provides is also global, as the institutions has its offices in several foreign countries, mostly where Basque companies have interests (Interview 1B).

Since 2014 a large part of the operational activities previously carried out by the Basque Government was re-directed to SPRI increasing its participative role in cluster development. This is mainly to do technical and networking competencies that this organization can offer Basque clusters.

2.2.3. Local development agencies

On the level of the municipalities local development agencies, often called as LDAs, exist. For example in San Sebastian the agency called Fomento de San Sebastian⁵¹ organizes different events and activities to enhance socio-economic development of the city. Among its activities in the last years, the identification, awareness raising and marketing of the existing clusters on the municipal level can be mentioned. One of the reasons for LDA appearance is associated with the problems of the municipal councils in understanding the economic policy on the regional level and herewith, of their desire to have an influence on the territorial development in the Basque Country (Aranguren 2010a). As such, LDA's are also considered to have innovation and competitiveness related functions at their level of action. This is of course one of the reasons for the multiplication of similar policies at different sub-administrative levels within the autonomous community of the Basque Country.

Nevertheless the local development agencies play, and have played, an important role in the successful identification and establishment of the clusters in the region. Besides the direct assistance provided to the companies, they often serve as a network builders and information providers. The networking character is seen through their knowledge of the actors and their needs on the local level and at the same time connections with key decision makers and institution up to the country level. The establishment of a special cooperation framework between the Basque Government and the association of the local development agencies of the Basque Country, which is called Garapen⁵², is a good example of this. Under this framework in cooperation with the research institute Orkestra – Basque Institute of Competitiveness, the mapping of clusters in the region is taking place. This collective information served as guidance for the sectoral definition of the strategic programmes on the municipal and regional level (Aranguren et al. 2008).

⁵¹ For more information see <http://www.fomentosansebastian.org/>

⁵² For more information see <http://www.garapen.net/>

II. Firms and firm based institutions

2.2.4. Chambers of commerce

Worldwide chambers of commerce are seen as network representation of different businesses and tend to be established with the purpose of defending the interests of the business community in front of other market agents. This is also the case in Spain and in particular in the Basque Country (Muñoz-Cañavate, Hípola 2008). These associations / institutions exist on different territorial levels, from the city to state and can be considered as an organism for public-private partnership. Each province, within the observed community, has its own chamber, Cámara de Gipuzkoa⁵³, Cámara de Comercio de Bilbao⁵⁴ and Cámara Oficial de Comercio e Industria de Álava⁵⁵, which are then coordinated by the Upper Council/ Consejo Superior de Cámaras de Comercio (Muñoz-Cañavate, Hípola 2008). Based on the interview (Interview 1J), we have identified that although the chambers of commerce provide numerous services, including advisory, information, enterprise studies, defense of interests, etc. to the local and regional companies, overall they haven't played a very proactive role in the cluster policy. At the same time, in the last couple of years within the developed initiative between the two bordering chambers, Chamber of Commerce of Gipuzkoa and Chamber of Commerce of Bayonne, Aquitania region in France, a project named Bihartean⁵⁶ has been launched. Within this project, which is aimed at discovering cross-border potentials of the regions, enhancement and stimulation of cross-border cluster cooperation has taken one of the central places. This project sets new basis for the role of the Basque chambers in terms of clusters development, stimulating cooperation and linking with existing institutional agents.

2.2.5. Cluster associations

In the Basque Country as a result of cluster policy 11 cluster associations supporting priority clusters and another 11 associations - pre (potential) clusters have been established (reference January 2015, Días De Alda 2015). The full list of the existing cluster association with key information can be found in the Annex 7. More detailed information on the establishment, organizational and thematic structure, relationships with other economic agents and modification of cluster association is presented in Part Policy implementation of this Chapter 6. The appearance of the first cluster associations is traced to the beginning of the 90s. Since then only one organization - "Business Knowledge" (Conocimiento), which used to be in operation, has disappeared. It was created 1996 and then later on merged into a new innovation agency, Innobasque (Parrilli 2013; Tecnalia 2011)

⁵³ For more information see <http://www.camaragipuzkoa.com/>

⁵⁴ For more information see <http://www.camarabilbao.com/>

⁵⁵ For more information see <http://www.camaradealava.com/>

⁵⁶ For more information see <http://www.bihartean.com/>

Cluster associations are non-profit entities, which are composed of different economic agents representing agglomeration of companies in a certain economic sector, which is called a cluster. The main purpose of the cluster associations is the development of existing or promising clusters in defined sectors in the Basque Country. Most of the **members** are companies, although in recent years other types of institutions are also starting to join these associations. Referring to Aranguren (2010b, p. 91; Tecnalía 2011, p. 15) the members of these associations compose 28% of the employment and 32% of GDP of the Basque Country. The same sources assume that one third of the Basque industry can be associated with one of the clusters. At the same time, each cluster association has less than 200 members. Due to the difference in the year of cluster association establishment and the character of the cluster/ industry, all of the associations differ from each other. In terms of the members, cluster associations also differ based not only on scale, but also geographical scope: local, regional and supra-regional/national.

In reference to Landart et al. (2005) the cluster associations in the Basque Country are established based on the existing sectoral value chains. The **establishment** of the cluster associations in most of the cases took place in a top-down or a mix way. Referring to interviews (1G, 1C) the idea of sector associations' wasn't absolutely new, as for many some companies already had their associations for several decades. Nevertheless the first official cluster association was established in 1992.

One can notice that the existing cluster associations are divided in two groups: priority and pre-cluster, which is based on the character of the regional cluster policy prioritization. These pre-clusters differ from priority clusters in terms of public financing and other aspects connected with general strategic regional planning. All cluster associations have an ultimate goal of "improving competitiveness of their companies through joint projects" (Basque Government: Department of Industry, Innovation, Trade and Tourism 2012) and later on through these to enhance the competitiveness and innovativeness of the Basque Country itself.

Starting from the first cluster associations its members had to pay for the participation in the organization and for certain services. The annual membership fee is variable depending on the size of the company, which in most of the cases is based on the number of employees, from EUR 800 to EUR 10000 yearly (Interview 1H). Cluster associations are also supported by public funding, which is mostly directed to the coverage of labour costs and activities organized by associations. Public funding varies depending on the type of the cluster association, priority or pre-cluster. As of 2014 there will be annual calls for the presentation of annual action plans, which will be reviewed and evaluated by SPRI and the Basque Government (Interview 1L). Cluster associations along with the government and other mentioned economic agents have been taking a central place in the development and the promotion of clusters in the Basque Country. Although their role is very

significant, the development of clusters shouldn't be attributed only to their establishment. Moreover as mentioned by Franco et al. (2012) the development of clusters itself was lead more by path-dependency forces, rather than political measures. Now cluster association is seen more as a forum for the communication between its members and representatives from business, universities and public institutions (Aragón et al. 2010). The participation in such a forum raises awareness of the companies on many current trends and helps the companies and other members to deliver a higher level of product quality, services and innovativeness.

III. Education institutions together with Research and Development institutions

2.2.6. Universities and research institutions

In the Basque Country there are several academic and educational institutions, which in one or another form have influenced the development of clusters. Generally during the observed 20 years the educational system has been improved. Nevertheless based on the conducted interviews (1H, 1O) local experts see further need to improve the educational system in the Basque Country. In particular to make it more oriented to the local business needs.

Regarding the cluster development we would like to mention the role of the **Mondragon University**⁵⁷, which has evolved from the polytechnic school due to the merger of three different cooperatives in 1997. The uniqueness and contribution towards cluster promotion of this University is in its participative model of education, which aims to integrate companies into the educational system while facilitating the social transformation of the society. The close cooperation between the university and the business sector ensures that the students receive strong practical knowledge, while in turn companies participate and share their knowledge with the students, who turn to be highly qualified specialists. Indeed such close relations between academia and the private sector should strongly contribute to cluster building. The University is owned by Mondragon Corporacion – a co-operative conglomerate, initiated by a priest in 1956. Besides being the biggest cooperative in the Basque Country, it is also the 7th biggest in Spain (OECD 2011, p. 57).

Another important academic and research institution in terms of cluster identification and analysis is **Orkestra-Basque Institute of Competitiveness**⁵⁸. The research center was created through the **Deusto Foundation** in 2006. Its prime aim is to contribute to the enhancement of Basque territorial development and competitiveness. Although the main objective of this institute is to investigate and provide recommendations for the promotion of economic development, it also serves as a modirator and a link between all economic agents in the regions and several outside players (Aranguren et al.

⁵⁷ Most of the information regarding the Mondragon University is based on its Homepage, see <http://www.mondragon.edu/>

⁵⁸ For more information see <http://orkestra.deusto.es/>

2008). The research conducted by experts of this institute not only serves as a guidance for many public and private entities, but also, due to their participative methodological approach toward the research, ensures the effective application of the developed methods and enriches the knowledge base of the center itself. Orkestra has conducted numerous studies on clusters, clusters associations and cluster policies. These practical publications increase the awareness of cluster associations, public actors and businesses from within and outside of the Basque Country.

The **University of the Basque Country** (Universidad del País Vasco⁵⁹) as well as **Deusto University**⁶⁰ along with academic and educational functions have also managed to establish some links with the business communities. Although these institutions are also worth mentioning, their role within the cluster building has not yet been fully realized.

2.2.7. Technology parks and networks

Other research institutions contributing to cluster promotion in the Basque Country from a more applied side are technological centers and organizations. They have been created mostly as the result of a very pro-active innovation and technology policy in the region in the last 30 years (OECD 2011; Sánchez 2008; Torres, Lagendijk 2000). For example in referring to Ahedo (2004) in 2004 there were around 10 technology centers, 4 sectoral research centers, 13 R&D business units, 4 research laboratories, 14 intermediate innovation organizations and 3 technological parks within the Basque technology network. In 2012 (Basque Government: Departament of Industry, Innovation, Trade and Tourism 2012) identified the next 6 Research Centres of Excellence (BERC), 7 Centres for Collaborative Research (CIC) and one more technology park (forming all in all 4 – in Bizkaia, Álava, Gipuzkoa & in Modragon, GARAIA). At the same time such number of different research, innovation and technological centers and parks for a comparatively small territorial scale raises a high level of criticism, as often these agencies cause the duplication of the activities and / or lead to concealing of the results or research sharing.

That is why since 2005 there were studies and analysis undergone to merge and/ or build more integrated co-operation of existing institutions with the aim of raising efficiency among them. These new established centers have often assisted cluster associations in developing their horizontal and very technology specific topics (Interview 1G). The first step towards the merging of existing efforts was the creation of **IK4 Alliance**⁶¹ in 2005, which is a private scientific and technological corporation composed of 9 centers (September 2014, IK4 Alliance Homepage). The members of this alliance keep their sovereignty while sharing their strategies. The biggest advantage of the IK4 is in its unification of the strategies of R&D centers, and herewith the centers' possibilities to

⁵⁹ For more information see <http://www.ehu.es/>

⁶⁰ For more information see <http://www.deusto.es/>

⁶¹ For more information see <http://www.ik4.es/>

respond to the challenges of the globalized big companies whilst at the same time maintaining the advantages of SMEs. In this way the alliance guides clusters' members on their way towards internationalization and technological product or service upgrade, and additionally helps centers to be effectively involved in the clusters needs by distributing and coordinating the information on required involvement in the firms (Basque Government: Departament of Industry, Innovation, Trade and Tourism 2012).

Further steps were taken in 2007 with the region-wide initiative stimulating cooperation networks for innovation, **Innobasque**⁶² (Aranguren 2010a). With time it turned to be an effective private, not-for-profit Basque Innovation Agency (Agencia Vasca de la Innovación-Berrikuntzaren Euskal Agentzia) promoting not only innovation but also entrepreneurial spirit and creativity.

Similarly to IK4 in 2010 another alliance named **Technalia Research & Innovation**⁶³ appeared. Moreover, from the merging of 8 technology centers with a total of over 1 400 people (September 2014, Technalia Homepage) it turned to be the biggest private research, development and innovation group in Spain. Having the main mission in “generating business opportunities for companies and to transform knowledge into GDP improving people’s quality of life” (ibid.) is a making a valuable partner for most of the Basque companies and clusters. The Technalia corporation, which was created in 2001 with the aim to contribute to the development of “economic and social environment by means of the use and promotion of Technological Innovation through the development and dissemination of Research in an international context” (ibid), is also actively involved in many cluster-based international projects, e.g. in energy sector or telecommunication sectors (Interview 1G).

To conclude the part on institutions we can see that different agents have been participating in the cluster development process over the last years. Some of the agents, like the Basque Government and most of the technology centers have been deliberately pursuing the cluster supporting strategy, whereas others, e.g. local development agencies or universities, first indirectly through natural needs and later by grown awareness became involved in cluster support. Nevertheless the coordination between them is not fully harmonized and requires better strategic prioritization.

2.3. Evolution of cluster policy

Considering the launch date the cluster policy is seen as one of the oldest, especially within the countries of the European Union (Azua 2008). Moreover, in reference to Hospers (2002) and OECD (2007a) it is also seen as one of the best practices in terms of the implementation. During these years the cluster policy hasn't stayed the same, but rather has been slightly modified. At the same

⁶² For more information see <http://www.innobasque.com/>

⁶³ For more information see <http://www.tecnalia.com/>

time Aranguren and Wilson (2013) highlights that the important issue is that the policy is still “active today and is one of the longest running in the world” (p. 10). That is why the cluster policy is especially interesting to study for the in-depths analysis.

First of all we would like to highlight the identified periods in the evolution of the cluster policy. The periods were identified while observing the cluster policy through the prism of the seven stages of the policy process.

During the observed 20 years of the cluster policy implementation we have identified four periods in the evolution of the cluster policy: I) 1989 – 1999: Grounds building, II) 2000 – 2005: Improving and polishing, III) 2006 – 2012: Giving new opportunities and IV) Since 2013: Re-management boost (Table 20). This division into cluster policy periods is very similar to the one earlier identified by Aranguren and Wilson (2013, p. 10) and Müller (2007). The cluster policy specific programmes and plans can be found in the earlier Graph 14 as well as in Table 20.

Table 20 Identified periods of the cluster policy evolution in the Basque Country

Period	I	II	III	IV
Years	1989-1999	2000-2005	2006-2012	Since 2013
Duration	10	5	6	6
Name	Grounds Building	Improving and polishing	Giving new opportunities	Re-organizational & re-focused industrial boost
Action	Cluster (initiatives) establishment	Setting strategic programme planning for cluster associations	New cluster identification/ pre-clusters and inter-clustering	Sharing organizational powers and building new sector priority
Core objectives	Identification; Realization of competitive strengths; Productivity improvement of companies	Internationalization; Learning; innovativeness	Cross-cluster spillovers; new innovation opportunities; hidden industries	Innovativeness, internationalization and industry focus;
Funding of cluster development	Public + Private	Public + Private	Public + Private	Public + Private

Source: Author’s development

Now we will describe the key highlights of the cluster policy in each identified evolutionary period.

I. 1989 – 1999: Grounds building

This period is associated with the bringing of the cluster concept into the regions and setting the grounds for its intensive implementation. By the end of the 1980s the Ministry of Economic Development and Competitiveness was looking for the new ways to boost regional strengths. It was clear that earlier launched innovation and technology-related programmes couldn’t give full strengths to maintain the economic pace of the regional growth. Furthermore as the 1990s were

considered as a transformation period, the cluster policy was seen more as a supporting tool to create the basis for the future challenges of the 21st century.

Around the same time the cluster as a concept was actively studied in academic circles and also promoted by Michael Porter as a tool to identify the industrial and sector strengths of the territory. The officials of the Basque Government initiated the study identifying clusters in the region. This study was followed by the programme, which aimed to raise general awareness (on the cluster concept, the existence of companies from similar sectors and potential, which could be extracted from possible cooperation with other companies in the sector) among the companies of the identified existing, or potential, clusters. Setting up, co-financing and providing informational support for cluster organizations was seen as a mechanism to achieve the set goals.

The main programmes, which were covering the cluster development, were the Basque Competitiveness programme (1991), Industrial Policy Framework (1991-1995) and Industrial Policy Framework (1995-1999).

II. 2000 – 2005: Improving and polishing

Around 2000 a review of the cluster policies functions as well as its general necessity was initiated. This was the first significant review of the existing mechanisms and actions to stimulate the economic competitiveness based on the cluster approach. During this time many discussions regarding the effectiveness and the purpose of the cluster policy took place. This period can be also strongly labelled as the first possible turning point for the existence of the cluster policy.

The outcome of these discussions and reviews was the decision to maintain the cluster policy, although with significant changes. The organizational and co-ordination structure within the cluster associations was changed. It started to be more organized and the employees' role and positions were more clearly defined. Furthermore, the associations started to design their sectors and action strategic plans and justify their activities in order to receive public funding. Finally the cluster initiatives started to be open to all the desired economic agents from a certain sector.

The cluster policy was supported along the following programme: Interinstitutional Plan for Economic Promotion (2000-2003), Science, Technology and Innovation Plan (2001 - 2004).

III. 2006 – 2012: Giving new opportunities

After the long debate and decision making in the previous period of cluster policy, in this third period it was made clear that cluster policy is justified. One of the possible contributions to such justification was number of European and worldwide studies and spreading of the cluster policy as an effective tool for the strengthening of economic potential. Another reason might have been the

interest showed towards cluster building on the national (Spanish) level as well. Until 2006 in Spain cluster policy was mostly the responsibility of regional authorities. Since then on the national level some cluster policy mapping initiative were suggested and were represented by Ministry of Industry, Tourism and Trade through the Directorate General for Small and Medium Enterprises (DGPYME) (Müller 2007). The main objective is the creation of a competitive and business enhancing environment for enterprises. This programme is known under the name: Innovative Business Groupings (IBG) identification and registration. Herewith in the third period of cluster policy evolution, the discussion and all policy relevant modifications were connected with the desire to maximize the potential from the existing and possible clusters by organizing a more result based cluster policy. Another crucial element within the new trends in terms of cluster promotion was the highlighting of the technological cooperation between the companies and all other relevant institutions as a source of innovation. That is why by observing all measures, which were taking place on the regional and cluster associations' levels, we labelled this period as discovering hidden chances or, in other words, discovering new sectors and potentials of the clusters in order to create new strengths for the Basque economy.

During this period (ca. 2008) policy notions such as pre-clusters appeared. The idea of pre-clusters has evolved from earlier existing Quality programme, which came to an end, but produced several potential sectors within the Basque economy, which needed continued attention and support in order to maintain their strengths on regional and national levels (Interview 1L, 1I). Furthermore, another cluster policy trend has also appeared, namely the stimulation of cross-cluster collaboration (ca. 2011). Finding the links between existing clusters were also seen as an effective way to gain new potential for companies and later for the region as a whole. The cluster policy was supported within the following programmes: Competitiveness and Social Innovation Plan / Programme (2006-2009) and within it Innova Cooperation initiative, Business Competitiveness Plan (2010 - 2013), Science, Technology and Innovation Plan (2007-2010).

IV. Since 2013: Reorganizational and re-focused industrial boost

The last period, which was identified by us, is considered to have started in late 2013. The main features of the fourth cluster policy period is associated with the change of the Government in 2012, and the desire to review the performance of the supported pre-clusters and in this way redefine the sector priorities of the region, re-allocate operational activities to SPRI while aligning regional strategy with EU thematic and funding priorities. Moreover regional institutions were in need to introduce a number of policy managing changes, e.g. a long term planning or thematic policy prioritization, while having interest in accessing European funding within the Cohesion policy 2014-2020 or Europe Horizon 2020.

It is still a little bit early to make comprehensive statement about forthcoming changes, as at the time when we conducted the interviews the new policy discussions and most of the decisions were only in development. Nevertheless, we managed to identify three main changes, which are about to take place in cluster policy in the Basque Country: the management and communication with the cluster organizations, the funding for cluster associations and strategic prioritization of clusters and the promotion of their internationalization. We will describe the changes in more detail in the Part Policy development stage of this Chapter 6. All in all this means a clear government desire to be less involved in the implementation of the cluster policy programmes and focus more on their general planning. The reasons for this are seen in the lack of cluster competent experts within the Basque Government authorities on the one side and the maturity of the associations to operate effectively independently on the other side. Another important change is connected to the high number of cluster organizations and as a consequence, difficulties not only in managing them but also in setting priorities for their role within the regional development. It is especially relevant within “European industrial renaissance”⁶⁴, where lots of attention is to be given to the strengthening of the selected industrial capacities of the region.

To conclude on the above policy periods, we can see that the cluster policy in the Basque Country by passing through different evolution stages has 1) always kept the focus on several key industrial sectors, 2) managed to stimulate diversification of traditional sectors, 3) was open to introduction of new models within the development of the cluster concept itself, 4) has used cluster policy as an important element to stimulate innovation and other way round and finally 5) responded with the cluster policy to the needs of the changing sectors within its own economy.

2.4. Reviewing stages of cluster policy process

In this part of the chapter, we are going to do an in-depth study of the 7 stages of the cluster policy process in each of the above mentioned 4 periods of the policy evolution. While presenting the policy stages we will keep in mind the identified key factors, which are important for the effective policy making leading to economic development of the region. The detailed information on the methodology of the policy stages is reflected in Chapters 3 and 5 of this thesis. The summary table of the main findings from each policy stage in each of the periods can be found in the Annex 9.

2.4.1. Discussion initiation stage

By the 1990s the industrial and economic development of the Basque Country was in decline. Landart et al. (2005) mentioned that at that time there was an opinion that the Basque economy had lost its traditional competitive advantages in regard to the global economy. At this time (1990s)

⁶⁴ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS For a European Industrial Renaissance (COM/2014/014 final), <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52014DC0014>

most of the industrialized countries started to compete in high-technology or high-quality products, and neither of these could be offered by the Basque producers. This was especially required of the Basque Country since the Spain's entrance to the European Union in 1986. In order to achieve new competitive strengths, the Basque economy needed to redefine its approach to economic planning and thinking.

At the same time it was also the moment when Michael Porter has been actively promoting the new model for defining economic competitiveness based on the clusters support, which was later expressed in one of his earliest books "Competitiveness of Nations" (Porter 1990). The cluster concept reached key officials from the Basque Country during their study trip to the United States (OECD 2007a; Ahedo 2004) (Interview 1E). As a result of this trip and with a strong encouragement of one of the government officials, Jon Azua, the discussion within the Basque Government to start the cluster policy was launched. In reference to Esteban (2007) Michael Porter himself made a visit to the Basque Country and convinced the Minister of Industry of the effectiveness of the project. Based on Torres and Lagendijk (2000) the logic or argument behind the concept of clusters presented by Porter was the continuation of sector-oriented approach, which already existed in the Basque Country but in a more systematic and structural way. Herewith the application of cluster based support for the territorial development would have been basically the continuation of already existing industrial structure.

Although many policy makers were convinced with the model suggested by Porter, there were others, criticizing the cluster concept and supporting the idea of stronger innovation support. These alternative points, as Torres and Lagendijk (2000) mention, had the idea of more horizontal and general support of the business environment and with a stronger promotion of R&D, education and marketing. Furthermore, the supporters of the alternative to cluster approach thought that if the supporting sectors were chosen incorrectly, it might lead to poor allocation of the resources and further destabilize the economy. Pro-Porter supporters strongly argued against these points. On the contrary they were sure, that without sector specification the general financial support would be a waste of money, as the region wouldn't be able to develop a certain kind of specialization, which was important for the technological and quality upgrade of the products and services. Another aspect of the discussion, in reference to Torres and Lagendijk (2000), was centered on the role of domestic and foreign companies within the Basque economy. The core of the debate was the fear that if the cluster related SMEs would follow the lead of the big companies while still not being able to face international competition, the Basque Country could lose not only big players, but the whole regional competitiveness as well. These discussions ended with the decision to contract Porter's founded company Monitor Group to conduct a study reflecting the current economic situation in

Basque country, its competitiveness especially in a long term perspective, main challenges and opportunities, and the identification of existing and promising clusters (Aranguren 2010b).

An alternative to the cluster approach, which was tried out in other Basque Country as well as in Spain was the opening of the regional market to foreign companies. This tended to stimulate demand and create additional strengths within the companies and then in the region as a whole. This concept was actually also implemented in parallel to the cluster policy, but it hasn't achieved the desired success. The main reason as mentioned by Torres and Lagendijk (2000) were the terrorist attacks from the political group ETA in the region, which were hindering the foreign investments. Only after the latest truce the Basque Country managed to recover its positive image and to attract the foreign investment.

By the beginning of the second evolution period the cluster policy in the Basque Country had already led to the establishment of several cluster associations, which were in operation for around 7 to 10 years. This, along with global trends, caused the initiative to make a review of the cluster policy, its effects and make a decision regarding its further continuation or discharge. These debates were developed mostly in government-related circles with strong feedback from the cluster initiatives. During this stage most of the discussions were based on the existing academic research and communication with national and international experts by additional involvement of consulting companies to conduct economic analysis of the regional development. Although neither the funding for cluster project support nor the operation of cluster associations was stopped, nevertheless the whole period from 2001 to 2004 was centered on study and reconsideration of the cluster policy implementation.

Just before 2006, which we mark as the **third period** of the cluster policy, the existing discussions and consideration in terms of the further character of the cluster policy started to result in certain concrete measures and actions. Herewith the discussion stage of this period is seen as a strong follow up from the previous, second period and can't be explicitly highlighted.

In 2013/14 another round of discussion regarding the cluster policy effectiveness and its future has been initiated. This **fourth and the latest period** is also connected with the change in the political governance of the Basque Country. Another reason for the increase of the discussion round was the worldwide popularity of the concepts effectiveness and big potential in terms of increasing the territorial competitiveness. Here the discussions were primarily set with the aim to inquire how the cluster policy could be improved in order to achieve its maximum input. The grounds for these discussions were international cluster and cluster policy related studies. Furthermore, as in 2006 the Deusto Foundation together with the support of the Basque Government have launched a research institute aimed at the study of the Basque competitiveness – Orkestra, its reviews and experts were

actively involved in the development of the policy approach. Finally the strong involvement of business groups and clusters associations should be also stressed.

Summing up the discussion stage in the fourth periods of the cluster policy we should stress that during the whole time Basque Government intends to have and maintain the communication with the business sector. Thus, until around 2005 these discussions were quite loose and essentially took place with the leading companies and technological centers. In the latest periods of the cluster policy the higher attention is given to SMEs and their integration into the discussion. Furthermore, the annual regular meetings of cluster associations are starting to be real discussion and information sharing forums and platforms for most of the regional representatives.

2.4.2. Economy and cluster analysis stage

Around 1990 along with the initiation of discussions on measure to choose in the Basque Country, the government together with the local province council of Bizkaia (la Diputación Foral de Bizkaia) and the Bilbao Financial Development Society (Sociedad Promotora Bilbao Plaza Financiera) decided to contract the Porter's consulting company Monitor group to conduct an analysis of the Basque economy and clusters (Müller 2007).

The study (Monitor 1991) was conducted in about a year and its main results were releases in the newspaper *Economiaz* in 1991. In reference to Landart et al. (2005) the basis for the analysis used for conduction of the study by Monitor Group was analytical works developed by Michael Porter. This study utilized several methodological approaches and was conducted in several stages. The focus of the study apart from analysis of clusters was also aimed at evaluation of the general situation in terms of competitiveness of the Basque Country. As a result two big challenges were observed: the weak business culture and entrepreneurial attitude (Torres, Lagendijk 2000). The existing business culture was seen as individualistic and not entrepreneurial (Gómez Uranga and Ozerin (1997), cited in Torres, Lagendijk 2000). Among further important weaknesses were the mismatch between the technological expertise and efficiency with marketing efforts, as many high quality products were sold under-priced in the foreign markets, e.g. under the names of other brands or through retailers (Torres, Lagendijk 2000). As Torres and Lagendijk (2000) explain the main reason was again the lack of business culture, in particular the lack of competitive experience among the business sector, which was the result of the market closeness and strong public regulation. Finally, one of the most essential drawbacks of the Basque Country's business environment was the absence of links or cooperation between companies, universities and research institutions. The exception was Modragon University that had strong industrial ties.

The further focus of the study (Monitor 1991) was on the identification of existing or potential clusters. As Aranguren (2010b) mentions the process of cluster definition consisted of 2 parts: after

the identification of around 50 potentially international sectors, the sectors were grouped in clusters, which were then revised by putting additional information, such as their weight in regional economy, share of employment, number of companies, linkages and ability to establish them (vertically & horizontally), nature of competitive advantage and costs of improvement. The final cluster selection included 11 clusters, among which 6 were seen as very competitive and 5 with competitive potential (OECD 2007). In the conducted study clusters were seen as “industrial systems marked by vertical (supply chains) and horizontal relationships: to customers, common resources, and particularly technology” (Torres, Lagendijk 2000). As Landart et al. (2005) mention the natural character of clusters and their possible competitive advantages, which can be created in the short term and in accordance with demand on international markets, were playing an important role by further cluster selection. This cluster selection was later used only as guidance for the government’s decision on the selection of clusters for their financial support. After the release of the study’s (Monitor 1991) results a public-private platform was established with the main purpose to decide, in cooperation with business, on common sectors/ clusters to receive further public support (Esteban 2007). The main point was the desire to find out the reaction of the companies with regard to the cluster concept and inquire on their willingness to participate in such an initiative. As Landart et al. (2005) think government was trying to push the cluster policy in the region but without taking a complete lead in the establishment of clusters.

The selection of the final clusters for the programme support was conducted by the government based on three sources: the study results (Monitor 1991), the opinion of the business sector and the interest of the government officials. Although it seems to be transparent and clear the decision on the sectors for further public support was often criticized by numerous regional actors. The basis for the criticism was the involvement of big and regionally influential companies and research centers (Torres, Lagendijk 2000). Cooke and Morgan (1998) express their opinion on cluster selection being done in a “rather secretive fashion” (p.245). That is why at the beginning from the study-proposed clusters only three were initially selected (OECD 2007a). Thus, due to the developed criticism, the sectors were revised and a new, extended list of clusters, which created the basis for a more diversified Basque economic development policy, appeared (Part Policy development stage in Chapter 6). In 1996 a mid-term evaluation, produced by the Monitor Group, presented the results from the group working with leading companies in defined clusters.

In the **second period** of cluster policy evolution extensive debates regarding the termination or prolongation of the cluster supporting programme in the Basque Country took place. Since this period we can find numerous studies produced by SPRI and other external and internal experts in regional studies, e.g. Torres and Lagendijk (2000) or Aragón et.al (2004). An extensive review of key publications is presented in Table 21. Based on the interviews, we assume that some consulting

companies, e.g. Deloitte, Boston Consulting Group or Accenture might have been contracted to perform the analysis as well (Interview 1L).

In 2006 the research academic institute Orkestra-Basque Institute of the Competitiveness was established. Its main aim is to perform analysis on the competitiveness, innovation and cluster promotion and to assist regional actors on their way to build welfare in the region. Since the **third period** of the cluster policy, many more studies related to cluster and economic analysis have been conducted due to this institute. Not all of them were explicitly used to modify the existing cluster policy in the Basque Country, but they often serve as a side or an independent guide for government, business and the public to inform on the current and forthcoming trends within the regional economy. The Basque Country Competitiveness report⁶⁵, which is published every second year, serves as an example. The report is based on the methodology developed by the institute's experts and along with the general review of the Basque Country's competitiveness in the last years includes independent paragraphs on the key components of the regional competitiveness together with the recommendations for the regional policy. The increasing number of publications might have to do on one side with the regional actors' demand for the information and on the other side with the action research / participatory methodological approach practiced by the researchers of the institute. Besides publications, within the international cooperation framework of the European Cluster Observatory⁶⁶ the institute has also created their own tool for the identification of clusters especially for the Basque Country and Spain.

At the same time, the selection of pre-clusters for public support was also increasingly initiated at the Government level based on the results from the Quality Programmes, which were in place from 1992 up to 2003. The selection of pre-clusters was done based on the outcomes of these programmes (the new sectors were showing strong internationalization or export potential) and in the consultation with key representatives from these sectors (Interview, 1N, 1L).

In the **fourth period** of the cluster policy Orkestra was also involved in responding to the new cluster policy targets, e.g. regarding the promotion of the cross-border cluster collaboration. The analysis were requested and used in the framework of the programme initiated by the two bordering chambers of commerce (Gipuzkoa and Bayonne), Bihartean. Traditionally involved institutions, such as SPRI or Technalia also continue delivering reports and studies, which can be used by the government in their planning. Especially SPRI is currently actively involved in the review of the cluster policy and the performance of clusters and pre-clusters in the last years. The objective of this review is to redefine the existing competitive clusters in the Basque Country and align them

⁶⁵ For more information see

http://orkestra.deusto.es/index.php?option=com_fabrik&c=form&view=details&Itemid=265&fabrik=12&tableid=12&rowid=242&lang=en

⁶⁶ For more information see <http://www.clusterobservatory.eu/index.html>

with regional industrial specialization strategy up to 2020. Furthermore, the developed Business Internationalization Plan 2014-2020 includes a brief economic review of the Basque Country and moreover, the international comparison with benchmark regions is made.

In the Table 21 below you can find the list of the most relevant economy and cluster analysis performed in the Basque Country with the aim to define, re-adjust or polish the existing cluster policy.

Table 21 Core studies on clusters and cluster policy in the Basque Country during the period 1986-1991

Year	Study
1986	- Círculo de Empresarios Vascos (Enero 1986): Informe sobre la Política Industrial, Bilbao - Del Castillo, J. (Primavera 1986): La Política Industrial del Gobierno Vasco, <i>Ekonomiaz</i> nº 2, Vitoria-Gasteiz
1989	- Departamento de Economía y Planificación (1989): Inversión Industrial en el País Vasco: Evolución Reciente y Perspectiva, Servicio Central de Publicaciones del Gobierno Vasco, Vitoria-Gasteiz
1991	- Monitor Company (1991): La ventaja competitiva de Euskadi. Fase I: Identificación del potencial de competitividad. <i>Ekonomiaz</i> , nº 21, 156-209.
1994	- Gobierno Vasco (Junio 1994): Una Visión para el Futuro-Programa de Competitividad de Euskadi, Samper S.A.
1995	- SPRI (1995): Análisis Estructural de la Economía Vasca 1985-1994. Perspectivas para el Periodo 1996-1999, Bilbao
1996	- Monitor (1996): Programa de competitividad. Resumen de conclusiones de los grupos de trabajo de los clusters. Monitor Consultancy, Madrid.
1998	- SPRI (1998): Gestión tecnológica de las empresas vascas. SPRI, Bilbao
2000	- Torres, K. and Arnoud Lagendijk (2000): "Industrial policy in the Basque Country", in A. Giunta et al. edition, <i>Restructuring Industry and Territory: the Experience of Europe's Regions TSP</i> , London, pp. 143-161.
2001	- Plaza, B. (2001): Política Industrial de la Comunidad Autónoma del País Vasco: 1981-2001, <i>Economía Industrial</i> , nº 335/336, 2000/ V-VI - Taylor, Sandra and Philip Raines (2001): "Learning to Let Go: The Role of the Public Sector in Cluster Building in the Basque Country and Scotland", Regional Industrial Policy Research Paper #48, European Policies Research Centre, University of Strathclyde, September.
2002	- Navarro A.M. (2002): El Análisis y la Política de Clusters, Universidad Autónoma de Madrid, Madrid - Porter, Michael (2002): "Basque Competitiveness", PowerPoint presented in Bilbao Spain, 18 April 2002.
2003	- Aranguren, M. J. & Navarro, I. (2003): "La política de cluster en la CAPV: una primera valoración". <i>Ekonomiaz</i> 53, 90-113. - Larrea, M. (2003): "Clustres y territorio: retos del desarrollo local en la Comunidad Autónoma del País Vasco". <i>Ekonomiaz</i> , nº 53. - Navarro (2003): "Análisis y política de clusters: teoría y realidad". <i>Ekonomiaz</i> 53, 14-49.
2004	- Aragón, C., Aranguren, M. J., et al. (2004): «A Methodological Approach for Cluster Policy Evaluation: the Basque Country Case» Paper presented in 8 the EUNIP Annual International Conference, Birmingham 2004
2005	- Esteban, Juan Manuel (2005): "Basque Country Cluster Policy: A brief outlook", Presented in Brussels, Belgium, October 2005.
2006	- Azua, J.M. (2006): Política Industrial y Competitividad: el caso del País Vasco, <i>Boletín Informativo Techinit</i> 321, País Vasco - Aranguren, M. J.; Larrea, M. & Navarro, I. (2006): "The policy process; clusters vs spatial networks in the Basque Country" in Pitelis, C; Sudgen, R. y Wilson, J. R. (2006). <i>Clusters and globalisation: the development of economies</i> . - Ahedo Santisteban, Manu (2006): "Business Systems and Cluster Policies in the Basque Country and Catalonia (1990-2004)", <i>European Urban and Regional Studies</i> , Vol. 13, No. 1, pp. 25-39.
2007	- Navarro, M. et al. (2007): Indicadores y análisis de competitividad local en el País Vasco, Edita: Servicio Central de Publicaciones del Gobierno Vasco - (OECD 2007a, p. 290)

Year	Study
2008	- Orkestra (2008): Informe de Competitividad del País Vasco. hacia una propuesta única de valor, Basque Institute of Competitiveness-Deusto Foundation
	- Aranguren, M.J. (2008): Identificación de clústeres en la CAPV, Basque Institute of Competitiveness-Deusto Foundation
	- Cuesta, A.; Albisu, B. (2008): La demanda, la oferta y el clúster de las Tecnologías de la Información y la Comunicación en la CAPV, Orkestra Serie Competitividad, Basque Institute of Competitiveness-Deusto Foundation
	- Valdaliso J.M. et al. (2008): Los orígenes históricos del clúster del papel en el País Vasco y su legado para el presente, Orkestra - Eusko Ikaskuntza
	- Report to the Basque Parliament (June 2008) (Informe al Parlamento Vasco (2008): “Estudio sobre la deslocalización productiva: riesgos para la economía vasca y estrategias de respuesta”) Deloitte
2009	- Orkestra (2009): 2nd Report on the Competitiveness of the Basque Country: Towards an innovation-based competitive stage, Basque Institute of Competitiveness-Deusto Foundation
	- Aranguren, M.J. et al. (2009): Asociaciones clúster de la CAPV: desempeño y retos, Basque Institute of Competitiveness-Deusto Foundation
	- Santiago M. López et al. (2009): Los orígenes históricos del clúster de electrónica, informática y comunicaciones y su legado para el presente, Orkestra - Eusko Ikaskuntza
2010	- Aranguren, M.J. (2010): Evaluación de políticas clúster, Basque Institute of Competitiveness-Deusto Foundation
2011	- Aranguren, M.J. et al. (2011): Identificación de clústeres: un proceso de investigación-acción, Orkestra - Instituto Vasco de Competitividad Fundación Deusto
	- Valdaliso J.M. et.al. (2011): Los orígenes históricos del clúster de la industria marítima en el País Vasco y su legado para el presente, Basque Institute of Competitiveness-Deusto Foundation
	- Orkestra (2011): Informe de Competitividad del País Vasco 2011, Basque Institute of Competitiveness-Deusto Foundation
2012	- Valdaliso J.M. et al. (2012): El clúster de la industria aeronáutica y espacial del País Vasco: orígenes, evolución y trayectoria competitiva, Donostia: Eusko Ikaskuntza ; Instituto Vasco de Competitividad - Fundación Deusto
	- Aranguren, M. J. et al. (2012): Estrategias para la construcción de ventajas competitivas regionales. El caso del País Vasco, Marcial Pons. Ediciones Jurídicas y Sociales. Madrid
2013	- Orkestra (2013): The Basque Country Competitiveness report 2013, Deusto University; Basque Institute of Competitiveness-Deusto Foundation

Source: Author's development

Concluding the economy and cluster analysis stages we want to highlight that despite the extensive highly informative studies and reviews produced before, during and after the implementation of the policy programmes, it seems that the knowledge coordination level between some of the regional actors, who are directly involved in the analysis, is still weak. In addition, apart from the reports on Basque competitiveness and the annual reports delivered by involved organizations (cluster associations, SPRI, government) there is no systematic approach to economy and cluster analysis.

2.4.3. Policy review stage

In the **first period** of cluster policy evolution an extensive review of the previously existing policies, programmes and measures was done. Moreover it was necessary as the new policy was offering completely new and a more demand based and industry diversification approach. Based on the interviews and as partially seen in the previous Table 21 a number of studies on the analysis of the previous policies were conducted in the period 1986 to 1989. Furthermore, as soon as the decision was taken to implement cluster policy the review of previously existing measures and

policy instruments took place. The study (Monitor 1991) not only reviewed economy but also provided the regional experts with the critical points and suggestions for further policy implications.

Prior to the introduction of the cluster policy in the Basque Country, as earlier mentioned in the policies review (Graph 14) the socio-economic development of the region was mainly within the frameworks of two types of policies: industrial and technology/ innovation one. The review of the instruments was mainly conducted within these two frameworks. In the mid-80s the public support was more targeted towards the traditional, mature but declining sectors, where employment was numerous. Furthermore, as stated by Torres and Lagendijk (2000) the promotion of companies' strengths was done through the technology-push model. This technology push model based on the OECD (2007a) was dominating the territorial development of the Basque Country in the 80s and consisted of programmes supporting the firms by the development of their technology. Another element of these policies was the creation of technological parks.

What changed in the 90s with the beginning of the cluster policy was the decision to support institutions, which would try to promote competitiveness of SMEs in particular sectors. These strategic changes as the result should also improve the overall strengths of the region. Furthermore, cluster policy represented a demand oriented rather than technology or innovation promoting type of policy in the view of the public officials (Torres, Lagendijk 2000). Except for skeptics, who wanted to continue public spending exclusively on technology promotion, the majority saw the promotion of clusters as a complementary, and more defined approach, to the previously developed set of technology oriented institutions. Moreover, clusters would have been filling the gap in regional support infrastructure as further promotion of innovation activities and technology would allow the region to compete in numerous sectors (Torres, Lagendijk 2000). The only fear was the selection of the right sectors. This issue was solved by trying to create a public - private platform for the establishment of cluster initiatives. Seeing clusters as a missing or so called "complete model of technology support" (ibid.) from demand side of economy might have served as a decisive component convincing enough to decide on the launch of the cluster policy at the beginning of 1990s. Additional to the above mentioned reason in reference to Torres and Lagendijk (2000) the significant factor for policies approval was the consensus of the Basque Government with the role it had to take within the further promotion of the cluster policy. In particular the benefits were the possibility on one side to keep on being an important player within regional development due to having a role of moderator and initiator of the newly established cluster associations, and on another side to have less responsibility for the effectiveness of the policy (as all activities within the established cluster organizations had to be developed by the companies and other institutions themselves). It was important both for the public and private sector, as one of the weaknesses,

which were identified in the Monitor report (1991) was the strong dependence of business from the government and inability of private sector to have an independent entrepreneurial culture.

The second extensive review of the cluster policy took place in 2000 (Aranguren 2010b). This indicated the **second period** of the cluster policy evolution in the Basque Country. It finished with the decision to continue with the concept of cluster promotion. Moreover the attention to the support of the cluster initiatives in the following third period further increased. The basis for the reviewing of the previous policies and approaches towards the development of the Basque Country was the Lisbon Strategy and the demand to increase utilization of local knowledge and technology. It was especially relevant for the Basque companies, which were still predominantly building their strengths on the basis of foreign technology. Herewith the strategic review, which included experts of the business, research centers and technology was done. We don't know the precise details of this review as the report wasn't accessed by us. Nevertheless along with other factors the review of the existing policies resulted in a significant change with regard to general policy planning and cluster policy as well. The core modification was the desire to unify certain policy activities and create a more general regional development planning. This resulted in the development of general Competitiveness Framework Strategy for 2003-2014. Within this framework the cluster policy was further supported.

In the **third period** of the cluster policy evolution, the review of the existing cluster policy took place around 2006. The main reason for this policy review was connected with the termination of Quality Programmes, which were assisting export oriented sectors since 1993. Apart from classical reviews of previous programmes, which take place on the regular basis before the development of the new one no specific analysis on clusters or economy were done. At the same time in 2007 the first overall academic analysis of the Basque Competitiveness was performed. Furthermore, around 2008 additional number of new clusters were identified. In the cooperation with business in several of these sectors so called pre-cluster associations were established.

The review of the cluster policy as well as other development policies before the beginning of the **fourth period** was influenced with the need to adjust to the European policy trends on the specialization and diversification in the framework of the Cohesion policy 2014-2020 and Smart Specialization Strategies. Some of the action plans proposed by the Basque Government already include a multi-level review of existing policies on business, entrepreneurship promotion, etc. Furthermore, SPRI in collaboration with Government is also developing a new approach to cluster enhancement. The policy review is done based on the cooperation with managers of cluster associations, quantitative indicators of cluster performance and their alignment with the forthcoming plans for regional development in the next 6 years.

To conclude we acknowledge that the review of previous programmes is done almost in all periods of cluster policy. At the same time no clear and structured cluster policy review has been performed until the recent years. We expect that it will be altered with the review of pre-cluster performance and cluster prioritization taking place at the moment.

2.4.4. Policy development stage

The main aim of the development stage is in elaboration of the grounds for further implementation actions. The basis for the development stage in the **first period** of cluster policy evolution was the study conducted by the Monitor Group (1991), the discussions held among the politicians and businesses. The outline of these decisions served as the guideline for the concrete instruments and was indicated in the **Competitiveness programme 1991 – 1995**, which was the part of the **General Framework for Industrial policy 1991 – 1995**⁶⁷ (Graph 14). The main objective of the newly developed programme based on OECD (2007a), Landart et al. (2005), Aragón et al. (2010) and Müller (2007) was the enhancement of regional competitiveness through the promotion of collaboration between firms and research centers. The collaboration would enhance innovation and innovation would lead to strengthening competitiveness. In order to achieve the objectives the actions had to assist in overcoming the core weaknesses (OECD 2007a) such as the poor marketing of local products, especially internationally, and the absence of coordination among companies, universities and other regional institutions (OECD 2007a; Esteban 2007). Furthermore, as we have already mentioned, the decision to develop regional policy based on the clusters had to address the demand side of economic development and make a certain industrial specialization for the regions.

Within the Competitiveness programme the cluster policy was implemented through following actions: identification and promotion of the clusters in defined priority sectors by establishment and financial support of sector focused institutions (cluster associations) as „facilitators” (Landart et al. 2005, p. 15, and Gomez-Larrañaga 2009; Aragón et al. 2010) promoting cooperation between firms, research centers, etc. in assisting them in search for common projects and providing knowledge on more effective marketing, internationalization and sector trends. Esteban (2007, p. 10) mentions further potential activities of these associations:

- To gather and spread strategic information
- To identify strategic challenges and potential synergies
- To evaluate the potential synergies identified
- To identify and promote cooperation groups with common interests in order to generate cooperation projects

⁶⁷ For more information see

[http://www.politicaindustrialvasca.net/PIGV/politicaindustrial_en.nsf/0/FDC1563542344594C1256F390026E0F7/\\$file/1.1MGA91-95+eng.pdf](http://www.politicaindustrialvasca.net/PIGV/politicaindustrial_en.nsf/0/FDC1563542344594C1256F390026E0F7/$file/1.1MGA91-95+eng.pdf)

As such the Competitiveness programme was exposing the notion of clusters, the need to see the economy through the prism of the clusters and stressing the focus on the following 8 priority clusters (Landart et al. 2005, p. 15; Aranguren 2010b, p. 90; Müller 2007, pp. 7–9):

1. Household appliances (CI in 1992)
2. Machinery tools (CI in 1992)
3. Value-added steel (CI in 2009)
4. Port of Bilbao (CI in 1995)
5. Aerospace (CI in 1997)
6. Paper (CI in 1998)
7. Automotive components (CI in 1993)
8. Food (CI in 2009)

The aim was to establish in each of the identified sectors a new sector organization, labelled as a cluster association. More on the character and style of these institutions is presented in the part Policy implementation stage of Chapter 6. It is interesting that the above mentioned list of the selected priority clusters in Competitiveness programme 1991- 1995 includes only three clusters (household appliances, machinery tools, port of Bilbao) primarily identified by the Monitor study (Monitor 1991), the other five were selected based on the political interests. That is why in the **Competitiveness programme launched in 1995** additional sectors (OECD 2007a, pp. 287–288; Torres, Lagendijk 2000) were included. They are:

1. Telecommunication (CI in 1996)
2. Energy (CI in 1996)
3. Environment (CI in 1995)
4. Business management and knowledge (CI in 1996)

Referring to Torres and Lagendijk (2000) the implemented competitiveness programme wasn't optimally developed, as it was very ambitious, lacked focus, had introduced too many new concepts and institutional entities. Moreover government officials were very ambitious with the policy results, in the sense that they had expected to see the progress from the implemented measure in the short term, which however can't be expected in terms of cluster promotion.

At the same time, despite certain criticism, the launch of the cluster based approach has managed to influence other existing programmes and plans in the Basque Country. In particular the **Industrial Technology Plan 1993 – 1996** not only included such notions as clusters, but had also stressed the need to support the articulation of technology demand through the cluster working groups. The plan mentioned three types of projects, which were contributing to development of stronger links between cluster associations and technology centers. They were (Torres, Lagendijk 2000):

- a) Generic projects proposed by the technology centers, to improve or change their technology profile
- b) Generic projects proposed by the cluster organizations or other sectorial groupings to meet future technology needs
- c) Individual projects presented by individual R&D units of firms, possibly in co-operation with the technology centers or the universities

These projects had to improve the interaction between the technological centers and companies, but also lead to more transparency and more structured provision and dissemination of technology support. Similar advantages were also expected for the companies in the region. It was clear that one of the purposes was to establish clusters and link them with technology which was perceived in other programmes as well.

The Industrial Plan 1996-99 as well as the **Science and Technology Plan 1997-2000** had included and considered the earlier principals defined in cluster policy in Competitiveness programme 1991-1995. In particular **INTEK innovation and technology programme 1997 – 2005** was seen as an economic instrument within the above two mentioned plans to support research, development and innovation activities within the priority clusters. This meant that the companies would be subsidized for the development of projects along the thematic areas, defined for the established clusters.

Therefore the Competitiveness programme supporting clusters has continued its implementation in the Basque Country without any significant changes until the development of the **Inter-Institutional Plan for Economic Promotion 2000-03**, which is already associated with the **second period** of Basque cluster policy evolution. The plan stressed three main pillars (Basque Country Competitiveness Atlas 2015):

- Infrastructure: Creation of the competitive context
- Structural change: Acting on existing industrial structure
- Industrial promotion: Development of new industrial structures

Due to this plan the Basque Government expressed commitment to develop the projects focusing on knowledge, quality and cooperation along three defined thematic areas: innovation, internationalization and investment (Basque Country Competitiveness Atlas 2015). Along with it, increased attention was set on two sectors: energy and tourism.

After the review of the cluster approach in 1999 the decision was taken to continue with the cluster supporting policy, thus through improving the organizational structure and the work of the cluster association (Aranguren 2010b) (Interview 1H). In particularly cluster managers had to improve their reporting of the implemented and planned activities in order to justify their support from

government authorities (Interview, 1L). Moreover this planning had to be oriented on 1) 3-4 years for sector development and 2) on the annual basis – reflecting the cluster association's activity and include thematic lines (innovation, internationalization and investment) identified by the associations. As these changes are closer connected with the implementation stage of the cluster policy process, they will be discussed in more detail in the Part Policy implementation stage in Chapter 6.

Another important plan, which was addressing the cluster development as a mean to strengthen internationalization was the **Internationalization plan 2000-2004**. It explicitly highlighted the increased chances for internationalization via promotion of collaboration and cooperation between companies and other regional economic agents. Similar to the first period of cluster policy evolution, also in the second period of policy evolution the support for clusters was reflected in **Science, Technology and Innovation Plan 2001 – 2004** along with the already in force **INTEK Programme** launched in 1997, where the technology centers were pushed to develop generic research projects to address the interests of companies in industrial clusters in the region. Furthermore, as the coordination of cluster policy was transmitted to Division Quality and Innovation, the cluster issues were also addressed in several programmes related to Quality Infrastructure, in particular **Quality Plan 2000 – 2003**. During this period one of the regional agencies, Euskalit-Basque Quality Foundation (Fundación Vasca para la Calidad⁶⁸), was actively involved in the communication with clusters.

In 2003 a new approach towards the regional economic and technological development was launched. Its core feature was a long term strategic vision, which had to build clear priorities for all economic agents in the Basque Country. It was also during the years when several East European countries entered the European Union and posed new competitive challenges for the old member states. The **Competitiveness Strategy Euskadi 2015** was associated with the 2nd Transformation period (Graph 14) of the Basque Country. It identified the following core pillars for regional development in the next decades (Basque Country Competitiveness Atlas 2015):

- Constructing the society of information and knowledge
- Turning the Basque Country into a referent within the European research and technology area
- Extending the Total Quality Principle as a form of organization management

The specification of the Competitiveness Strategy for the Basque Country was reflected in The **Business Competition and Social Innovation Plan 2006-2009 (PCEIS)** and the **Science, Technology and Innovation Plan 2010**. Both of them along the general industry and technology

⁶⁸ For more information see <http://www.euskalit.net/>

support included the promotion of clusters. They mark the start of the **third period** in cluster policy evolution in the Basque Country 2008).

In particular the PCEIS Plan 2006 – 2009 strongly highlighted the need for cluster-based vision for the region and the need to extract more potential from the application of this development approach. A significant novelty in the developed strategy and plan was the need to generate regional knowledge and capacities to enhance the competitiveness of the Basque Country. The defined thematic areas were productivity, innovation, creativity, generation of knowledge, capacity to adapt, internationalization or social cohesion (Basque Country Competitiveness Atlas 2015).

Cluster and sector based strategies were at the heart of the developed competition model within the Business Competition and Social Innovation Plan 2006 – 2009. This meant that specific lines of action were created for the promotion of clusters, which were specified in the "Business Competition and Social Innovation" document: Rules for Strategy and Lines of Action" - a reference framework for PCEIS 2006-2009. One of the activities was related to the establishment of Orkestra-Basque Institute of Competitiveness (Part 2.2.6. Universities and research institutions of Chapter 6). Further actions were related to deepening and widening the cooperation of clusters between themselves and with other regional agents. Strategic planning for cluster associations was further highlighted as important for their effective existence. More specifically these principals were expressed in the **INNOVA Cooperacion Initiative**, which was launched in 2007 within the **Science, Technology Plan 2007 - 2010**. As mentioned in the Basque Country Competitiveness Atlas (2015) the central objective of the programme was to “to integrate the complete cycle of innovation particularly affecting knowledge transfer between clusters and technology centers”. Specifically Innova Cooperacion was developed along the following principals (Basque Country Competitiveness Atlas 2015):

- Promoting and articulating cooperation within the Basque Innovation System systematically
- Strengthening and reinforcing the creation of cluster breaking with the confusion that cluster is cluster association
- Renewing agents' commitment to cooperation as a key vector for innovation
- Boosting innovation opening up new fields for cooperation innovation and new methods for making it happen

This is also the programme which stimulated the need to promote not only existing priority clusters, but also give opportunities to promising sectors and clusters. It was especially necessary as during the earlier Quality Plan (2000-2003) several potential sectors were identified and the Government was looking for tools to continue the support for these sectors as well as “mover un poco de sectores (boost or reshuffle a bit existing sectors)” (Interview 1L). This, as the result led to the appearance of

new pre-cluster associations since 2008. Along with pre-clusters the initiative for inter-cluster collaboration was also pronounced since 2009. Within this initiative the idea was to establish an organization or institution (selected by the cluster initiatives), which would unite different existing cluster initiatives and look for possible links and projects between them. The rationale behind it was the thought that there are some open global niches with possible big potential for Basque companies to compete (Interview 1B).

The third period of the cluster policy finished with the cluster supporting strategies outlined in the **Business Competitiveness Plan** developed for years **2010 – 2013**. Here the role of the clusters, technological centers and the cooperation between them for competitiveness and growth was further stressed. The general model for the development expressed within the plan was built on three horizontal lines: Companies (as drivers of transformation), Governance (as the motor for the transformation), Competitiveness (resort for the transformation) and three vertical thematic lines: open economy, economy which is innovative, entrepreneurial, and technologically advanced, and sustainable economy. Within it, clusters were building a contributing part in the established horizontal competitiveness pillar. Moreover the promotion of clusters was seen not only as an instrument of creating a competitive economy but also an economy that could take a lead. The horizontal action line, labelled as “Cooperation boost”, was to address the actions to take place for the promotion and development of clusters. The previously declared initiative to stimulate pre-clusters was continued. The plan was very clear and precise in the actions to be taken, thus a bit ambitious considering it had only three years for implementation. Moreover, it has already included the milestones to measure the implemented results. Finally, the plan had clearly indicated a) the participants from business as well as research institutions, who were involved in the discussions and development of the plan, and b) the responsible parties within the government and government administration. Although the Competitiveness Strategy Euskadi 2015 is still in force, which makes several programmes to be connected to them, it is clear that the new transformation period in the policy planning has been launched. Along with the relevance of knowledge, technology and innovation the revitalization of industry is essential for economic growth and territorial competitiveness. For the Basque country’s private and public sector it means facing and overcoming new global, digital, technological and industrial challenges. Embracing these challenges the Basque Government has already managed to stress the role and promotion of clusters within several newly developed programmes. Along with the **Science, Technology and Innovation 2015** and **Plan Euskadi for Sustainable Society 2015** in particular the **Business Internationalization Plan 2014 – 2016** incorporates the main principals for cluster promotion and integration into the system. Clusters are seen as central to innovation and knowledge building by taking the role of the forum for networking and knowledge exchange with the aim to reach the right partners and develop innovational projects built on spill-overs between multiple sectors and

clusters. Moreover clusters should be integrated in the global value chains by stimulating unique partnerships all over the globe and enhance internationalization of companies. The plan is very well elaborated, includes contribution of other public institutions on the regional, province and municipal levels. It has a multi-level scheme (European, Spanish and Basque administrative level) of programmes in force, funding context is also taken in consideration. With these inspirations the **fourth period** of the cluster policy development is associated.

In addition to these, the Basque Government together with SPRI has developed more specific strategy for further cluster promotion. As of August 2014 the strategy is in development. At the same time its main aspects have been shared with us and include (Interview 1I, 1L): 1) the narrowing of existing cluster associations, 2) strong focus on advanced manufacturing, industry and energy, 3) internationalization and technological development and 3) stronger integration of clusters in the development of plans (the drafts of industrial / competitiveness plan is being shared with cluster association and their comments are being incorporated). In the next years mostly following clusters will received priority: energy, automotive, aerospace and maritime. Possible mergers can be between following clusters: household appliances and Habic (includes forestry and furniture/ office related equipment) or logistic and port of Bilbao.

Summing up on the policy review, we can highlight significant progress in the specificity of the programmes and their objectives. Moreover there is a higher involvement grade of regional actors in the development of plans. In addition the plans are closer harmonized between each other. Nevertheless, the feeling of continuity of the main pillars and actions across and within each new plan is still very loose.

2.4.5. Policy implementation stage

Implementation stage makes the review of the concrete actions, which were taken towards the achievement objectives indicated in the programme papers in relation to the cluster policy. However it is often very difficult to make a clear separation between the implementation elements, which were written down in the programme plan itself and the concrete actions, which have taken place. Nevertheless here, based on our developed methodological framework, we have tried to highlight the most relevant activities. In order to make the report more structural in the review of the implementation stage we will first present a general approach in terms of selected instruments to strengthen, develop and promote clusters and then within each instrument, we will discuss its evolution over the four identified periods of the cluster policy.

The final objective of the cluster programme as we already mentioned was the promotion of general regional competition through strengthening of existing and/ or promising clusters in the region. The strengthening of these clusters was seen as possible due to stimulation of cooperation among

companies in certain sectors, labelled as clusters, and technological centers. This cooperation would stimulate the development of companies' new products and improve their managing and/ or production processes and as a result increase their competitiveness regionally and internationally.

Herewith on the regional policy level basically two main instruments were selected to strengthen the clusters in the regions:

- i. Establish and support **cluster associations**
- ii. Stimulate and fund the development of **projects in the cooperation** between companies and/ or technological centers

Mainly, these two instruments with certain modifications have been the core of the cluster policy in the Basque Country during the last 20 years.

I. Cluster Associations

The **first period** of the cluster policy implementation consisted of **two phases: 1) 1991-1995 and 2) 1996 – 1999**. In the **first phase**, when the policy was launched under the framework of the Competitiveness programme (1991-1995) only sectoral priorities were set and the government expressed the desire for companies to cooperate within these sectors. In order to facilitate this cooperation it was recommended to establish cluster supporting groups-associations, where companies could exchange experience, knowledge and look for project partners (Müller 2007; OECD 2007a). Thus the main role of cluster associations was to be a sectoral/ cluster facilitator.

In order to establish this cluster association the Department of Economic Development and Competitiveness (at that time under another name, for more information Part 2.2.1 Basque Government and Administration Chapter 6) created working groups, which were composed of officials from different divisions of the Basque Administration and representatives of the leading companies. The working groups in each sector/ cluster had almost no-hierarchical structure. These groups represented closed networks of companies due to strict membership. The aim behind it in reference to Torres and Lagendijk (2000) was to create and educate the expert groups, which would be acting as mentors for the whole industry. The type of work these working groups were doing is to gather under the framework of particular workshops and to discuss sector relevant issues. From these by the year 2000 independent operational cluster associations had been established.

Representatives from the Basque Government, also known as public servants were technicians from the Basque Administration, mainly from the Department for Economic Development and Competitiveness. They were specially trained and educated so as to have competence in order to help companies to understand the cluster concept, realize its benefits and by having the local knowledge stimulate the right people in the companies to create projects. Their number was based

on the number of cluster associations. Their responsibilities included visiting and/ or guiding the meetings of the working groups, maintaining contact with the people attending these sessions, ensuring attendance and low rotation of companies' representation, so that the knowledge and awareness of the cluster concept is sustained (OECD 2007a; Esteban 2007). The Monitor group was also actively involved in the arrangement of the working groups and the evaluation of the first results in 1996. As a result of the communication and awareness raising within the first cluster supporting programme following clusters associations have been established (Aranguren 2010b, p. 90):

- 1992 ACEDE Household appliances
- 1992 AFM Machinery tools
- 1993 ACICAE Automotive
- 1995 UNIPORT Port Bilbao
- 1995 ACLIMA Environmental Industries

The full list of the existing cluster initiatives can be found in the Annex 7 and Graph 79. We agree with the view of Landart et al. (2005) and Müller (2007) who say that the establishment of cluster associations was faster in the sectors which had already established their industrial organization. For them it was easier to understand the cluster approach and transform/ adapt their vision to this new type of policy.

The **activities** of the cluster associations in this period of time included the organization of meetings with the purpose of sharing knowledge between the participants, identification of the company's needs and problems, education management, etc. The drafting of the possible strategic plans was also initiated, but it was mainly done on a volunteer basis. However, due to high novelty of the concept, at that time non-independent behavior of companies as well as not really understanding the reason for their collaboration with their competitors, not much progress neither in the establishment of associations or in the development of the cooperation took place. As a consequence government had to take pro-active action and stimulate companies to form cluster initiatives (Landart et al. 2005). In order to enhance the communication as well as cooperation between the companies and the public sector, in the second Competitiveness programme, launched in 1997, more strategic collaboration with the Department of Economic Development has been introduced (Landart et al. 2005).

This led to more structural and organized coordination between the Basque administration / Government and clusters in the **second phase** of the first period of cluster policy. Representatives of the Basque Administration established the matrix approach for looking over the cluster associations which was built in the following way: 1 servant per cluster association and 1 per

thematic area and general coordinator. In addition to their earlier functions appeared the need to attend the Boards of Directors meetings, and other Committee meetings, which were established along the newly defined themes (Esteban 2007). These committees are built up of special employees of the cluster association together with the representatives from the selected members. As cluster initiatives advanced in their function, these officials turned from being pro-active to be more passive listeners and actors within the decision-making processes of these associations. Apart from Government representatives there are also competent officials from technological centers. This organizational structure of the cluster associations was similar for all policy priority sectors apart from machinery tools (here coordination of activities was conducted by the industrial organization Asociación de Fabricantes Máquinas Herramientas (AFM)) and more service-oriented clusters, such as environment, business knowledge and telecommunication. In the latter, the management was done in reference to Torres and Legendijk (2000) based on “the kind of local expertise available”, like e.g. one big telecommunication company in case of the telecommunication cluster. During this second phase following cluster associations have been established:

- 1996 GAIA Information and Technology Communication
- 1996 Conocimiento Business Knowledge Management
- 1996 Energía/ Energy
- 1997 HEGAN Aerospace
- 1997 FMV Maritime/ Ship Building
- 1998 Papel/ Paper

Since around 2000, during the second period of the cluster policy, cluster associations opened their membership to all interested companies, but some still maintained some restrictions (Müller 2007). They were managed by the Secretariat, which was nominated by the government. Then there were a boarder number of sector-related actors participating in the projects and cluster associations (OECD 2007a; Müller 2007). The funding for the cluster associations was provided by the government along with annual fees, which had to be paid by the members. This established a matrix based organization structure between the Government and cluster associations (with slight modifications) which has been maintained until 2013.

During the second period another set of cluster associations was established. There number is however significantly lower:

- 2004 EIKEN Audiovisual
- 2005 ClusterTIL Transporty & Logistic

During the second period of policy evolution the number of activities performed by cluster associations has increased (Müller 2007): e.g. strategic reflections, consensus building, creation of formal committees, designing action plan. While the cluster initiatives started to be more mature they were also self-responsible for the development of the strategic business plan (often taking the basis sector analysis produced by Porter's study) and even turned into being mandatory for all cluster associations (Müller 2007; Landart et al. 2005). The activities and the projects had to be evolved around following 3 core thematic lines (Torres, Lagendijk 2000):

- Technology & innovation;
- Quality management;
- Human resources development

In the third period, the structure of coordination between government and cluster associations were maintained, although with the further opening of the membership to the association on the diverse local, regional and even national agents from the similar sectors. At the same time not all of them were similarly involved in the promotion of particular clusters. More detail on the key institutions involved in the cluster policy building was mentioned in Part Regional institutions involved in the cluster policy making of Chapter 6.

The general strategic action and project lines of listed cluster associations are often the same, as they are developed under the guidance of the Government, but are then modified and adjusted on the initiative level. Although the structure of the association has stayed similar, the thematic areas have been modified during the last years and in the year 2014 are related to following: quality and internationalization, technology and innovation, education. Promotion of cooperation between existing members and attraction of the new members are the two main activity lines, which are aimed at the development of the sector. There is also an extra development vertical line: education (Aragón et al. 2010). Cluster associations were also in charge of developing strategic sector planning for 3-4 years along with annual activity proposals and reports. Their main purpose is to facilitate the achievement of the strategic goals and justification of financing for the planed actions. Furthermore, annual plans also serve as providers of the information on the current status of the clusters, its members, conducted activities, budget and resources spent (Landart et al. 2005; Aranguren 2010b; Tecnalía 2011).

Organizational structure of the cluster associations has undergone some changes by maintaining its core structure. The operational part of the cluster association is composed of a director, who is a manager of the associations and several employees, responsible for certain strategic lines. The main aim of the manager is to make strategic planning for the cluster organization, create better coordination within and between other regional agents (Aragón et al. 2010). Apart from the

director/ manager there is also a General Assembly (Asamblea General), which takes place annually and includes all members of the cluster association. At this assembly the strategic plans are presented and are aimed at informing about the past and forthcoming trends within the cluster association. This Assembly selects the Board of Directors (Junta Directiva) that is actively involved in the elaboration of the cluster association's strategic development. The Board of Directors can work closely with the technical representatives of the Basque Government. The main aim of public servants in the third period of cluster policy was to have a general overview of the activities and new trends lines, which are happening and are developed in cluster associations. As such, they are able to establish special links between the government and members of the associations and ensure that cluster associations develop along the general regional strategic areas and in other ways assist the Basque Government in setting the development focuses, which go along with market and companies' needs.

Along with early established cluster associations, since 2009 a new type of the associations has been created. The new pre-cluster associations represent the natural strong mostly export oriented sectors, which can be of strategic interest for the Basque country. At the same time these sectors were lacking the cooperation between its sector companies. Herewith the establishment of association in these sectors had to primarily focus on the stimulation of the cooperation. The promotion and enhancement of these potential pre-clusters is aimed at strengthening new and promising sectors of the economy, especially in the wave of Regional Specialization Strategies. In addition it was considered that support for the promising new clusters would also reinforce traditional existing sectors (Aragón et al. 2010). These associations also received public support but in smaller amount, and have also introduced annual fees for their members. The coordination is further performed by the Department of Economic Development and Competitiveness, thus the funding can also come from other departments, e.g. Department of Transportation or Department of Health. During this period following cluster associations have been established:

- 2009 FEAF Iron & steel, foundry
- 2010 BBC Biosciences
- 2009 Alimentacion Food
- 2009 HABIC Habit & construct
- 2009 SIFE Forging & casting
- 2010 Herreramex Hand tools
- 2010 SIDEREX Cider
- 2010 ERAIKUNE Construction
- 2012 Langune Languages

- 2012 MAFEX Railways

The main activities of the cluster associations realized during the third period are the following: assist companies in their technological development and process innovation, learn to apply new business models and upgrade in their business management, support in marketing, trade regional, national and international, training of personnel, expansion of member companies to new segments and geographic markets, stimulate relationships with technology centers and leading international universities, etc.

In 2009 - 2010 the Basque Government also stimulated development of inter-cluster cooperation between different related clusters. The realization of inter-cluster activity had to be coordinated through the organization, whose representatives had to be selected by all cluster associations. Its main purpose was to identify the needs of each cluster and try to find possible cooperative links between them. Nevertheless initiative was launched it has received limited support among the regional associations. In the first discussion four cluster associations represented by around 8 companies were present (Interview 1L). Although the idea of inter-clustering was seen to be interesting, in reality it is the companies who have to be addressed and not the managers of the cluster. Moreover it was the period of the economic crisis and many companies by not realizing clear benefits of such initiative were preoccupied with other more relevant aspects. Nevertheless, several successful inter-cluster projects have been initiated. The most successful example is between the maritime and energy clusters (Basque wind energy - Eolica offshore⁶⁹).

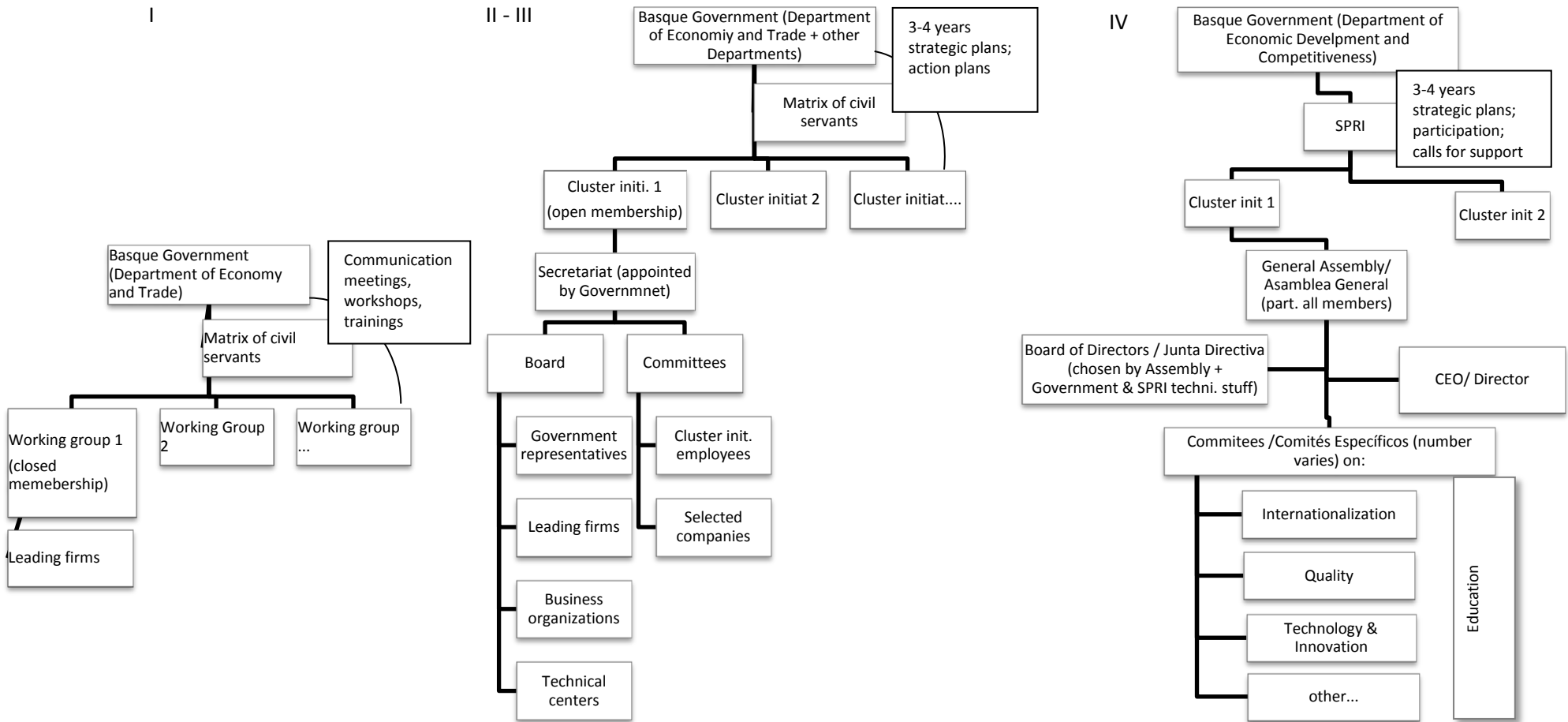
In the **fourth period** of cluster policy all cluster associations have continued receiving public support. At the same time based on the conducted interviews (1L, 1I, 1B, etc.) there were several significant changes, which are to be taken in terms of cluster policy.

First of all the, coordination and communication with clusters have been transmitted to the regional development organization, SPRI. On the basis of this organization the matrix of experts is established. This matrix has taken a similar role to the earlier existed matrix of the Department of Economic Development and Competitiveness. In total there are around 13 people, each of them is responsible for up to 2 clusters. SPRI is able to offer companies more technical, networking and internationalization related opportunities. At the same time the Basque Government will still be in charge of the development on a normative basis and funding. However, the decision on the funding will be taken by the special executive commission, which will review the plans of the cluster associations. Secondly, the number of existing cluster associations is to be revised and narrowed. Less successful cluster associations are to be merged with other associations. The level of success

⁶⁹ For more information see <http://energia.siccluster.com/sicc/verFicha.do?idficha=27065&ididioma=1&l=-1>

of the cluster association is seen through the number projects in cooperation, the capacity in strategic planning and implementation and the weight in regional economy. Thirdly, the annual action plans have to be developed more precisely and focused, as the number of activities is limited to around 30. Finally, the funding for the cluster association is also to be revised. This information is reflected later under Financing.

Graph 17 Evolution of coordination and communication between Basque Government and clusters (period I / II-III/ IV)



Source: Author's development

Table 22 Evolution of the key implementation instruments of the cluster policy in the Basque Country

Period/ Element of the implementation	I (1989-1999)	II (2000-2005)	III (20006-2012)	IV (since 2013)
Government involvement	High	High to medium	Medium	Lower medium
Cluster associations				
Membership	Closed	Closed to open	Open	Open to all institutions from sector
Types	Priority	Priority	Priority & pre	Priority
Funding	Mixed	Mixed	Mixed	Mixed
Cluster Association	1992 ACEDE 1992 AFM 1993 ACICAE 1995 UNIPORT 1996 GAIA 1995 ACLIMA 1996 Energia 1996 Conocimiento 1997 HEGAN 1997 FMV 1998 Papel	2004 EIKEN 2005 ClusterTIL	2009 FEAF 2010 BBC 2009 Alimentacion 2009 HABIC 2009 SIFE 2010 Herramex 2010 SIDEREX 2010 ERAIKUNE 2012 Langune 2012 MAFEX	
Thematic areas	Technology & innovation Quality management Human resources development	Technology & innovation Quality management Human resources development	Internationalization, Quality, Technology & innovation, Education	Internationalization, Quality, Innovation, Education
Activities	Organization of meetings with the purpose of knowledge sharing between the participants, identification of the company's needs and problems, education management	Strategic reflections, consensus building between members and other regional institutions, creation of formal committees on thematic areas, designing action plan	Assist companies in their technological development and process innovation, learn to apply new business models in management, support in marketing, trade regional, national and international, training of personnel, expansion of member companies to new segments and geographic markets	Assist in the internationalization activities (marketing, trade), education in business management, trainings, workshop, fair trades
Projects				
Thematic focus	Productivity & innovation Generic Projects	Technology, Quality, Business Management	Innovations, social impact, knowledge generation	Internationalization, marketing
Name	Type 2; Cooperation Projects;	Supply-Demand, Cooperation, Individual, Integrated Projects	Inter-clustering, Training, Know-how transfer	Inter-clustering, Know-how building and transfer
Involvement of other organizations	Government + leading companies	Government + leading companies + technological centers	Government + companies + technological & research centers	Public institutions + companies + technological, innovation & research centers

Source: Author's development

II. Co-operation projects

One of the special roles and activities of the cluster association within the cluster policy was to establish the cooperation links between the technological and research centers and companies. These links can be either in the form of simple dialog, but more desirably in the form of real projects developed in cooperation between regional agents.

These projects in cooperatopm can be either funded by companies themselves or recieve public funding. Aforementioned aspect should be specifcly addressed in the thesis. First of all, as it represents a general instrument for all clusters and also companies outside of clusters, this instrument is highlighted not only in the cluster-related (competitiveness) programme, but also in others, particularly in Science & Technology Plans and finally it composes the prime objective of the cluster policy in the Basque Country.

Most of the projects are being developed through the cluster associations, nevertheless similar projects can take place outside the cluster initiative, when the leading institution is not a member of a cluster and is strong enough to lead other project participants.

In the **first period** within the **General Framework of Industrial Policy 1991-1995** (Basque Country Competitiveness Atlas 2015) main projects for clusters had to be focused on creating and maintaining relations between cluster companies and leading research centers in order to establish systems to increase companies' productivity and to strengthen regional competitiveness. The support for cluster-related projects could be received if projects were proposed within the policy vector line Promotion of Investment. Here some of the cluster sectors (car industry, aeronautics) could get specialized sub-hiring, and the environment industry were also recognized as being favorable to receive investment as well.

Furthermore, in order for the projects from technological centers to receive funding within the **Plan for Industrial Technology 1993 – 1996** they had to be adjusted to the needs of clusters in priority industrial sectors. In order to achieve higher participation from clusters, the changes were introduced in the typology of the R&D projects in the Industrial Technology Plan they were Generic Projects Type 1 - proposed by the Technological Centers and Type 2 - by clusters. These generic projects were made up almost 50% of the funding within generic projects (Table 23). Moreover the cooperation and individual projects were kept and their funding was further increased with keeping the focus on cluster sectors.

Table 23 Generic (type 2), individual & in cooperation projects per cluster, 1993 – 1996, the Basque Country

Year	1993		1994		1995		1996	
	Ind.	Coop.	Ind.	Coop.	Ind.	Coop.	Ind.	Coop.
Project per cluster								
Machine Tools	161	208	227	140	199	82	295	130
Electronic Household Appliance	62	46	55	131	81	100	36	67
Automotive	11	288	25	300	73	313	94	234
Aeronautics	27	-	38	12	7	58	19	125
Electromechanics-Computing	252	77	299	264	338	277	370	395
Environment	-	-	91	-	102	38	93	122
Other	267	-	208	-	113	85	250	156
Total	780	619	943	847	913	956	1157	1229
Type 2 generic projects (share of total generic projects)	31%		61%		55%		49%	
Amount (million pesetas)	538		891		1,234		3,901	

Source: Basque Government, Plan for Industrial Technology 1993 – 1996 (Basque Country Competitiveness Atlas 2015, pp. 5–6)

The projects proposed within the **General Framework of Industrial Policy 1996 – 1999** stressed the need to involve and extend the number of institutions for cooperation. Herewith not only technological centers or cluster companies had to be involved but also e.g. universities. Cluster related projects were advocated within two actions lines of the Policy Framework: Achievement of Competitive Context and Structural Change of the Companies. New industrial model for economic development composing three core priorities had direct impact on the thematic areas of cluster association within which projects and knowledge had to be developed, namely Technology & innovation, Product Quality and Business Management. Apart from creating a Business Knowledge cluster association the Strategic Reorientation and Operational Techniques Programme (RETO) were superficially created on the demand expressed by clusters to support them in development and guidance of business projects. The **Science and Technology Plan 1997-2000 Plan** similar to the previous one (1993-1996) was also created with intention to align the needs of clusters to technological centers. Almost all types of suggested projects were cluster related: Supply-Demand projects, adapting the generic research of the Basque Technology Network (alliances between the research institutions) to the needs of clusters; Cooperation Projects – developed with the technology centers, agents of the Basque Technology Network and companies, Individual Projects – determined to assist individual companies and a new type Integrated Projects - combination of generic supply-demand projects and cooperation projects. The distribution of grants per cluster can be found in Annex 11. The INTEK Programme, which was launched within the Plan 1997 – 2000, was also continued in the subsequent **Science, Technology and Innovation Plan 2001-2004**.

Since the launch of the general Competitiveness Forum Euskadi 2015 the transition to knowledge based economic development has taken place. The project developed within the Plans of the Competitiveness Forum 2015 indicates the **third period** of cluster policy. **Business Competitiveness and Social Innovation Plan 2006-2009** stressed the consolidation of competitive strengths. In such new projects, leading to more specialized and at the same differentiated economic development, were pushed. Clusters were further placed at the heart of the competitiveness, at the same time business also had to be developed considering social issues and the values in order to promote social innovation. The impulse for generating knowledge and innovation related projects through inter-cluster cooperation was the INNOVA cooperation-initiative within the action field “Making the Business Base more Competitive” of the **Science, Technology and Innovation Plan 2007 – 2010**. Here the supported projects needed to be developed not only along previously defined thematic horizontal areas of internationalization, quality, technology, but also vertical – education and with intention to stimulate initiatives between different clusters as well. Furthermore, projects had to be more result oriented and stimulate diffusion of science, technology and innovation. The initial INTEK Programme supporting different cluster related projects has been split in three sectorial ones, The Gaitek⁷⁰, Innotek⁷¹, Ikertu⁷², Hedatu⁷³. The aim of each of these programmes is to enhance the competitiveness by stimulate networking and knowledge exchange among different actors from diverse sectors in specific science, technology and innovation projects. In most of them cluster companies, especially SMEs are able to apply for funding. The type of support can be for operational cost, training, equipment purchase, etc. Also particular attention is given to knowledge exchange or information transfer through networking.

Passing to the last **fourth period** of cluster policy evolution this trend has been continued. **The Science, Technology and Innovation Plan 2015 and Business Internationalization Plan 2014 – 2016** will run out introducing a new one marking year 2020. Projects strengthening cooperation and aiming at social innovation and sustainable economy will be further supported. The priority of the collaborative projects is given to SMEs and the companies aiming to go outside the regions. Education and knowledge exchange will be further priorities. Herewith, projects between clusters and educational institutions are especially desirable, as this type of cooperation supports both sides

⁷⁰ For more information see

[http://www.politicaindustrialvasca.net/PIGV/politicaindustrial_en.nsf/0/B549484C373B994BC12576E300555F04/\\$file/3+GAITEK_v3-EN.pdf](http://www.politicaindustrialvasca.net/PIGV/politicaindustrial_en.nsf/0/B549484C373B994BC12576E300555F04/$file/3+GAITEK_v3-EN.pdf)

⁷¹ For more information see

[http://www.politicaindustrialvasca.net/PIGV/politicaindustrial_en.nsf/0/A6209B2A14C23788C12576E300555FE2/\\$file/4+INNOTEK_v3-EN.pdf](http://www.politicaindustrialvasca.net/PIGV/politicaindustrial_en.nsf/0/A6209B2A14C23788C12576E300555FE2/$file/4+INNOTEK_v3-EN.pdf)

⁷² For more information see

[http://www.politicaindustrialvasca.net/PIGV/politicaindustrial_en.nsf/0/19CEE884FCE4D7B3C12576E3005560BB/\\$file/5+IKERTU_v3-EN.pdf](http://www.politicaindustrialvasca.net/PIGV/politicaindustrial_en.nsf/0/19CEE884FCE4D7B3C12576E3005560BB/$file/5+IKERTU_v3-EN.pdf)

⁷³ For more information see

[http://www.politicaindustrialvasca.net/PIGV/politicaindustrial_en.nsf/0/F76E4E331987F47AC12576E300556199/\\$file/6+HEDATU_v3-EN.pdf](http://www.politicaindustrialvasca.net/PIGV/politicaindustrial_en.nsf/0/F76E4E331987F47AC12576E300556199/$file/6+HEDATU_v3-EN.pdf)

simultaneously. Reduced unemployment can be achieved through better alignment of companies needs with educational profiles of graduates. Moreover the projects bringing external knowledge to be integrated into regional innovation is beneficial. Although the inter-clustering initiative wasn't very successful, generally inter-cluster projects between companies of different clusters are very welcomed and should be developed not only on the regional, but also supra-regional level. This will also increase the international standing of Basque industry. Even considering the difficulty of projects application and granting on the European or international level many Basque companies and clusters are very interested in these types of collaboration. Based on interviews (Interview 1F, 1G) international collaboration is more enriching and innovation-driven. Moreover the clusters as well as companies see many more possibilities for development of new projects and products on the supra-national level. On the national level several inter-regional co-operations have been developed.

Finally it was stressed that regardless of the period of the cluster policy evolution the initiation of projects, their development and their success is very case by case based. The initiative can come from any side of the collaboration: cluster manager, technical center or companies.

Financing

Financing of the cluster related programmes and policies come from several sources. The Department of Economic Development and Competitiveness was the main source of funding for the priority cluster associations and some projects developed within them. More recently, along with the establishment of several pre-cluster associations, the contribution of other Departments, like Education, Linguistic Policy and Culture or Health has also appeared, but it is still weak. The contract between each cluster associations and the Department is signed annually (Müller 2007). In reference to (OECD 2007a) public funding support covers up to 60% of internal and up to 50% of external costs of cluster associations. The rest of the needs are funded by the companies, as some of the services delivered by cluster associations have to be paid for above the membership fee. The projects within the cluster association's thematic lines or agendas of the policy plans, that are proposed by (non-)member-companies and/ or other regional actors can be additionally funded from other programmes.

In light of the changes since 2014 each cluster association makes annual calls for the presentation of their action plans in order to receive the funding (convocatoria). The action plans should include up to 30 activities. In addition to this the cost dedicated per organization will be based on the labour involved, character of the cluster and number of projects and herewith the necessary amount of labour involvement (e.g such big cluster as ACICAE received EUR 188,725, while EIKEN almost half less, Días De Alda 2015). Overall the Basque Government annually spends around EUR 1,800 thsd for 11 priority clusters and EUR 600 thsd for 11 pre-cluster organizations (Interview 1L) (Días De Alda 2015). For example, automotive cluster The presentation of plans takes place in the form of

an executive commission, which is composed of specialists from SPRI and the Department of Economic Development and Competitiveness. The plans are reviewed and along with resolutions are returned to the cluster associations. The evaluation of plans is fully performed by SPRI. The payments are released in two stages, the second half after the evaluation of actions. Before the latest changes the funding of cluster associations was based also on the annual projects, which were presented to the commission (el convenio), but its role was only administrative.

Concluding on the policy implementation we can highlight that in the Basque Country two main general approaches have been selected to implement cluster policy: 1) establish cluster associations, and 2) support collaborative projects, which align the capacities of research/ technology centers to the needs of the companies. Although the main approach to the implementation was generally similar over the last years, it has been also slightly modified in order to improve different coordination, financial and communication aspects of cluster development.

2.4.6. Monitoring and evaluation stage

When reflecting monitoring and evaluation stage we are mainly referring to the macro level (connected with general regional planning) of cluster policy making. Nevertheless we should also highlight that there is another micro level (connected with the analysis done by cluster associations) for the policy study, which will also be specifically included in our review. At the same time it should be stressed that evaluation stage often co-insides with the economy, cluster analysis or policy review stage. In particular part of the information, especially regarding the performed studies or analysis has been already mentioned in the earlier policy stages. Specifically for the analytical studies see Table 21. Here we will highlight the information closest related with “evaluation and monitoring” stage.

In the **first period** of the cluster policy evolution, the developed competitiveness programme 1991 – 1995 as the cluster initiatives were initiated predominantly by government administration, they were also in charge of controlling and monitoring of these processes. We consider that **monitoring** of the cluster policy implementation was already present in its first period. In particular the monitoring took place through government officials and monitoring group experts arranging and then attending different working groups and thematic committees within the cluster associations. Nevertheless, as it was a new concept, which had characteristics of a pilot project, no specific monitoring indicators were developed.

This was however improved already in the next Programme 1996 -1999. Moreover, in terms of developed cooperation based R&D, technological project monitoring had also been implemented towards the end of the first cluster policy period. SPRI had to deliver an annual report indicating the amount of financial support provided for the projects per cluster association, especially within the

INTEK programme 1997 – 2005. For this period of the programme implementation SPRI was tracking the change in subsidizing per type of project per cluster.

The first **evaluation** of the implemented instruments within the Basque Country in terms of cluster policy was performed by the Monitor Group in 1996 in their report “Programa de competitividad. Resumen de conclusiones de los grupos de trabajo de los clusters. Monitor Consultancy, Madrid⁷⁴”. The report was centered on the main achievements of the first years of the cluster policy implementation and stated key recommendations for the further steps of the policy. This built the main basis for further development of the cluster-supporting programme 1996-1999.

The second large **evaluation** of the cluster policy took place in around 2000. It was connected with the end of the previously existing industrial policy framework and with already almost 10 years of cluster policy implementation in the Basque Country. By the end of the 90s even Michael Porter was visiting the Basque Country several times in order to inquire on the progress of cluster policy implementation and provide the regional government official as well as other regional agents with his guidance or recommendations in terms of policy effects and/ or improvement⁷⁵.

Moreover since the end of the 90s the Basque Country started to be an extremely interesting region for many experts in economics and policy studies in terms of clusters and cluster policy building. Herewith the **second period** of cluster policy is very close associated with numerous visits from academia and other expert groups with the aim to learn and evaluate Basque cluster policy. Some of their analyses were later integrated in the policy building. The most relevant are:

- Sandra, T. and Raines, P. (2001): “Learning to Let Go: The Role of the Public Sector in Cluster Building in the Basque Country and Scotland”, Regional Industrial Policy Research Paper #48, European Policies Research Centre, University of Strathclyde, September
- Aranguren, M. J. & Navarro, I. (2003): “La política de cluster en la CAPV: una primera valoración”. *Ekonomiaz* 53, 90-113
- Larrea, M. (2003): “Clustres y territorio: retos del desarrollo local en la Comunidad Autónoma del País Vasco”. *Ekonomiaz*, nº 53
- Navarro (2003): “Análisis y política de clusters: teoría y realidad”. *Ekonomiaz* 53, 14-49

These studies were dominantly done based on interviews with different regional representatives. The main results of the studies were stressing generally positive trends in the implementation of the cluster policy, but also highlighted the need to develop a better alignment of the existing principals of the cluster policy programme with the actual needs of the companies. The evidence for such

⁷⁴ The Competitiveness Programme: Main conclusions from the cluster working group

⁷⁵ Porter, Michael (2002), “Basque Competitiveness”, PowerPoint presented in Bilbao Spain, 18 April 2002 in OECD 2007a

conclusions was seen in low level of co-operation, projects or alliances between the companies. Increase of inter-firm relations with stronger focus on the needs of companies had to be stronger addressed to improve the effectiveness of the cluster policy.

These studies resulted in significant changes in the second and then third period of cluster policy evolution. These changes influenced the operation of the cluster associations and their relation with the Basque Government. Based on report from Tecnalía (2011) due to this evaluation in 2000 Basque Government launched a more systematic monitoring of the cluster policy based on annual strategic plans, which had to be provided by cluster initiatives. The development of the strategic plans has further improved the **monitoring** and planning of the activities. During 2004-2005 as mentioned by Müller (2007) each existing cluster organization had to make a strategic reflection on their achieved results and propose new areas of their development. Matrix of civil servants was also involved in associations in the form of participation in the thematic committees.

The **third period** of the cluster policy started after the period of extensive study done on the cluster policy not only by the government, but also by independent researchers and research institutions. Many of the recommendations provided in the studies were taken into consideration. For example, it was clear for the Basque Government that in the rapid wave of establishing a knowledge based economy the Basque institutions, as well as they themselves, were in need to improve their strategic long term policy planning in order to optimize their financial resources and programmes. This was associated with the long term vision in Competitiveness Strategy Euskadi 2015. Furthermore, it was clear that they would need to establish their own academic institution, which could inform and assist them in developing new economic models for the region (Basque Country Competitiveness Atlas 2015), e.g. Basque institute of Competitiveness, Orkestra. With the establishment of Orkestra a constant **evaluation** of clusters, cluster associations and cluster policy as well as the general competitiveness strategy and plans within them was possible. Along with its numerous publications (Table 21) it launched an online cluster mapping tool and produces biennial reports of the Basque Competitiveness.

Indeed, in this period of cluster policy the Basque Government itself was very interested in performing not only individual studies but more on a systematic and generalized basis. As an example can serve the Deloitte Report to the Basque Parliament dated June 2008, which was based on an extensive analysis of the delocalization of risk for the main clusters of industrial activities (Informe al Parlamento Vasco (2008): “Estudio sobre la deslocalización productiva: riesgos para la economía vasca y estrategias de respuesta”, Deloitte). The main objective of these analyses was the intention to use the maximum from existing clusters and already implemented measures. The technical staff from the Basque Administration was aware of numerous indicators and approaches and was aiming to apply them. In the end as mentioned in Esteban (2007) have seen dominantly

“the number and quality of the projects in cooperation launched by the clusters, with a strategic focus” (p. 15) as the most relevant, because it reflects the cooperation between clusters and technical centers.

On the **level of cluster associations**, the evaluation and monitoring also took place. Since then associations were obliged to produce annual plans, in which detailed key data of their association together with further actions were reflected. This annual report serves both as an evaluation and a monitoring element and is used to develop thematic lines within the cluster associations as well as competitiveness plan. Indicators included in the reporting are related to measurement of “confidence among agents, public/private collaboration, collaboration among competitors and a strategic cluster orientation” (OECD 2007a, p. 290). In addition to quantitative indicators cluster managers try to keep in person contact and monitoring with the members of the associations (visits at least once a year) (Interview 1G).

These interests in quantitative measurement can be traced to one of the latest Business Competitiveness Plan 2010-2013. The plan contains clear information on the general vision and model for the Basque regional development and the role/ positioning of clusters within it. Furthermore it already includes precise stated action lines and responsible persons for their implementation. It also indicates the expected milestone indicators per year, which should be achieved by cluster associations, namely the number of pre-cluster associations, number of projects within the strategic lines, number of agreements developed within the horizontal and vertical priority lines, etc. as well as all other programmes and plans, which are publically accessible and distributed among the cluster associations as well as other relevant institutions.

In regard to the **fourth period** of cluster policy evolution it is still too early to report on some novelties in terms of alternative approaches to monitoring and evaluation. It is clear that the Basque Development Agency, SPRI, will be much more involved in the monitoring and evaluation of cluster associations, at the same time whether the manner of evaluation and monitoring will be modified is not clear.

Summarizing there are a range of evaluation and monitoring actions being taken , especially as mentioned by Storey (2000, 2004, cited in Aragón et al. (2009, pp. 10–11) there were certain monitoring activities, such as internal evaluation of planning and budget control, however all these evaluation measurements and actors haven't been identical during the whole period of time and are still not systematic enough in order to have a clear traceability of the cluster policy implementation, especially its effectiveness and impact on economic development in the region.

2.4.7. Policy improvement stage

During the last 20 years, after the establishment of the first cluster supporting activity, the instruments and the form of the regional cluster policy has not remained the same. Most of the changes or modifications that have been introduced during the cluster policy have already been mentioned in the Part Economy and cluster analysis stage and Part Policy review stage in Chapter 6. Here we will focus only on the most relevant in the view of our theoretical framework.

By the end of the **first period** of the cluster policy with the Monitor (1991) performed review of the cluster policy, the Basque Government was very interested in the results of the first implementation years and was very eager to contribute to its improvement. At the same time Government officials as well as business circles had their own strategic interest in the regional development. Thus, the recommendations were only partially integrated into the policy. Several main changes took place. The annual agreements between the Government and cluster associations were established. Cluster strategic and annual planning were ensured. This was explained and seen as justified for most of the clusters initiatives. Furthermore, as initially recommended stronger integration between innovation, technology centers, academia and companies took place. Particularly in the Science and Technology Plan 1997 – 2000 “inclusion of universities and systematic approach to innovation” (Torres, Lagendijk 2000) was stressed. Along with it technological centers started to become more integrated into the processes of education, innovation, industry development.

In the **second period** of cluster policy further improvements took place. The central point of these modifications was the alignment of thematic areas for the regional strategic planning to the companies’ needs and vice versa. This was the basis for the establishment of working committees in specific areas, e.g. internationalization, technology and quality in the Basque cluster associations. Moreover, the recommendations regarding the improvement of the public funding scheme and establishing more balanced financing for cluster policy actions and technology and science activities were also revised. Both industrial as well as technological plans were based on the same economic model for the regional development. Finally the Basque Government also followed the initial recommendation of the first Monitor study on Basque Competitiveness and further reduced its involvement in the coordination and decision making of the cluster associations. Nevertheless the technicians were still visiting the committees and attending meetings but mainly with the aim of gathering information rather than influencing internal decisions. Cluster associations themselves have matured in managing their activities. The open membership offered better opportunities for technological centers to create projects with SMEs, which largely lack resources for the conduction of their own innovation.

The **third period** of cluster policy in the region was associated with extensive self-improvement, which led to following core changes. First of all public institutions as well as companies started to be more open for self-evaluation. Some evaluation measurements were included both in the competitiveness plans as well as in reporting of the cluster associations. Moreover recommendations provided by the European Commission on general regional planning were stronger integrated in the policy. The need for regional specialization as mentioned in RIS3 strategies was reflected through the support of pre-cluster association initiatives and inter-clustering. Finally government communication with cluster associations went from a clear top-down to more bottom-up approach. This opinion is also supported by Müller (2007). This can also be seen in the organizational structure of managing and coordinating cluster policy, as since 2014 SPRI overtook the communication and coordination role with cluster associations.

Generally, we can state that the major part of the changes was integrated based on the pre-conducted evaluations and recommendations. The changes tended to be explained through public press-releases, accessibility of plans. In the last, fourth, cluster policy period, we can also see the trend towards stronger community involvement in the policy development and modification. Nevertheless, the political interest of certain industrial groups is still present in the region and has a strong effect on hindering some vital improvements in the policy making. Cultural and historical reasons also block co-operation between the companies, especially in bordering regions.

2.4.8. Factors important during the whole process of cluster policy

The factors, which are important for all stages of the cluster policy process, haven't been the same over the last 20 years. Thus as the development of the factors in each period of cluster policy evolution is easier to trace on an individual basis, we see it justified to make the review of this part based on the factors and periods within them.

The Basque Government has taken a leading role in the development, implementation and modification of cluster policy in the Basque Country over the last 20 years. Moreover the Department of Economic Development and Competitiveness especially has always indicated its **political support** for the development of the cluster policy. Particularly at the launch of the policy programme the involvement of the officials from the administration was very active and informative. Even the change of the political parties at the head of the Parliament in 2009, from EAJ-PNV to PP, didn't reduce the support of the existing cluster policy. Moreover, as mentioned in the interview (Interview 1L) – until 2013 cluster policy was seen as a Government responsibility.

The long term existence of the cluster policy can also be associated with the **political stability** over the last years. Since 1990 up to 2009 the same political party, EAJ-PNV, had the majority in the Basque Parliament and could dominantly form their Government. At the same time it should be

mentioned that in the first period of the cluster policy political stability in the region was hindered due to the activities of the Basque separatist group Euskadi Ta Askatasuna (ETA, or Basque Country and Freedom) (Idoiaga 2006), which was causing numerous armed attacks on different institutions and killing of more than 800 people related to policy making. After a number of declared-ceasefires, which were then broken again, the peak of the activities during the 90s caused not only political instability but also negatively influenced the image of the whole regions. The actions of ETA was especially hindering for attracting foreign investment during the first period of regional transformation (Interview 1H). The latest ceasefire was declared in 2010 and is still in force, moreover since in 2011 the group announced a cessation of its armed activities.

Due to the autonomous status (Gernika status) of the Basque Country the governing institutions in the community have one of the highest levels of independence in Spain (Aragón et al. 2010). Apart from the official status the Basque Government and its Administration has developed and maintained its **strong character** in the region's regulation Cooke and Morgan (1998). This was especially the case during the first period of cluster policy evolution in the Basque Country. Since the second period of the cluster policy the Basque Government tried to reduce its engagement and decision making in many economic processes and give the private sector more freedom in acting independently on the market. The further reduction of the Government participation can be seen especially in the final fourth period of the cluster policy, when the Basque Development Agency has started to be strongly involved in the activities of cluster associations. Nevertheless Basque Government deliberately tries to reduce its influence in the regional actors' behavior, it is still considered to be a strong decision-making institution in the Basque Country.

As already mentioned in the Part Historical overview of public policy interventions of Chapter 6 by the start of the fourth period almost all key **actors from the triple helix**: government, companies, research centers/ institutions were actively **participating in the cluster policy making** (Graph 15). Nevertheless, it hasn't been always like this and the engagement of each side is still unbalanced. In the first period of cluster policy mainly government was actively pushing the private sector to establish cluster associations. The technological centers based on Science, Technology and Innovation plans were also motivated to participate. Thus, the real cooperation between the companies and technology centers took place only in the second period of the cluster policy (Interview 1F). Moreover, even by then companies were still very skeptical in terms of co-operating with what they called the "competitors" from their sector (Interview 1F). Herewith, from our opinion the balanced involvement of all actors of the triple helix has taken place since the third period of the cluster policy making, but it is still not optimal.

Similar trends as in the involvement of the triple actor's in the cluster policy making can also be observed in respect to the **collaboration, commitment and motivation of the economic agents** in

the Basque Country. Although the Basque Government, together with its supporting agents or partners on the community level, has expressed its long term commitment and motivation from the beginning, the same cannot be said for technological centers or companies. Especially in the first period of cluster policy implementation the technological and research centers were not strongly committed or motivated to collaborate due to extensive financial support from the Basque Government. Only since the second period of the cluster policy as the development of projects within the certain thematic lines, was required, this motivation has increased. The same scenario can be observed for most of SMEs, where lack of motivation was obvious due to involvement of mainly big and/ or leading companies in the cluster associations in the first period of the policy. However their interest and commitment has increased with the launch of pre-cluster initiatives toward the beginning of the third period.

At the same time the Basque Country was always considered to have **trustworthy** relations among its population and institutions. Esteban (2007) and Aranguren (2010b) have explicitly mentioned that trust between the actors in the Basque Country was one of the most important values contributing to cluster policy. In several interviews (Interview 1F, 1L, 1C, 1E) it was also underlined that even until now (2014) many agreements or projects can be first arranged on the basis of trust relations between the agents, and are only formalized later.

Finally if motivation or commitment was not always present between the economic actors, the **communication** and **dialog** among the key agents has always taken place. The dialog between the actors of the triple helix takes place in both official and non-official form. First of all due to the small scale of the territory and small rotation of the positions within the government, public or research institutions the people of these organizations can develop and maintain close relations with each other. This is further complemented by different social professional and entertaining public events, such “Brunch & Learn⁷⁶” or “Tuesdays with Innobasque (Los Martes de Innobasque)⁷⁷”, where the experts from different fields have the possibility to meet on regular bases, exchange and communicate on relevant topics. In addition to these, since the beginning of the cluster policy, technicians from the Basque Government were first participating in the working groups, then in the Board of Directors of the cluster associations and finally in some of the Committees on the thematic areas. There are numerous (non-)official meetings and visits among the members of the cluster associations, e.g. Annual Assembly, where the strategic reports on the latest operational years and the forthcoming action plan is highlighted. Finally since the third period of cluster policy evolution the representatives of technological centers and companies have also been involved in the co-drafting of regional strategic plans.

⁷⁶ For more information see <http://www.innobasque.com/home.aspx?tabid=1606>

⁷⁷ For more information see <http://www.innobasque.com/home.aspx?tabid=790>

2.5. Policy important factors explicitly mentioned by regional actors

We want to mention several **factors**, which were considered as important for the effective implementation of the cluster policy in the Basque Country and were **specifically mentioned by the interviewers**.

The role of **people** and the relations between people have been highlighted several times (Interview 1G, 1H). Human relations are especially relevant for the development of projects between companies and institutions, as the cooperation develops among people within these institutions and not entities. In the example given by one of the interviewees from cluster association (Interview 1G) it was highlighted that the change of the more pro-active persons in charge of the cooperation has significantly increased the number of projects.

The **education** of the young generation is considered to be a top priority, especially in the coming years (Interview 1C, 1H, 1K). The education curriculum must be aligned to market needs and be more business or industry related. This tendency will ensure high employment rates and herewith economic growth in the region.

Another important factor for the effective cluster support both on the regional as well as on the level of clusters is the **clear explanation cooperation form/ types and constant reporting on the sector** for cluster members (Interview 1H, 1C). At the beginning of the 90s most of the companies in the Basque Country were not aware of the possibility of cooperation with other companies from a similar sector, as they viewed each other regardless of product or process specification as competitors. The process of learning (which took place due to introduction of cluster policy) “opened the eyes” of many companies. Due to this, companies have realized that although they might come from the same sector, they can be involved in absolutely different elements of the production chain and as a consequence thematic non-strategic cooperation can be beneficial for all.

As we already mentioned along with the cluster policy several other important policies were in the implementation in the Basque Country. Based on the opinion of several interviewers (Interview 1A, 1B, 1F) permanent **industrial focus along with technological and innovation support** were important contributing factors for successful economic growth over the last years. The absence of one or the other would lead to decrement of results.

Finally, apart from the well-developed programmes and policies, all regional actors must be aware that economic, cluster, business **development are permanent processes**, which need consistent monitoring and improvement. The awareness and acknowledgement that “hay siempre montón de cosas para hacer (there is always thousand things to do)” (Interview 1C) should always be present.

2.6. Summary on the review of cluster policy

Cluster policy in the Basque Country has been launched at the beginning of the 1990s and is still in force. Over the course of more than 20 years of implementation, cluster policy has experienced a number of modification and changes. At the same time it has maintained its main principals, namely the enhancement of the cooperation between companies and technological centers with the aim to foster innovation and technological process, which should lead to economic strengthening of the region. Moreover cluster-based economic development has created a sectoral development focus within the Basque Country in which its core competitive strengths are grounded.

In the cluster policy (as of September 2014) all **actors from the triple** helix are involved (Graph 15). Nevertheless, this has not always been the case. The initiative towards the cluster-based economic development was initiated from the government, top-down, level and then overtaken by the companies and other institutions, such as technologic and research centers. The policy now largely consists of a bottom up approach with further support of the Basque Government. Many important strategic changes in the Basque Country were connected with the election and new representatives in the Government/ Ministeries.

Based on the review of the cluster policy in the Basque Country we identified **four periods** in cluster policy evolution. They are I) 1989 – 1999: Grounds building, II) 2000 – 2005: Improving and polishing, III) 2006 – 2013: Giving new opportunities and IV) Since 2013: Re-management boost (Table 20). Based on these periods we can see the evolution of the cluster policy, which goes along the evolution of the main sectors of the Basque economy. Furthermore, the influence of global and European policy and markets trends is also evident. At the same time the business and political groups try to align the local interests with the external demands.

We have also done in-depth analysis of each **stage of the cluster policy** process in each period of the policy evolution. The Annex 9 and Annex 10 are based on the developed policy framework and include main insights on each of the policy stage and period. Broader conclusions will be presented at the end of this Chapter 6. **Influence of cluster policy on regional economic development**

The review of the cluster policy has given us deep insights in the character of the cluster policy making in the Basque Country. At the same time, another objective of our study is to investigate the cluster policy implications for the regional economic development. In this part of the chapter we are analyzing the way selected factors have influenced economic development in the Basque Country over the last 20 years. Moreover based on the identified periods of the cluster policy we will try to make links between the economic development and implemented cluster policy in the region. Main conclusion can be found in the summary part. Note: In the further analysis available statistic data

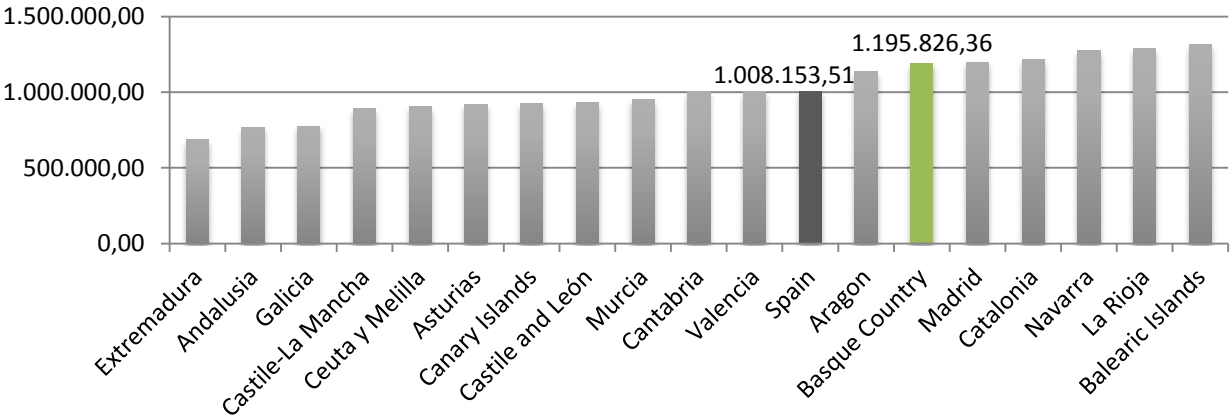
does not always cover the each evolution period of cluster policy completely. As a consequence observation periods were adapted to available data.

3.1. Economic development and growth

The Basque country has always been seen as one of the industrially strong autonomous communities in Spain. This can be also clearly reflected in its economic indicators. Moreover it is considered that this autonomous community has improved its economic and industrial strengths in the last 20 years, especially due to its industrial and general competitiveness programme based on clusters and innovation (Fañña et al. 2010). In this paragraph we will focus our attention on the review of the main indicators, which are related to economic growth: value and growth of GDP, GDP per capita and other relevant indices.

In the **1990s** based on the **GDP per capita** the Basque Country was only the **seventh** within Spain (Graph 18), while neighboring and/ or industrially strong regions, e.g. Navarra, Catalonia, Rioja, were showing much better results in terms of the GDP per capita. Nevertheless the Basque Country was still better positioned than the Spanish total.

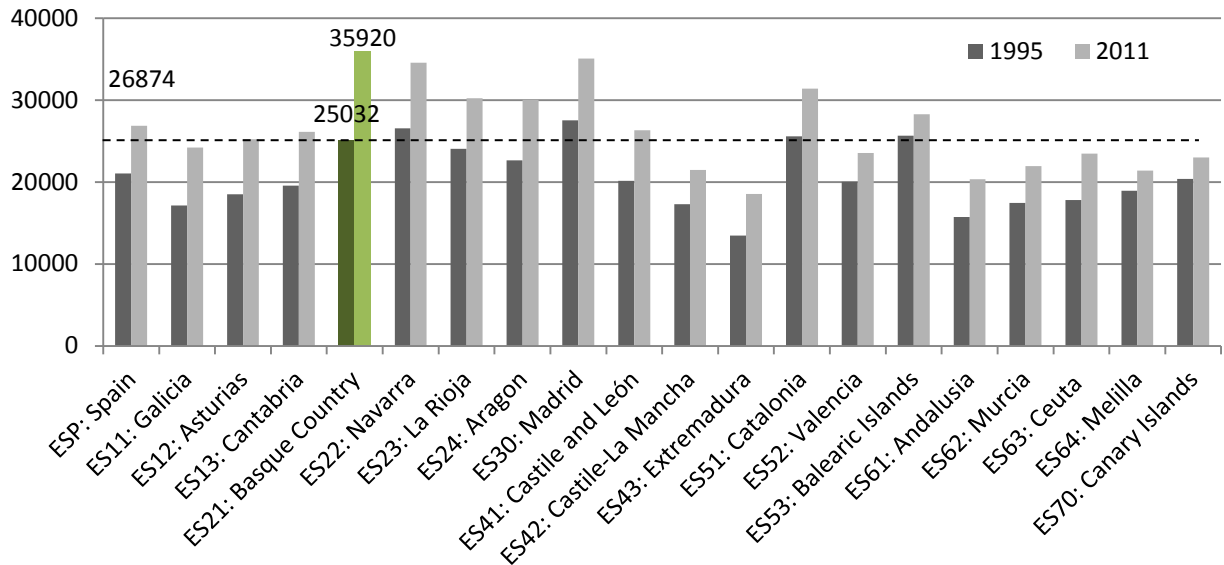
Graph 18 GDP per capita, Spanish pesetas, Spain and Spanish autonomous communities, 1990



Source: Authors’ development based on INE, OECD, 2014

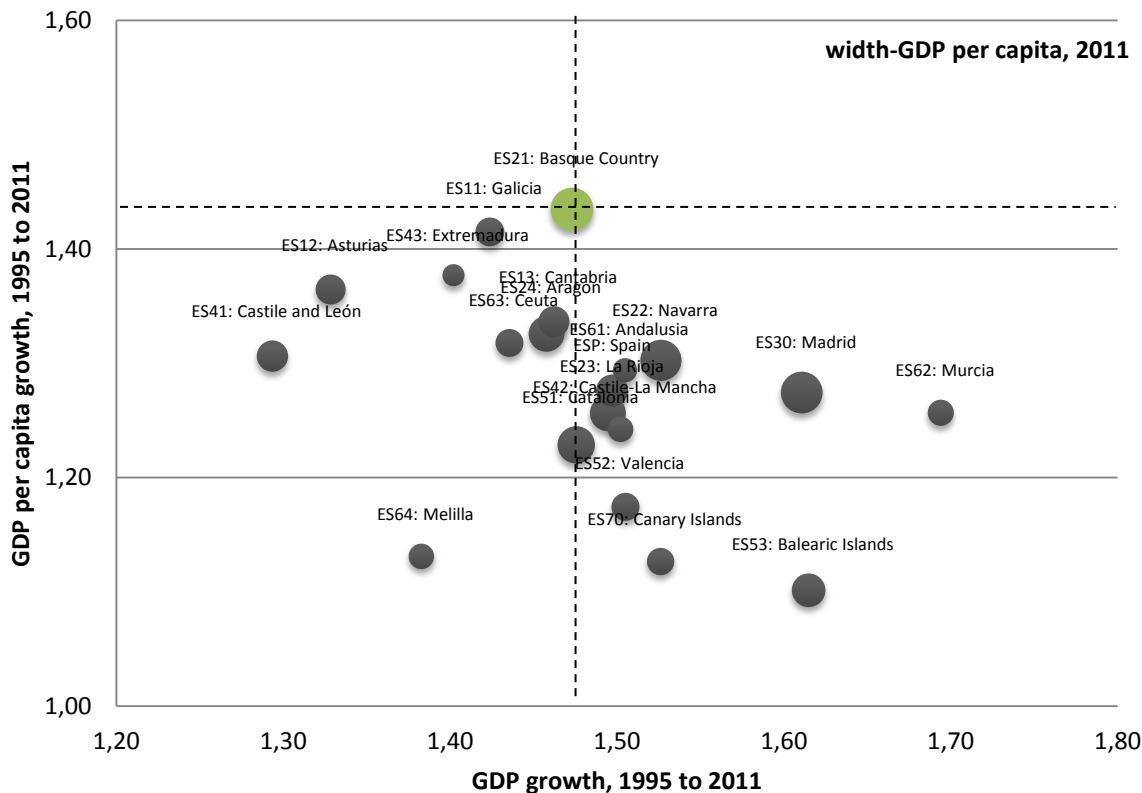
21 years later the Basque Country managed to increase its economic strengths and have built up **the highest real GDP per capita** (Graph 19) in Spain. Furthermore, in 2011 the Basque GDP per capita was not only the highest in Spain but was also higher than EU 28. Its strong growth is observed especially starting from 2000. As such when in 2000 it was only 1% higher than EU28, in 2011 it was 22%, and just before financial crisis in 2009 – 27% (Graph 80).

Graph 19 GDP per capita EUR, constant prices (year 2005), Spain and Spanish autonomous communities, 2011 and 1995



Source: Author's development based on OECD, 2014

Graph 20 GDP and GDP per capita growth (based on EUR, constant, year 2005), Spain and Spanish autonomous communities, 1995 to 2011



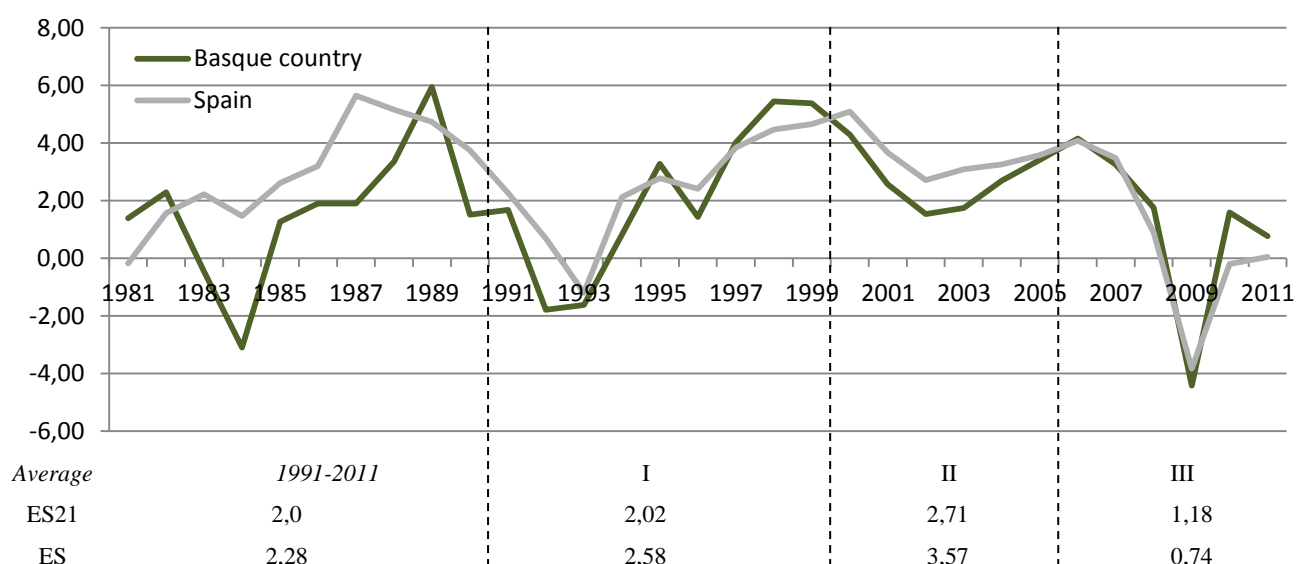
Source: Authors' development based on OECD, 2014

Moreover, among Spanish regions the Basque Country has also shown the **highest GDP per capita growth from 1995 to 2011**, which is 43% (Graph 20). Similar high rate has been observed only by Galicia, Asturias, Cantabria, which are neighboring, autonomous communities in the north of Spain. At the same time the change of GDP (47%) from 1995 to 2011 is even higher than the change of GDP per capita. Nevertheless there are many other regions, such as Murcia, the Balearic Islands and Madrid, which have managed to beat the Basque Country in this indicator.

Observing the **annual GDP growth** rates and comparing them with the national, we see that the GDP growth rates in the Basque Country are **generally lower than the Spanish** total (Graph 21). If we make a year/period-based analysis of the GDP growth rates (Graph 21) we can see that starting from 1989 to 1993 the economy of the Basque Country was in stagnation, and to a greater extent than that of Spain as a whole. From 1981 until 1989 the growth rate was only twice higher than the national, other than - always significantly lower. After 1993 to almost 1999 we can finally see the rising trend of GDP growth in the Basque Country resulting in even higher than the rates of Spain, especially in the last 3 years before 1999. The period from 2000 almost up to the beginning of financial crisis in 2008 can be considered as stable development. In particular in the second period of cluster policy evolution from 2000 – 2005 the average GDP growth rate is the highest in comparison to all other observed periods. In the third period of cluster policy implementation the average annual GDP growth rate despite being higher than the Spanish national is still significantly lower than in the first observed period. Moreover the disparity between higher and lower rates is also large. The two obvious downturns are connected with the latest financial crisis 2008 and with oil, Russian and Asian financial crises in 1997-1999. Shortly before and during the financial crises 2008 national and regional growth rates aligned and experienced a similar deep drop in the growth rate. At the same time the Basque Country seems to have made a faster recovery from the last crisis than Spain. Finally during the whole period of observations from 1981 to 2011 the highest annual growth rate in the Basque Country was 5.95% in 1989 and since the launch of the cluster policy 5.45% in 1998. Both of these indicators are higher than any of those taking the Spanish total. At the same time the lowest rates in the Basque Country are also lower than any of Spanish ones, and occurred during the crisis year of 2009 –4.43%. On average, during the period of cluster policy implementation (1991-2011) the growth rates for Spain were higher than Basque ones, 2.28% to 2% respectively.

Finally one of the highest growth rates the Basque Country experienced was during the first period of cluster policy, notably between 1997 and 2000.

Graph 21 Annual GDP growth rates, Spain and the Basque Country, 1981-2011



Note: separation line marks periods of the cluster policy in the Basque country (Table 20 Identified periods of the cluster policy evolution in the Basque Country)

Source: Authors' development based on INE, OECD, 2014

Apart from economic growth, which is traditionally measured in GDP growth rate and GDP based indicators it can be viewed from the perspective of multiple other indices. A review of these indices gives us a broader view on economic development, especially in terms of the Basque position within national, European and other levels.

Based on the recently proposed **index of overall competitiveness (RCI)⁷⁸ 2013** (developed by the Joint Research Center, Annoni/ Dijkstra 2013) the Basque Country has RCI Index of 0,175, which places the region in the **middle-green group** with indicators between 0 and 0.2. Apart from Madrid, no other region in Spain falls into this or a higher group. In a similar group as the Basque Country we can also find some leading German, French, Swedish and Austrian regions. In addition the current positioning of the Basque Country is **above EU average** and is one of the indicators of region's good economic development over the last years.

Our picture will be more complete by observing some selected sub-indicators of this RCI index as well. There are three overall sub-indicators. In terms of the first one, which is named **basic⁷⁹**, the Basque Country is ranked as 135th (out of 262) with a score of -0,057. Comparing to other Spanish regions the Basque Country is better positioned, and in comparison to the European regions – in the

⁷⁸ For more information see

http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/6th_report/rci_2013_report_final.pdf

⁷⁹ Based on RCI 2013 index the basic groups is composed of indicators referring to: basic education, health, infrastructure, macroeconomic stability, institutions

middle one. In the further sub-index, which is the **efficiency**⁸⁰, the Basque Country is placed in 63rd (out of 262) position with 0,459 points. Again after the Madrid area, the Basque Country is leading in national and above average in EU terms. The same situation is reflected in the **innovation**⁸¹ category. Although the Basque Country takes only 140th rank (-0,143 score), it is still within the EU average. Finally we also want to mention the specificity of indexes usage, considering their compositional and complex character.

Summing up this part of economic development, we can clearly see the better performance of Basque Country in terms of almost all indicators with respect to the whole picture of Spanish regions, whereas in EU terms – average or slightly above average. Furthermore, the period based observation of Basque economic growth shows a generally positive trend, especially in the 90s, which correspond to the first period of the cluster policy. Apart from this we can also see high GDP rates since 2003 and up to the latest crisis. Such performance of the Basque Country can be associated with several issues: effective application of technological, industrial and cluster policies, significant independence in terms of policy regulation and tax collection and a historically well-built industry exploration. At the same time although we have a 20 year period for the observation of the economic indicators during this time several crises have strongly hindered the developmental trends within the Basque economy. This complicates the data analysis and the generalization of conclusions especially regarding the influence of the cluster policy.

3.2. Factors of influence

In the theoretical framework we have identified several main factors influencing economic development. In this part we will review these factors independently over time and based on the identified periods of the cluster policy evolution observe their relation with economic growth and attempt to establish the links between the periods of cluster policy and their performance.

3.2.1. Factor capital and industrial focus

As mentioned in the theoretical framework, capital is considered to be one of the significant factors influencing economic growth. While analyzing this we will mainly refer to three indicators: Disposable household income (amount of money, which is in the position by households after payment of an income tax), Gross Fixed Capital Formation (GFCF, equivalent of spending on capital stock, such as equipment, machinery or land improvements, reflecting net increase in fixed capita) and Gross Value Added (GVA, measures the net value of goods and services in different

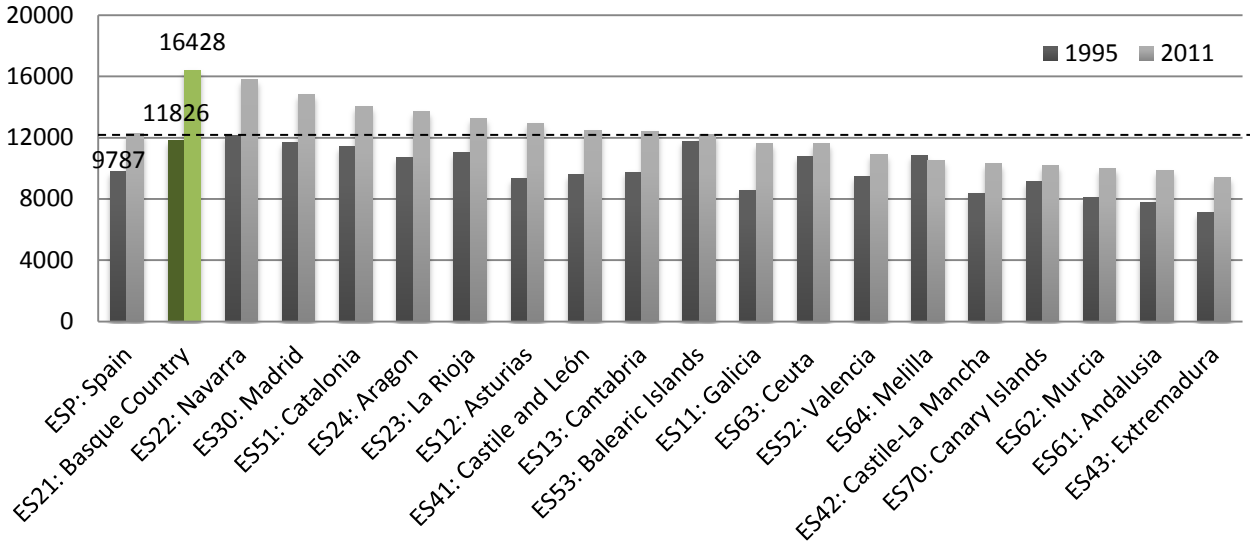
⁸⁰ Based on RCI 2013 index the efficiency groups is composed of indicators referring to: market size, labour market efficiency, high education, training & lifelong learning

⁸¹ Based on RCI 2013 index the innovation groups is composed of indicators referring to: innovation, business sophistication, technological readiness

sectors, or on other words GDP extracting taxes and subsidiaries). Definitions are proposed by the World Bank 2014.

Similar to the GDP per capita the Basque Country is also a leading autonomous community in Spain in terms of household income per head in 2011 (Graph 22). Although this top positioning has been the case since 1995 (then the region was only bettered by Navarra), still the increase rate of disposable household income per head is the highest in Spain, 39% since 1995 to 2011. It is higher than Spanish growth of 25% and Navarra 30%.

Graph 22 Disposable household income, per head, constant prices EUR, Spain and Spanish autonomous communities, 1995 and 2011



Note: ES63 & ES64 year 1995 – data 2000

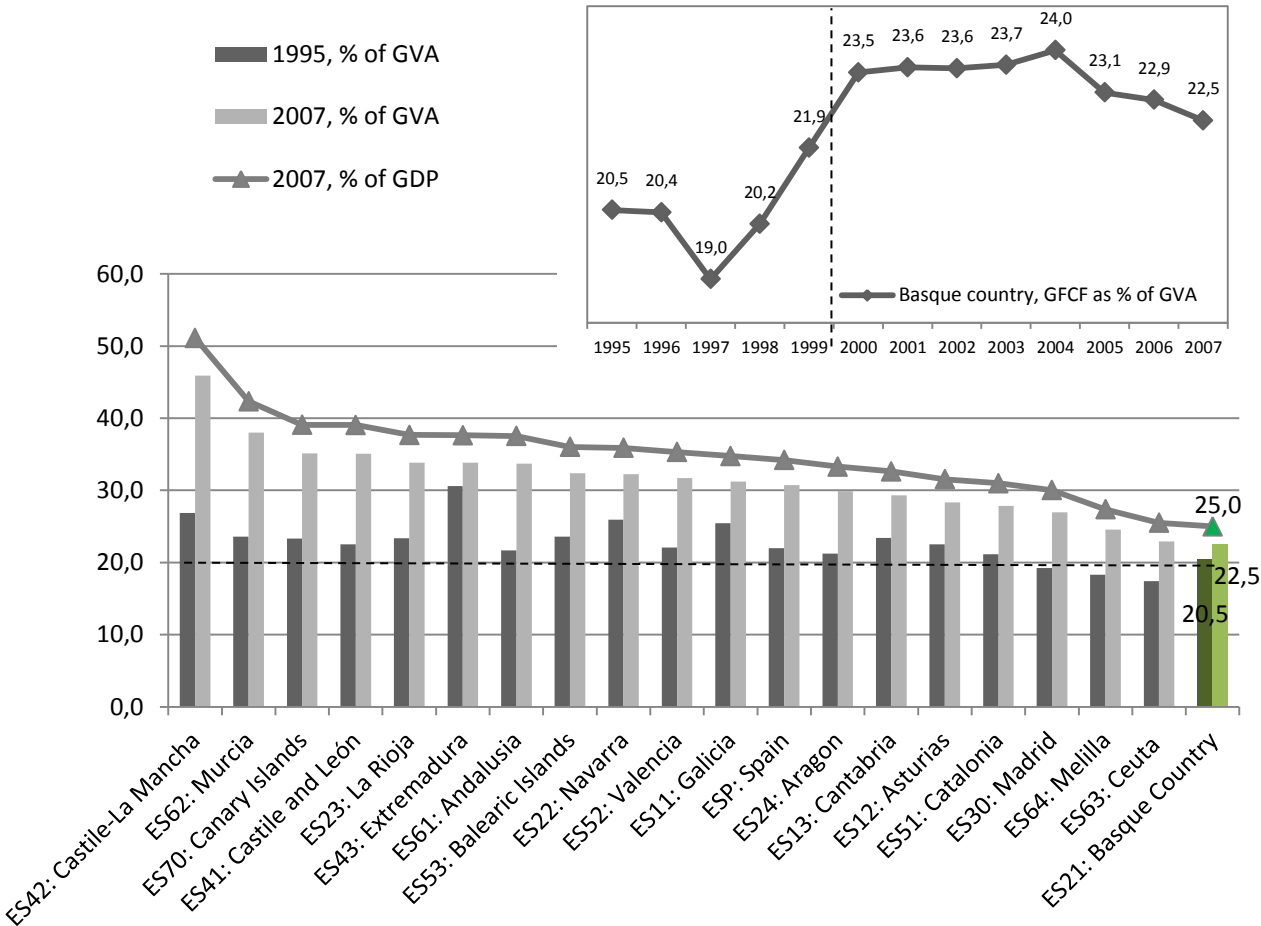
Source: Authors’ development based on OECD, 2014

Due to the availability of data only from the year 1995, the average indicators for the first period of cluster policy are not fully comparable with the other periods. Nevertheless, if we compare Basque household income for the different periods we can see that both in the first and the second period of cluster policy the rates were almost the same and higher than in the third period, namely (6% and 4% for 1995 to 1999 and 2000 to 2005 respectively, and 2% – 2005 to 2011) (Own calculations based on data OECD, 2014).

In terms of Gross Fixed Capital Formation as a percentage of GDP (25%) the Basque Country generally experienced one of the lowest rates in comparison to Spain and other Spanish communities (Graph 23). Almost the same situation was observed in 1995 when the Basque Country after Madrid was second from bottom in terms of the GFCF as a share of GDP (22.2%). Such low rates are characteristic for industrialized countries, with low but steady GDP growth rates. In terms of GFCF as a share of GVA, which is a more common measurement for capital factor, in

2007 the Basque region showed a similar trend. If in 1995 the share of GFCF was 20.5% in 2007 it was only 2% higher, whereas other regions the average rise is around 9%. At the same time generally after rapid growth of GFCF percentage of GVA from 1997 up to 2000, the Basque companies have further experienced a steady increase of invested assets used in the productive process until 2004.

Graph 23 GFCF as a share (%) of GVA, 1995 and 2007, and as a share (%) of GDP in EUR, current, 2007, Spain and Spanish autonomous communities

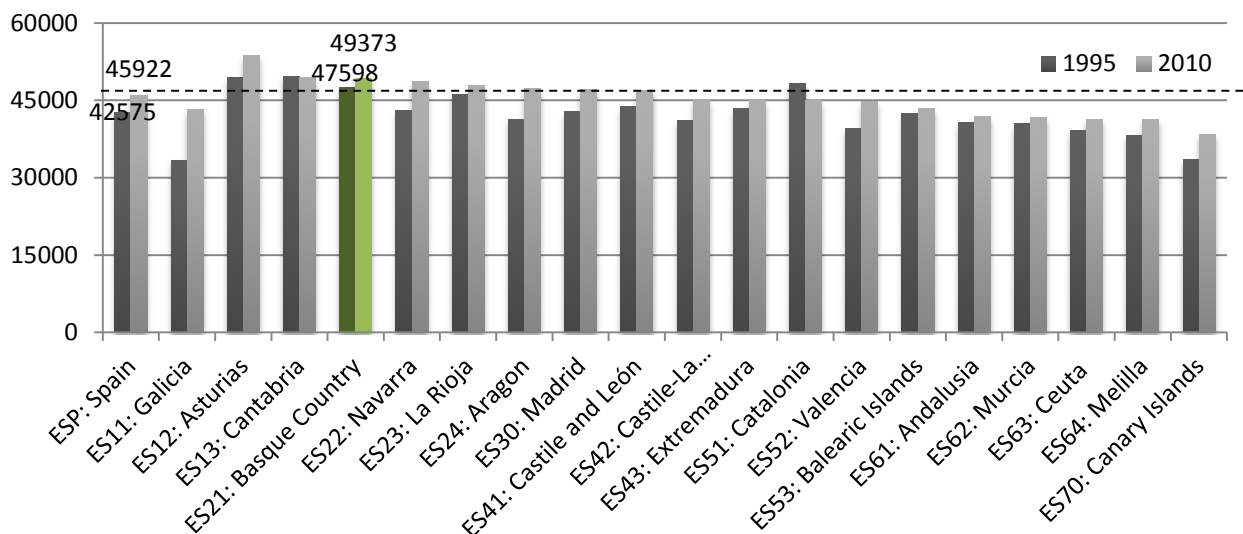


Note: ES63 & ES64 year 1995 – data 2000

Source: Authors’ development based on Eurostat & OECD, 2014

Referring to Gross Value Added measurement of all purchased goods and services it can be seen that the change from 1995 to 2010 wasn’t very significant (Graph 24), only about 3.5%. Nevertheless the Basque Country is still in top ranking among Spanish autonomous communities in terms of GVA per worker.

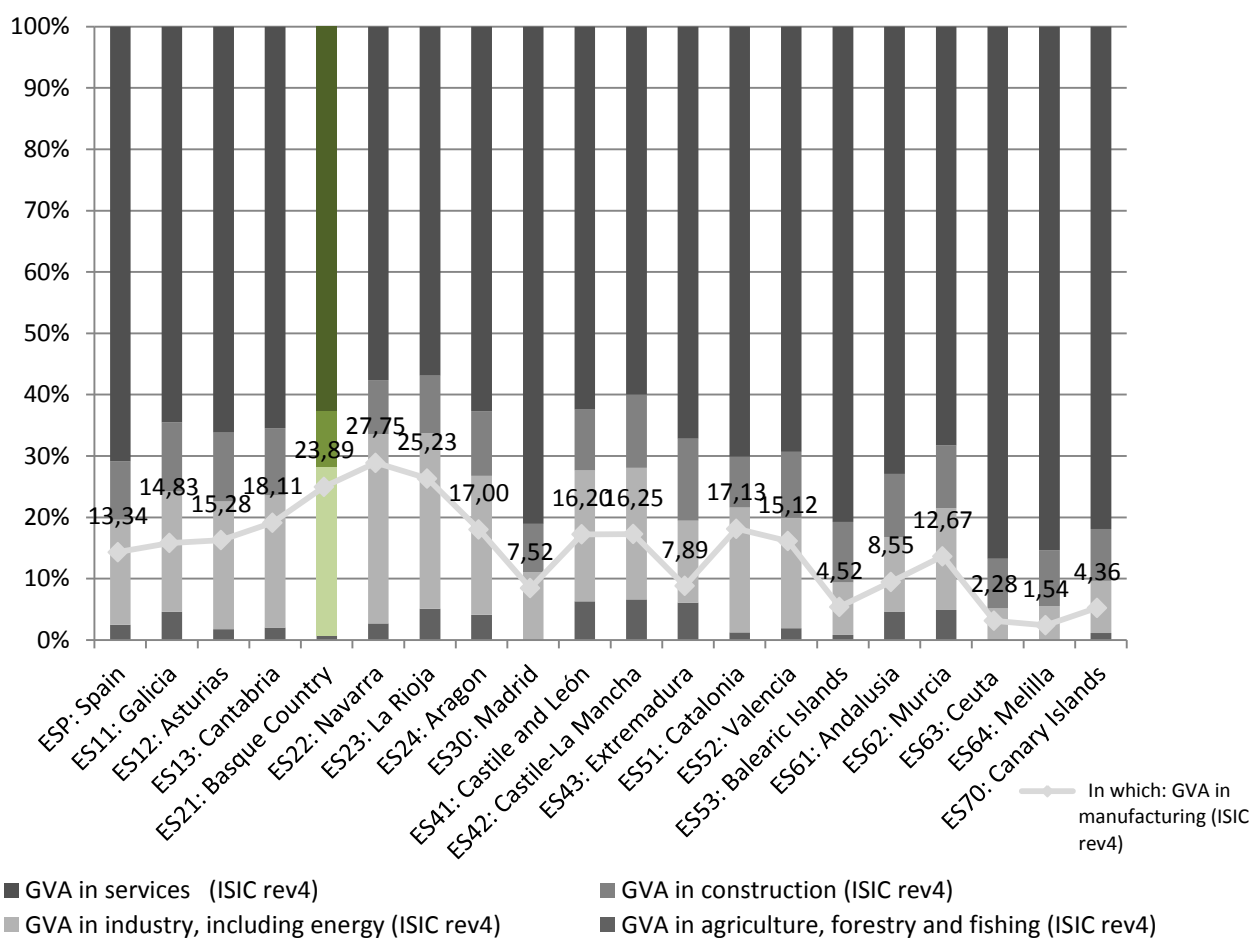
Graph 24 GVA of total activities, per worker in EUR, constant (year 2005), Spain and Spanish autonomous communities, 1995 and 2010



Source: Authors' development based on OECD, 2014

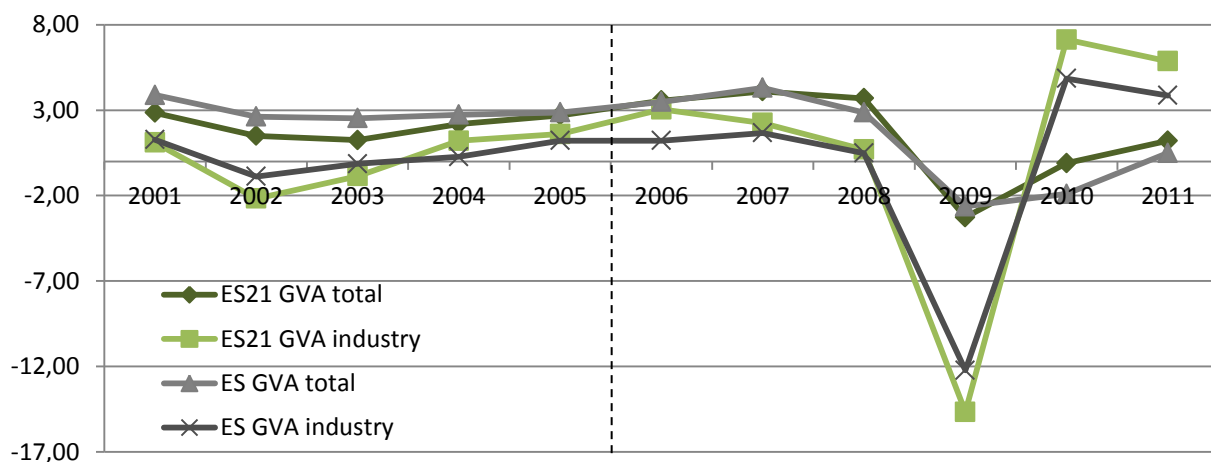
Reviewing the composition of the GVA per sector (ISIC Rev.4) we again state that Basque Country has a very strong industrial base, which in 2011 composed 27.53% of the total GVA (Graph 25). Only several other Spanish regions have a similar industrial share of their economy, Navarra with 30.87% and Rioja – 28.58%. At the same time the industrial composition of the Basque economy has decreased over the observed years. In 2000 it was almost 31.5% but in 2005 it had decreased to 28.55%, although in absolute terms it has shown increase. This trend was deliberately chosen by the Basque Government and was also one of the results of the cluster policy, which was aimed at promoting diversification, in particular through the support of not only traditional sectors of the Basque economy. In the forthcoming years due to proclamation of industrial renaissance, both by European Commission as well as in the recent Science, Technology and Innovation or Business Internationalization Plan of the Basque Government this tendency might take another turn. In terms of the manufacturing share within the Basque industry, the situation is similar to the industry sector in total. This means that with 23.89% in 2011 the region was third place in the rankings, behind the communities of Navarra and Rioja, at the same time showing a general decline from 28.54% in 2000 (Graph 85). Among the important service related sectors of the Basque Country business services, electricity, water and gas supply should also be mentioned for their high growth rates. On the contrary – a steady decline has been noticed in market services and constant but slow growth in non-market services, which is also claimed by Fafña et al. (2010).

Graph 25 Sectoral GVA as % of total GVA, Spain and Spanish autonomous communities, 2011



Source: Authors' development based on OECD, 2014

Graph 26 Growth rates of GVA total and industry, the Basque Country and Spain, 2001 – 2011



Source: Authors' development based on OECD, 2014

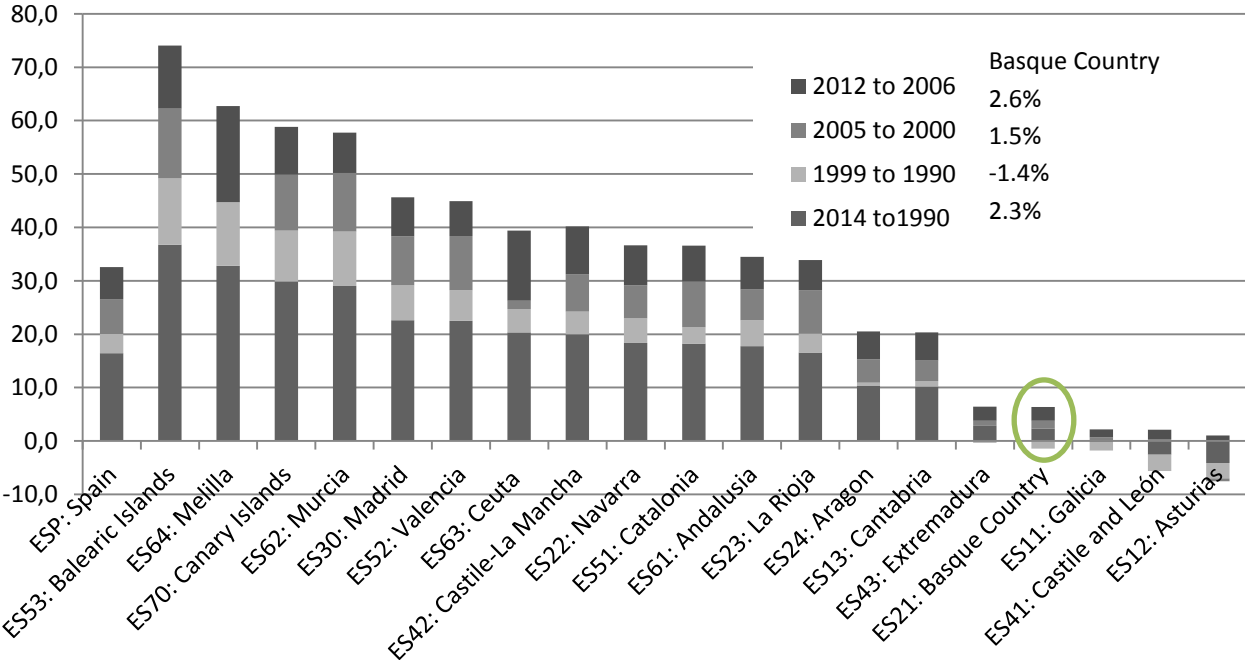
After the deep drop in the industry sector especially the Basque economy managed to overcome the financial crises faster than Spain, both in terms of total GVA and the industry sector in particular (Graph 26). Especially, the industry growth rates are significantly higher than in the pre-crises periods. The industry GVA growth rates with the exception of the year 2009 had an average rate of around 2%, whereas GVA total – 2.3%. The Basque average growth rate in all other sectors is similar to national (Spanish) ones, whereas in terms of the industry sector – the rates are higher. This again implies the strong industrial specialization of the Basque economy.

3.2.2. Labour and human capital

The Basque Country is a small scale region, as is reflected in its population and labour force. The total population is slightly above 2 million people (2 167 166, INE 2014), which in 2013 made around 4.7% of the Spanish total. Moreover this share in the national total has even decreased since 1999, when it was around 5.2%.

Generally over the last 20 years, from 1990 the population increase was only in 2.3%, which is one of the lowest in comparison to other communities of Spain (Graph 27). In the third period of the cluster policy (from 2006 to 2012) the population increase seems to be the highest for the Basque Country (2.6%), whereas in the first period (from 1990 to 1999) on the contrary, a decreasing trend of the population is observed. The reason for this can be related to the high rate of migration and political conflict within the region.

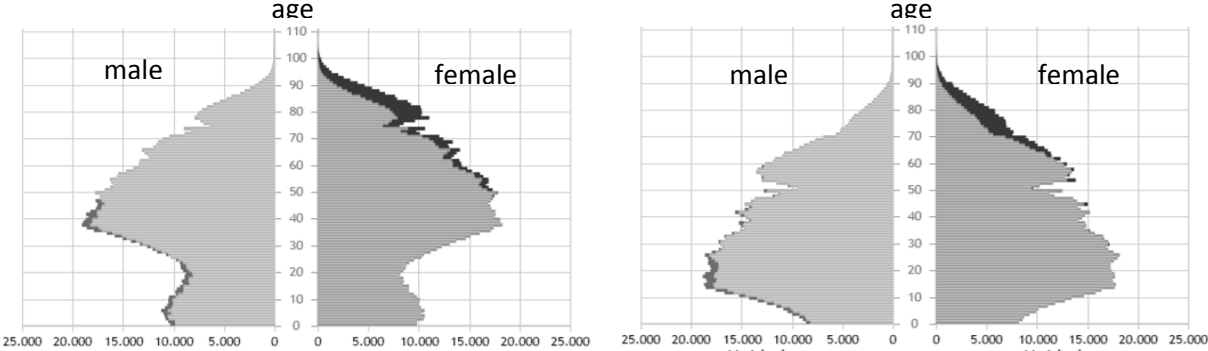
Graph 27 Period based increase of population, in percentage, Spain and Spanish autonomous communities, 1990 to 2014, 1990 to 1999, 2000 to 2005, 2006 to 2012



Source: Authors' development based on INE, 2014

The population pyramid for the Basque Country also shows typical to European Union countries demographic problem based on low birth rates and increased elderly population (Graph 28). Nevertheless, the births in the last years are higher than the ones for the beginning of the 1990s and up to the financial crisis in 1998.

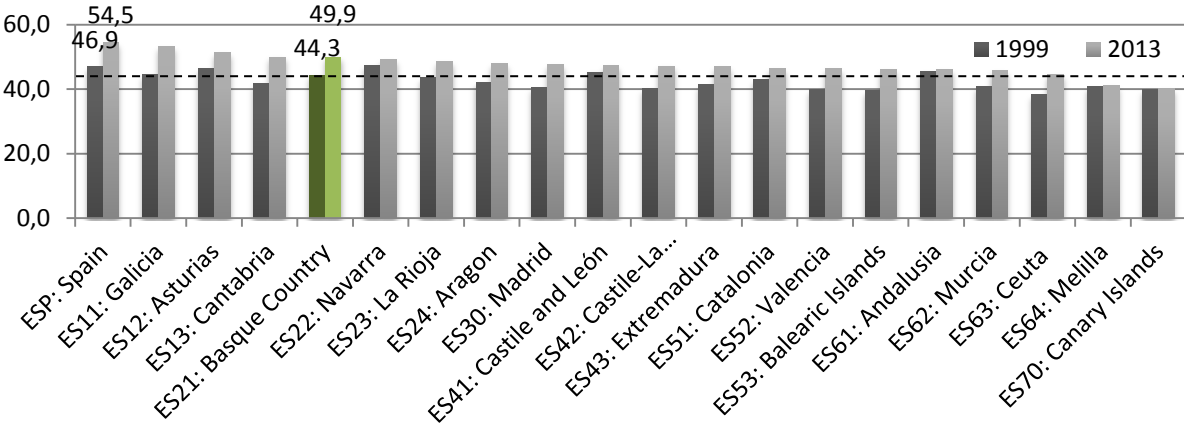
Graph 28 Population pyramid, the Basque Country, 2014 (left) and 1990 (right)



Note: Dark grey shows the difference between male and female
 Source: Authors' development based on Eustat, 2014

Despite the low increase in the population over the last years in the Basque Country, the region is the leading group of regions based on the number of labour force as a share of the total population (Graph 29). In 1999 the labour force was 44% of population, in 2013 - 50%.

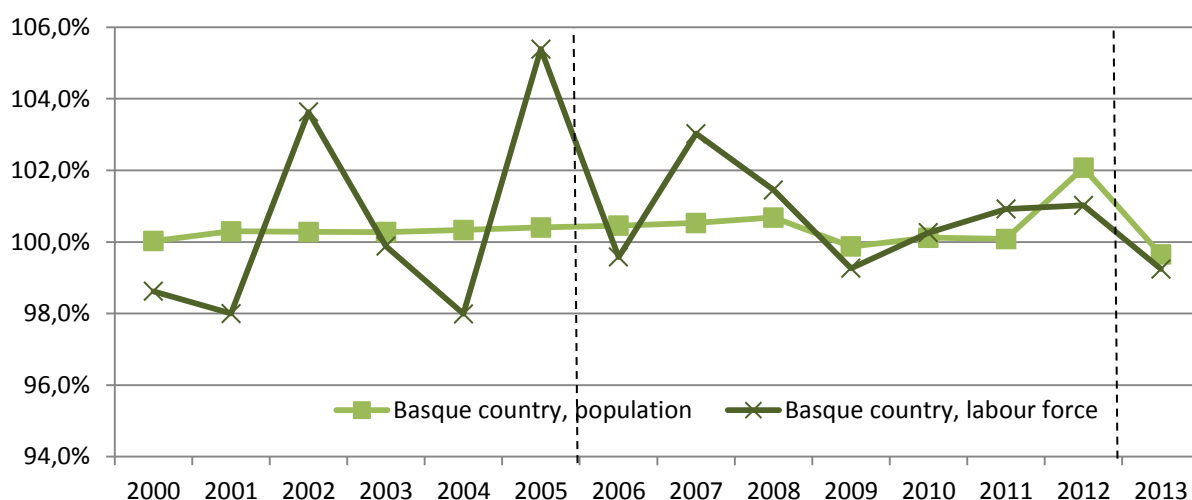
Graph 29 Labour force total, as a % of population, total, Spain and Spanish autonomous communities, 1999 and 2013



Source: Authors' development based on OECD, 2014

We have also observed the growth rates of labour and population in the Basque Country from 2000 to 2013 (Graph 30) and can see that until 2005 the Basque Country experienced higher and lower growth peaks in terms of labour force, while the growth rates for population were slightly but constantly increasing. The situation changed in the period from 2006 to 2012.

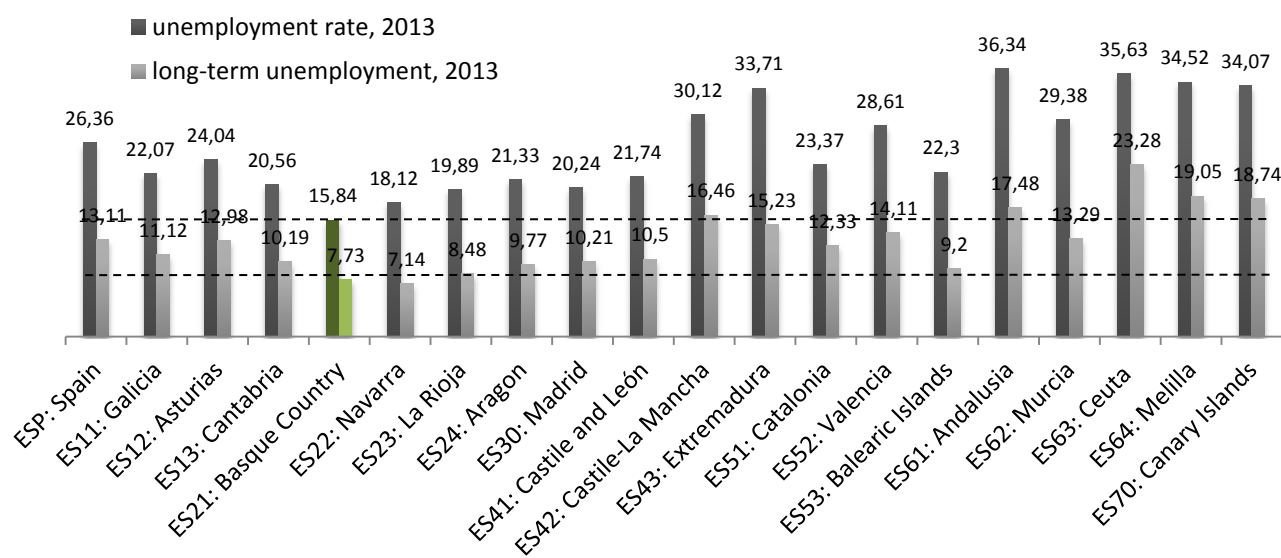
Graph 30 Growth of population and labour force, the Basque Country, 2000 to 2013



Source: Authors' development based on OECD, 2014

With a high share of labour force, the Basque Country in 2013 had a bit higher unemployment rate (15.84%) than the EU17 (11.9%, OECD 2014) and also the EU28 (10.8%, Eurostat 2013). At the same time within Spain the Basque region has the lowest unemployment rate (and apart from Navarra also lowest long term unemployment rate) (Graph 31). This can be associated with better economic performance of the Basque Country relative to other Spanish regions and due to the region's strong traditional industrial base, which is able to offer better conditions to maintain employment.

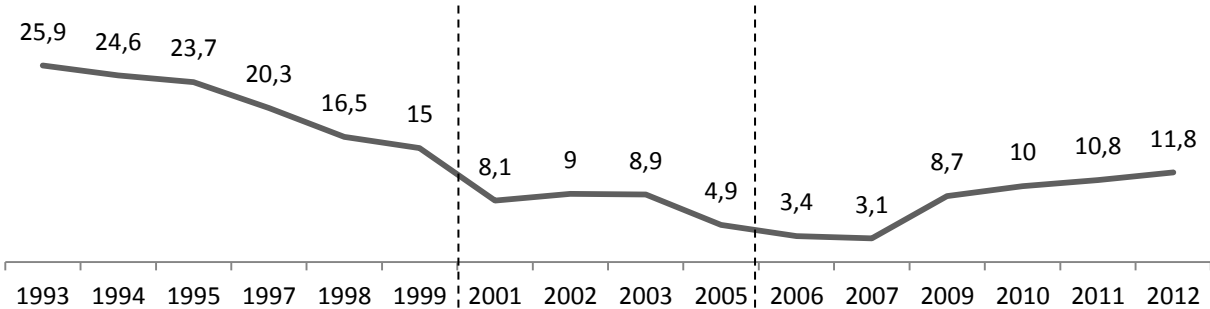
Graph 31 Unemployment and long term unemployment rate, Spain and Spanish autonomous communities, 2013



Source: Authors' development based on OECD, 2014

If we observe the evolution of the unemployment rate over the last 20 years, we can clearly see its significant decline: from almost 26% in 1993 to around 12% in 2012 (Graph 32). This drop was very significant in the first period of the cluster policy, when the decrease was more than 10% (from 1993 to 1999). After the period of stable rates, between 2001 and 2004, the declining trends continued but lasted only until the beginning of the financial crises. Although in the third period of cluster policy the unemployment rates went up, as we mentioned they still stayed lower than the Spanish and most of other Spanish autonomous communities.

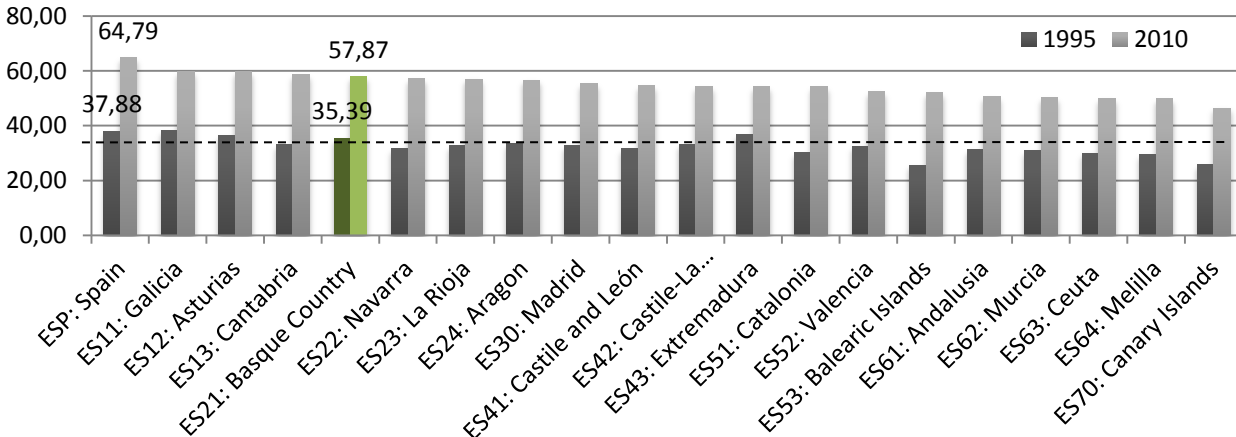
Graph 32 Evolution of unemployment rates, the Basque Country, 1993 – 2012



Source: Authors’ development based on Eustat, 2014

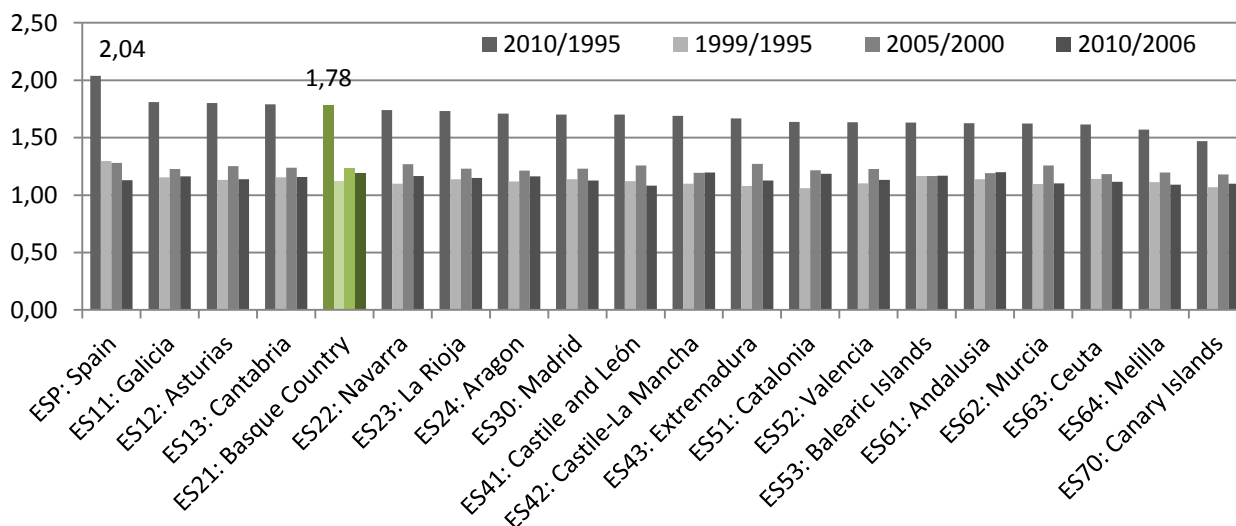
The Basque Country was also in the group of Spanish autonomous communities with the highest labour productivity with 57.87 thsd in 2010, moreover this trend of having one of the highest productivities has been maintained since 1995 (Graph 33). Nevertheless, as particularly highlighted by Orkestra, Basque Competitiveness Report Summary (2013) such high productivity rates are more to do with cutting jobs, which is also characteristic of other Spanish regions.

Graph 33 Labour productivity (GDP thsd. EUR current, per employee), Spain and Spanish autonomous communities, 1995 and 2010



Source: Authors’ development based on OECD, 2014

Graph 34 Change of labour productivity based on periods, Spain and Spanish autonomous communities, 1995 to 2010, 1995 to 1999, 2000 to 2005, 2006 to 2010

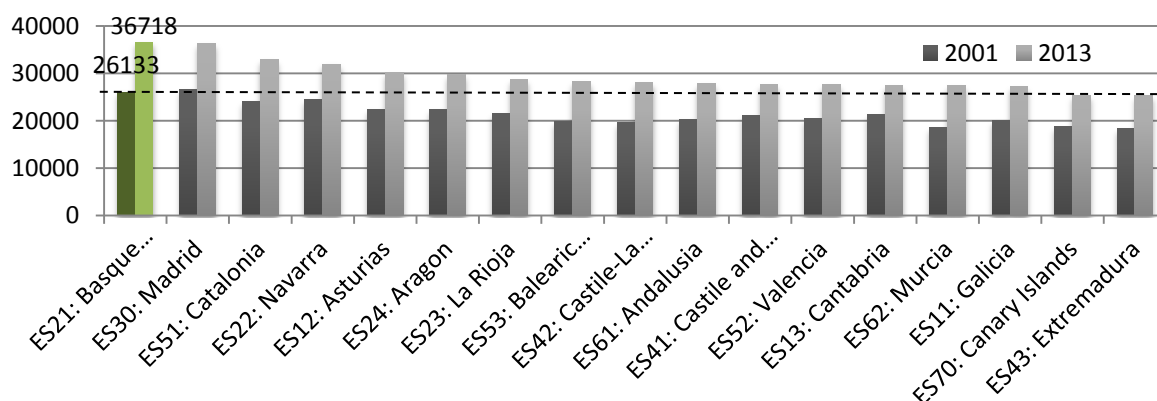


Source: Authors' development based on OECD, 2014

Nevertheless, the increase of labour productivity from 1995 to 2010 in the Basque Country was also one of the highest in Spain (Graph 34). At the same time it is still lower than the Spanish total. However, we think that the Spanish increase was accompanied by jobs elimination. This might less be the case for other autonomous communities, notably Galicia, Asturias and Cantabria that have a higher increase than the Basque Country. In the second period of cluster policy the increase of productivity was the highest in comparison to all other periods in the Basque Country. At this time, while referring to Graph 21 and Graph 31, the unemployment was almost stable and the GDP growth was to observe as well, which could signify productivity increase in Basque region.

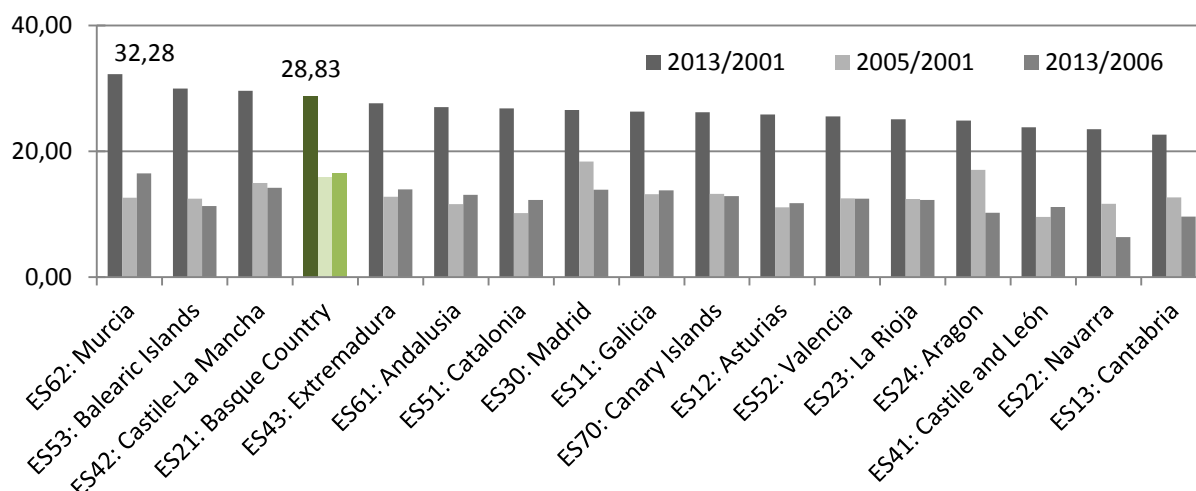
In 2013 similar to GDP per capita the Basque Country also had the highest gross total labour costs (Graph 35). At the same time this leading position has also been maintained since at least 2001.

Graph 35 Labour costs, total gross per year, EUR, Spanish autonomous communities, 2001 and 2013



Source: Authors' development based on INE, 2014

Graph 36 Labour cost gross period based change, in %, Spanish autonomous communities, 2001 to 2013, 2001 to 2005 and 2006 to 2013



Source: Authors' development based on INE, 2014

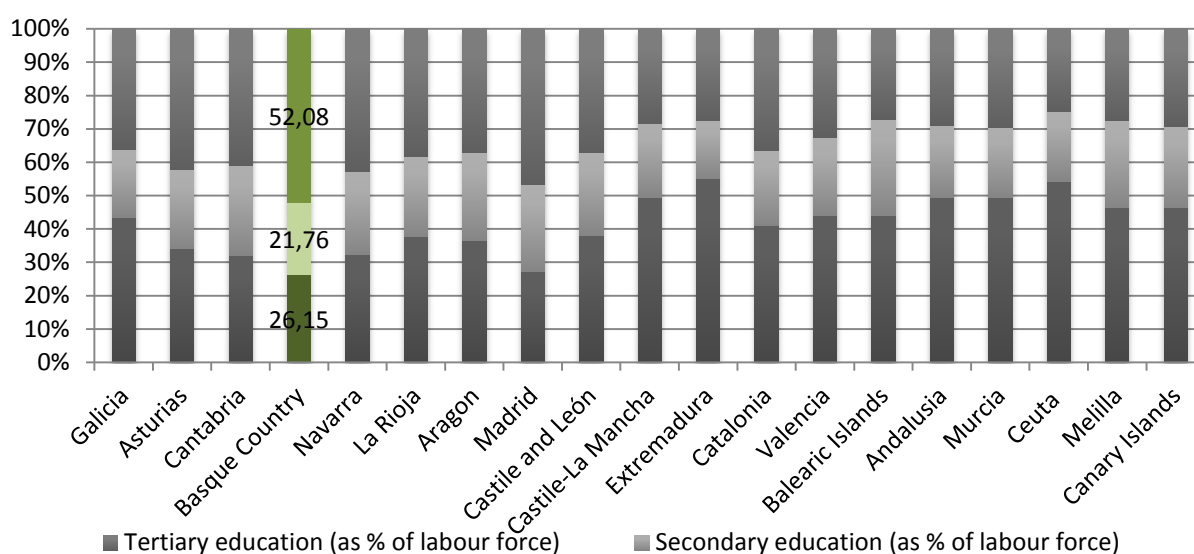
An increase of almost 29% in labour costs from 2001 to 2013 in Basque Country can be observed and is also one of the highest in Spain (Graph 36). Higher percentages were observed for such regions as Murcia, Balearic Islands and Castile-la Mancha. At the same time the increase was also similar from 2001 to 2005, as for the period, 2006 to 2013. The growth of the labour costs is an important input element influencing the increase in price of products or services produced by the region. Although this increase in labour costs is positive as it may assist the Basque producers to compete in more high-value groups of products, it can be risky, as the countries with lower labour costs may compete with the Basque Country producers. However, as we will later see, Basque producers are starting to offer more technology intense and high value products, which should be competitive on the international market.

Finally referring to sub-indicator “Labour market efficiency” of the Index of overall Competitiveness (RCI) 2013 (Annoni, Dijkstra 2013) the Basque Country falls in the middle group, with -0.02 taking 146 place out of 262. Therefore by driving the main **conclusion** from the reviewed factors we can highlight that the population and labour development in the Basque Country during the last years was positive especially in comparison to the Spanish trend. Nevertheless, considering the high unemployment rates and sub-optimal productivity trends, the issues related to the labour market should be stronger addressed. The second period of cluster policy is especially associated with the top indicators for the labour market development in the Basque Country.

3.2.3. Education, technology and innovation

The Basque Country has the highest share of labour force with tertiary education among other Spanish regions, which is also higher than the EU28. It means that over 52% of all labour capital has been graduated from the post-secondary education, including not only education at universities, but also technical colleges, etc. (OECD definition)(Graph 37 and Graph 87). This is also one of the reasons, why the Basque Country took 13th place with 1.22 points in the sub-index category “Higher Education & Lifelong learning: summary description of candidate indicators” of earlier mention index of overall competitiveness (RCI) 2013 (Annoni, Dijksra 2013).

Graph 37 Education level as a share of labour force, Spain and Spanish autonomous communities, 2013

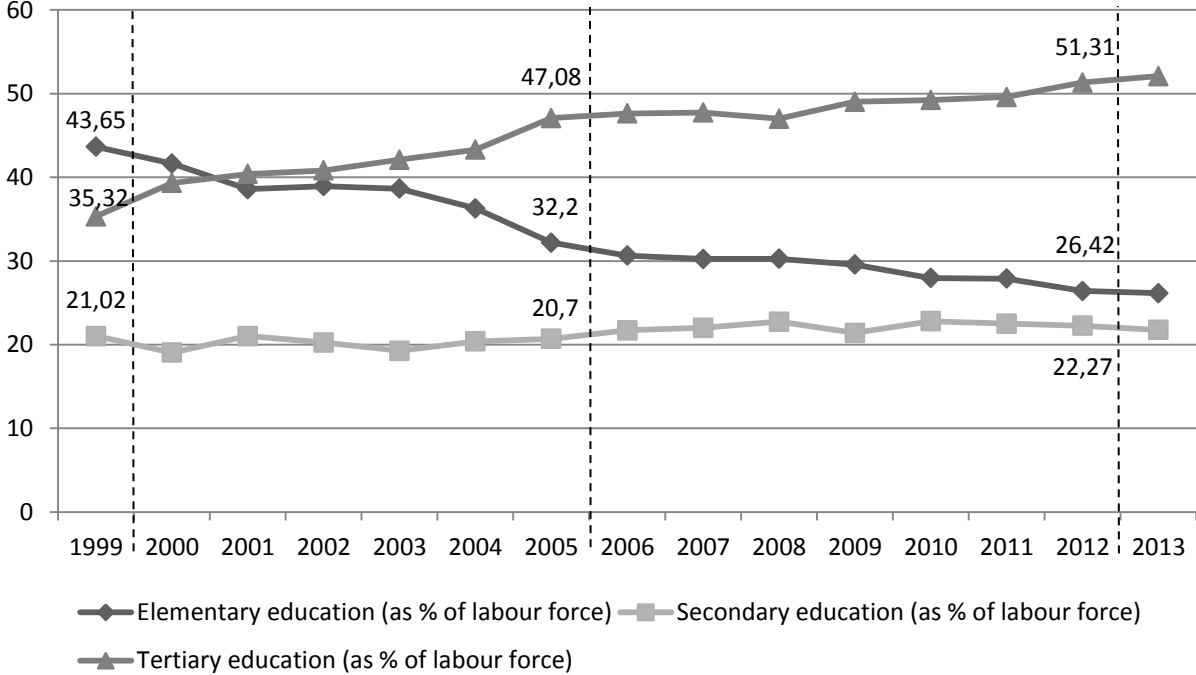


Source: Authors’ development based on OECD, 2014

These high rates of labour force with tertiary education tend to indicate the high capacity of labour to innovate and be pro-active in knowledge creating and sharing, stimulating technological and innovation progress within their companies and institutions. Nevertheless, considering the high industrial share within economy and based on the interviews (Interview 1H) the need for more technically specialized graduates and experts, one of the problems, which can arise is the search of this labour force for high paid jobs, which might not always be offered by industry and lead to a mismatch between the offer and demand on the labour market and high unemployment or migration rates. This could be particularly the case for the Basque Country companies, whose production facilities are still located in the region. The recruitment of high paid labour force is justified for technological product development, but in production might lead to rising costs and demotivation among employees.

The high share of labour force with the tertiary education has not always been the case, but rather was a result of education reform and the promotion of education and knowledge accumulation in the last years, especially since the second period of the cluster policy (since 2000). Graph 38 below clearly indicates this change. In 1999 the share with tertiary education was lower than with the elementary (35% to 44% respectively), in 2005 (by the end of the second cluster policy period) the rates were already other way round – 47% to 32% respectively. The share of labour force with the secondary education has stayed almost the same over the last 20 years – 21%.

Graph 38 Evolution of education as a share of labour force, the Basque Country, 1999-2013

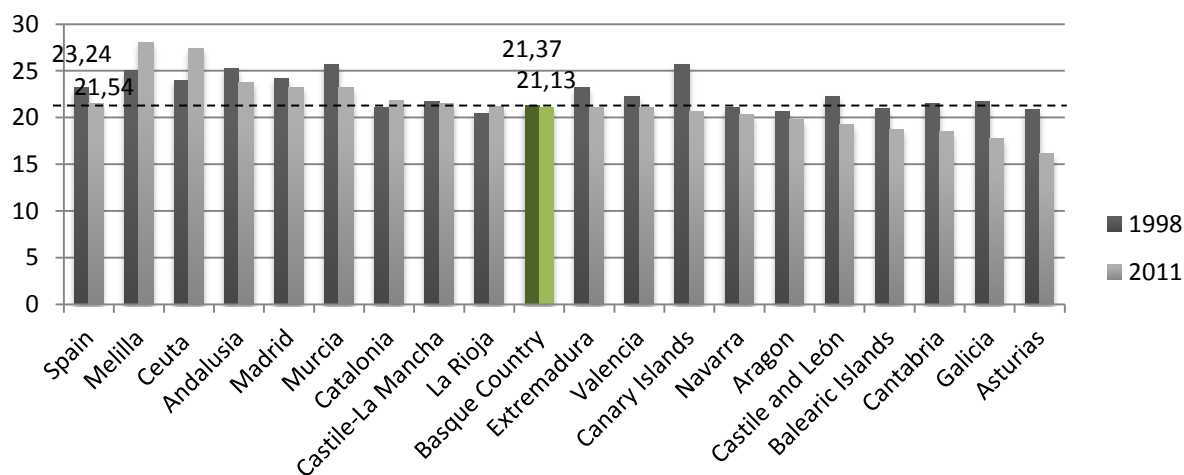


Source: Authors’ development based on OECD, 2014

At the same time in 2013 based on the total enrollment of the population (21%) the Basque Country was placed in the middle comparing to other autonomous communities of Spain (Graph 39).

The level of education is an asset of the region that significantly influences the quality of the labour force and the economic development. Apart from this, education is an important factor impacting on technological progress, innovation and scientific developments, which in their turn contribute to development of the economy. Herewith we support the opinion of Sánchez (2008), who acknowledges the contribution of high education level and labour market dynamism to the positive progress in terms of several innovation-related indicators, such as number of patents (Graph 88). Moreover, she considers human resource development “a key element for the Basque regional development” (Sánchez 2008, p. 161).

Graph 39 Total enrollment as % of population, Spain and Spanish autonomous communities, 1999 and 2011



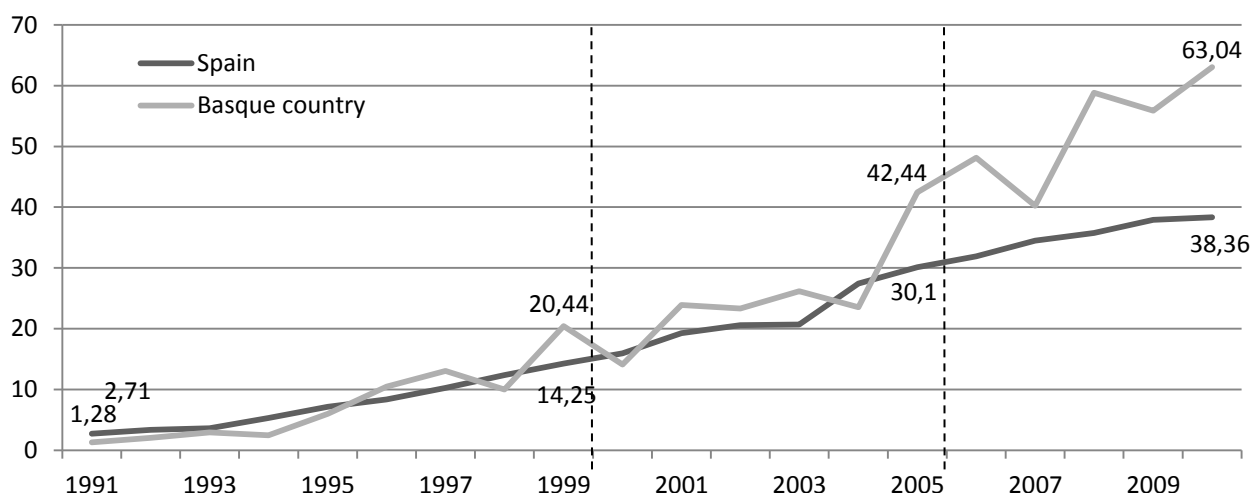
Note: Data for Ceita & Melila in 1999 based on year 2003

Source: Authors' development based on OECD, 2014

In light of innovation oriented policy, which was accompanied by the industrial and cluster policy, in the Basque Country the analysis of the indicators related to the innovation and technology is in particular of great interest (Sánchez 2008; Torres, Legendijk 2000).

Considering the number of patent applications one of the most frequent measurement for innovation progress, the Basque Country during the last decades has managed to make a significant leap: while having around 1 patent application per million inhabitants in 1990 to one of the highest in Spain in 2010 – 63.04 (Graph 88). Nevertheless, it is still lower than in most of the other EU 17 countries.

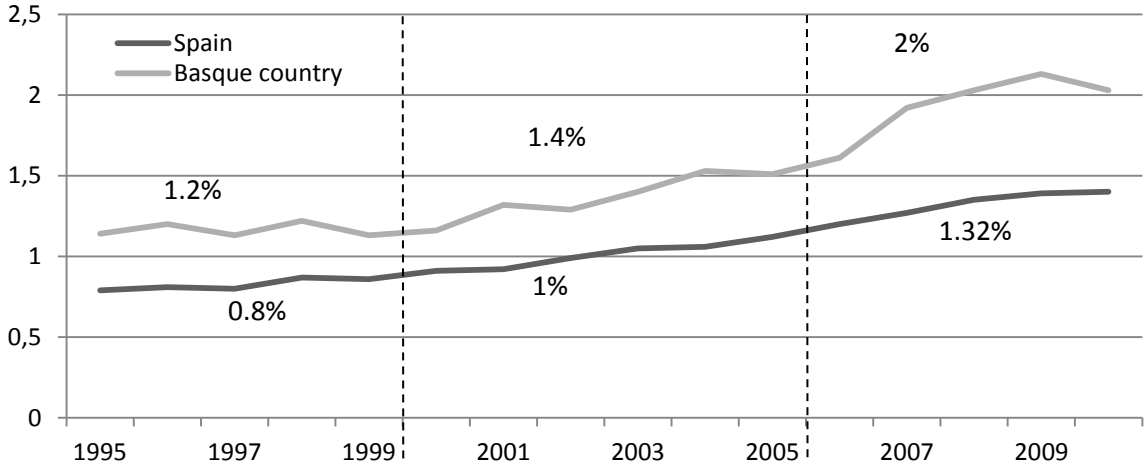
Graph 40 Evolution of PCT patent applications per million inhabitants (fractional count; by inventor and priority year), Spain and the Basque Country, 1991-2010



Source: Authors' development based on OECD, 2014

Reviewing the development of the PCT patent application per million inhabitants based on defined cluster policy periods, we can trace a significant constant increase over the last 20 years (Graph 40). At the same time the higher rise of PCT patents can be observed toward the end of the second period of cluster policy. During the same period the deviation between the Spanish and the Basque patent density starts to be more expansive.

Graph 41 Evolution of total R&D expenditures as % of GDP, Spain and the Basque Country, 1995 - 2010

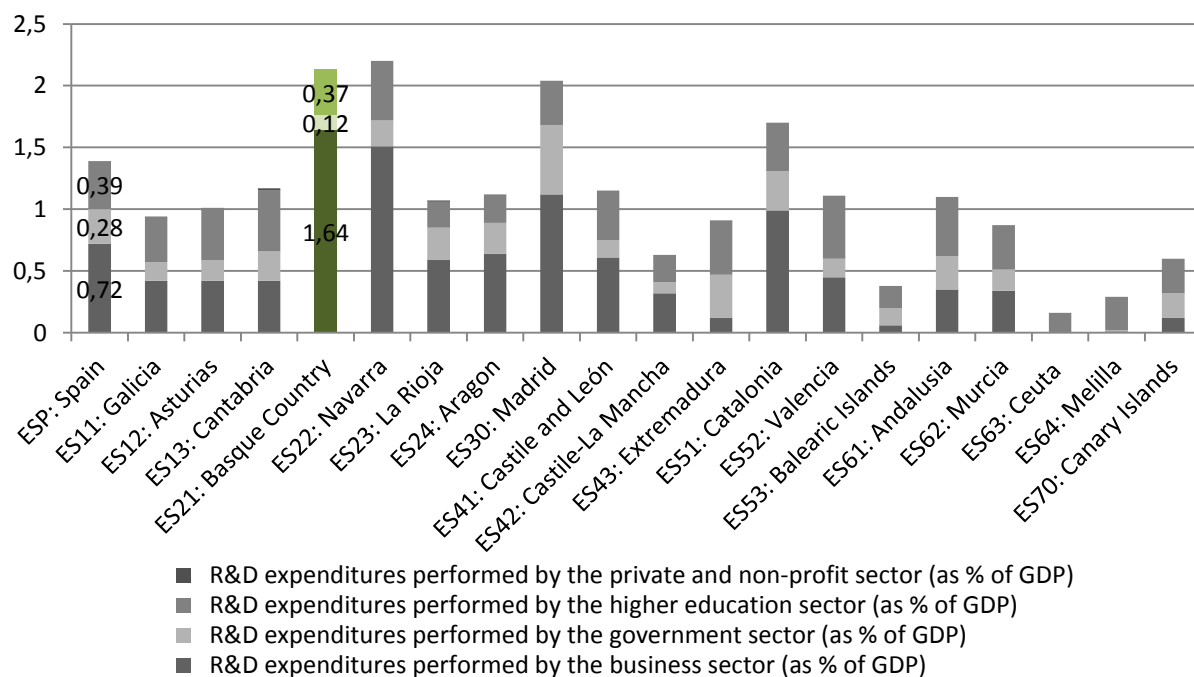


Note: Numbers above and below country lines on the graph stand for average value in an indicated period

Source: Authors' development based on OECD, 2014

Due to intensive pro-active science, technology and innovation policy in the Basque Country, the expenditures for R&D are also very high (Graph 88). In 2010 R&D expenditures were 2.03% of the regional GDP. Based on this indicator the Basque community is positioned third after Madrid and Navarra, and is also very close to EU28 average. The average percentage of R&D expenditure over the last 20 years in the Basque Country is also high – 1.5% of GDP and places the region in the leading group based on the share of investments in the regional innovation system. The highest R&D expenditure as a share of GDP can be observed in the period since 2006 (Graph 41). At the same time as it was the period during the financial crises the GDP went down, while the expenditures were maintained or further increased, which could be an explanation of higher expenditure rates as a share of GDP in the period since 2006. A major part of these expenditures in the Basque Country is due to business sector R&D expenditures (1.64% as of GDP) and is the highest among other communities in Spain. In the study of the period based evolution of expenditures we focused only on R&D expenditures in business sector, as they are the most relevant in relation to cluster policy. The change in business R&D expenditures has the same trends as total expenditure in the Basque Country. In particular, they grew from 0.87% of GDP in 1995, to 0.88% in 1999, 1.17% in 2005 up to 1.64% in 2010 (Own calculations based on OECD 2014)

Graph 42 R&D expenditures per type, 2009, Spain and Spanish autonomous communities

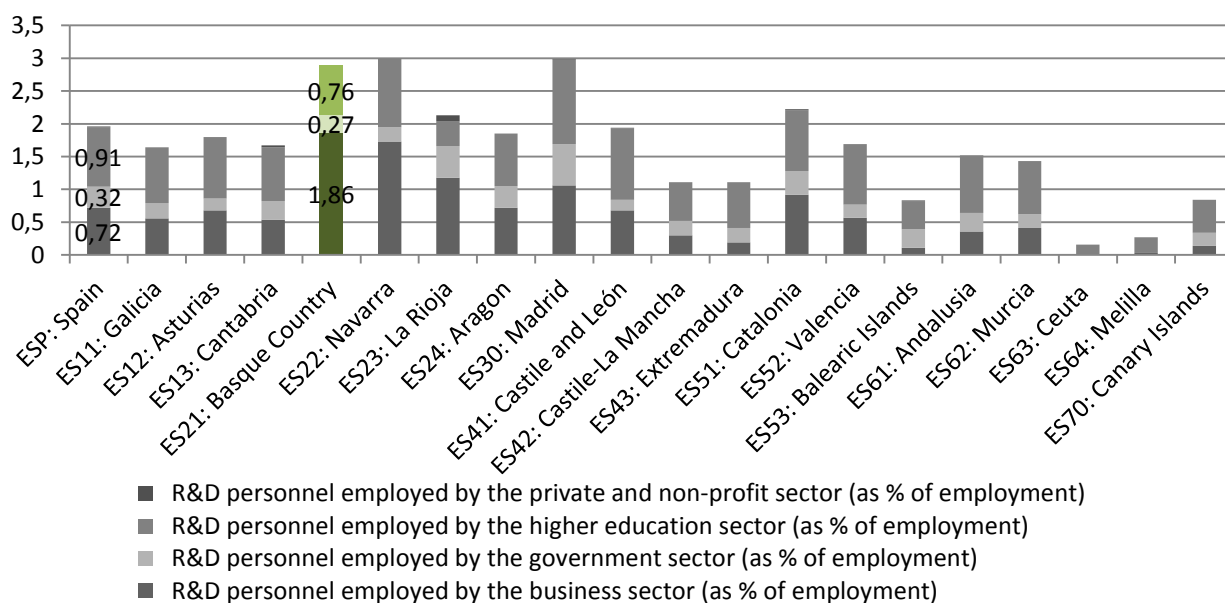


Source: Authors' development based on OECD, 2014

An important component for such a noticeable technological improvement in the Basque Country is the involvement of high professionals in research and development field, which is one of the highest in Spain based on rates of R&D personnel as a share of employment in 2010 (Graph 43). The trend is similar to the one showed by the Basque R&D expenditures. The period based increase of the R&D personnel was also similar to expenditures' trend and was also higher in the years since 2006 (Graph 86). As such in 2002 and in 2006 the share of R&D personnel in business sector composed 1.12% and 1.36%, while in 2009 it was almost 2% (Own calculations based on OECD 2014).

In the framework of technological improvement the Basque Country managed to take a leading position in terms of high and medium high technology manufacturing as well (Graph 89). In 2008, with around 40% of total manufacturing along with Aragon (39.8%), Catalonia (42.5%) and Madrid (41%) the Basque Country was one of the leading regions not only in Spain but also in Europe. A similar, or even more progressive trend, can be observed in terms of knowledge intensive services as a share of total services. Here the Basque Country with 47% is second after Madrid (50%). Moreover, the Basque innovation system has stimulated from 1996 to 2008 the highest rate of change in terms of high and medium high technology products – 54% (Graph 90). At the same time if for the high and medium-high technologies the highest growth was observed in the second period, from 2002 to 2008, in the case of knowledge intensive services the rate was higher in the first period. The years from 1996 to 2002 are also associated with the extensive change in the education and knowledge related areas, which could be the cause of these trends.

Graph 43 R&D personnel as a share of employment, Spain and Spanish autonomous communities, 2009



Source: Authors' development based on OECD, 2014

Finally, although the innovation performance of the Basque Country appears to be better than most of other communities in Spain (in all innovation related indicators: patent density, share of employees in R&D sector or R&D expenditures), it is still average or below average in comparison to the European level. This can be supported by reviewing the sub-indicators of the Index of overall competitiveness (RCI) 2013 (Annoni, Dijkstra 2013). Out of 259 countries the Basque Country took 153 place with -0.73 points and is located in the middle group regarding Technology. The same situation is also seen in terms of Technological readiness of regional households: -0.27 points and 159 place out of 269. Significantly better performance is attributed to the innovation indicator in the Basque Country: 93 place with 0.05 points.

3.2.4. Clusters

Clusters, developed in the Basque Country, are the result of historical processes accompanied by supporting public activities developed in the framework of industrial and technological policies. These activities claim to have had a positive influence not only on cluster development in but also on the enhancement of general economic development in the Basque Country as a whole. Up to August 2014 has defined 11 priority clusters and 11 pre-clusters associations, which address a set of key sectors (clusters) important for the regional development. The full list of the clusters associations and clusters can be found in Table 48 and in Annex 7. The identification of these clusters was based on the results proposed by analytical works (Monitor Group 1991) and from the discussions among business and political groups. Most of these clusters reflect the classical definition of clusters proposed by Porter and are based on the sector's value chains (Interview 1F).

In all of these sectors, in the framework of the cluster policy cluster supporting associations/initiatives have been established. Therefore we assumed that if the cluster policy had been implemented effectively these established cluster association should have led to strengthening and further growth of the sectors defined as clusters by the Basque Government. At the same time we know that cluster associations might be established differently to natural clusters sectors and lead to other type of the results. This is to be reviewed in this part. There are different approaches to measure clusters (performance). We will estimate the cluster progress mainly based on value of exports, employment in the sectors and number of establishments.

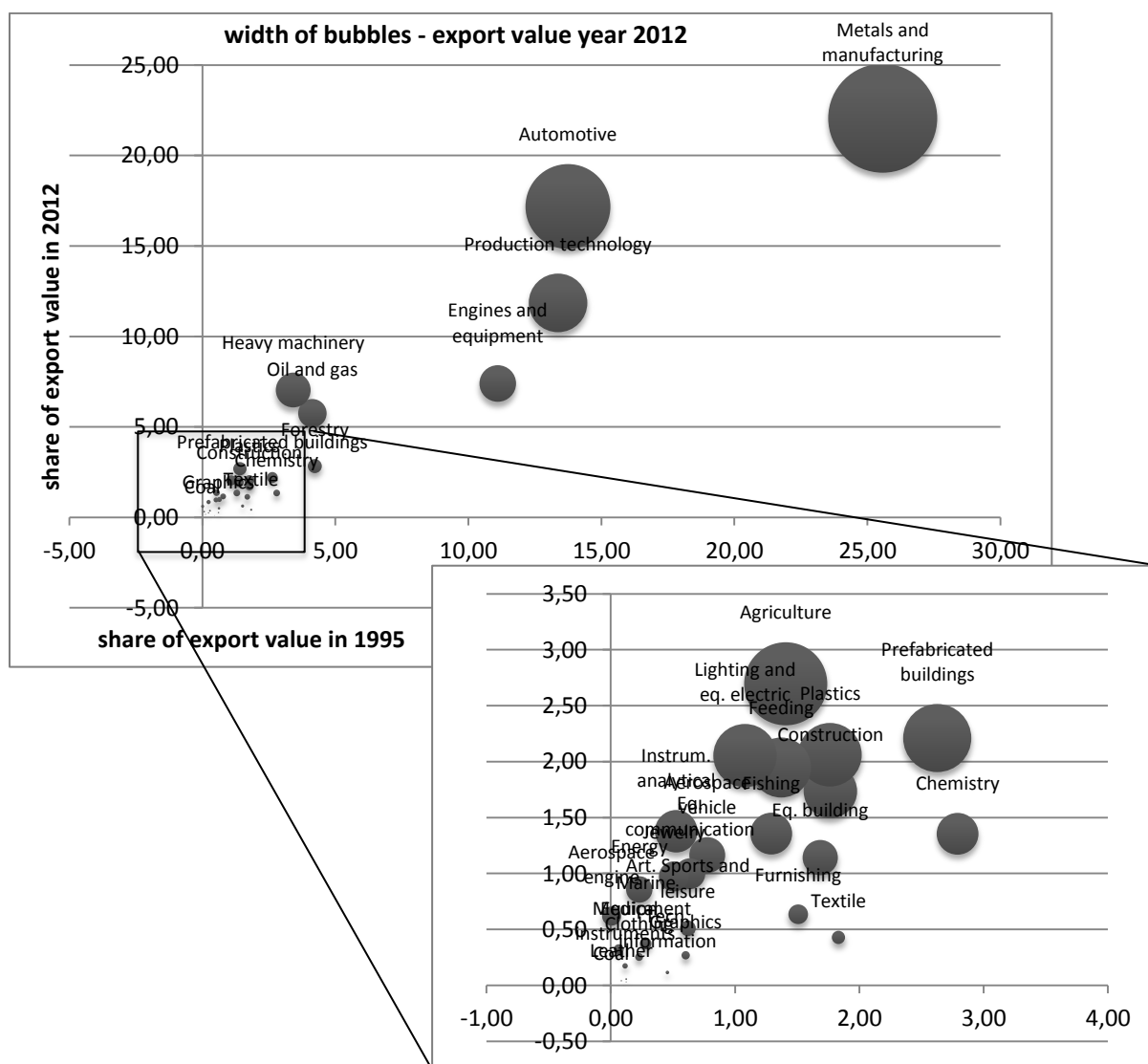
The review of the cluster data based on the **export value**, which was provided by Orkestra-Basque Institute of Competitiveness, suggests a high value share of the following clusters in the Basque Country (Graph 44 and Table 48): **metal and manufacturing, automation, production technology, engines and equipment, heavy machinery, oil and gas, forestry**. The Basque **metal manufacturing cluster** in 2011 based on the number of employees also enters the top 25 biggest clusters in Spain. This fact once again highlights the old tradition and the importance of this industry in the region (European Cluster Observatory 2014). At the same time there is no public-private supporting organization in this sector. The reasons behind it were first of all, the desire to diversify the Basque economy from this sector and second of all, the preexistence of strong groups of companies with high level of cooperation, which didn't needed or expresses the need for extra support. However, in its two sub-cluster groups: foundry products and iron and steel manufacture two pre-cluster associations have been established since 2009, FEAF and SIFE. The **automobile / automotive sector** is another priority cluster in the Basque Country; it is actively supported by the government, companies and public since the first years of the cluster policy. Moreover in reference to Faíña et al. (2010) and numerous interviews (Interview 1I, 1F, 1B, 1A) it has a substantial influence on the competitive environment of the Basque economy. Its sub-clusters can be grouped into: automotive parts and engines assembly. There exists a cluster association established to support the automotive cluster, ACICAE. The importance of the **energy sector** is also seen from the data review. Energy cluster has also been supported from the early beginning of the cluster policy. At the same time the current focus of the cluster is not only in oil and gas, but also in energy related technologies and products. The prioritization of the energy sector is one of the main focus lines of the Basque RIS3 Strategy. The sector also has its cluster association, Enrgia. One of the sub-clusters within the **production technology cluster**, machine tools and accessories, is also a very relevant sector for the Basque economy. The first cluster association in the Basque Country was established in this cluster, AFM. **Forestry sector** didn't have its cluster association until the introduction of the notion of pre-clusters. Although HABIC cluster association addresses not only issues related to forestry, it is still able to provide significant sector specific inputs for companies' development,

especially in terms of giving a clearer picture on potential consumers. Within the **engines and equipment cluster** only the **electrical household appliances** sub-cluster was seen relevant by the Basque Government. It has its own cluster association, ACEDE, as well, but generally the cluster is not very dynamic though potentially could create more competitive strengths through links with other existing clusters.

Another important group of clusters is in **electronics, aerospace and environment** sectors. In all these sectors cluster associations were established in the first years of the cluster policy, moreover they are also seen as priority ones. At the same time the **aerospace sector** wasn't a traditionally strong sector in the beginning of 90s, it managed to increase its weight within the Basque economy especially as a result of the deliberate government cluster supporting activities (Franco et al. 2012). Starting from the third and in the fourth period of the cluster policy evolution the aerospace cluster has grown in matureness and started to be self-developing. Aircrafts and firearms are the two most relevant sub-clusters within it. In the **electronics** there is also a cluster supporting association, GAIA. Its origin is from the earlier existing sector associations. The electronics sector is very closely related to numerous other sectors in the Basque Country. It is especially relevant in the framework of latest policies, e.g. Basque the Information Society 2011-2015, and the possible linkages that the cluster can develop with others to enhance advanced manufacturing, etc. In addition the **maritime sector** has also managed to overcome the challenges of the last 20 years due to its specialization in high value products and improvements in productive process management. In such, the cluster showed sustainably good performance, which is also 2 stars rated based on the star marking system developed by European Cluster Observatory (Table 27). It also has its cluster association, FMV, established since 1997.

The dominance of most of the priority clusters based on their regional share of total export value has been maintained over the last 20 years. The top 10 clusters in 2012 composed around 75% and top 5–53% of the Basque exports (Orkestra Tools 2015). The Graph 44 below shows main clusters in the Basque economy in 2012.

Graph 44 Clusters in the Basque Country based on export value data, EUR, 1995, 2012



Source: Authors' development based on data provided by Orkestra (original data: UN-Comtrade y la AEAT)

Although most of the leading clusters have maintained their dominance over the last years the diversification of the economy also took place, as the new sectors and clusters have grown in weight during the last years (Table 24). This is also possible to see through the export share of top 10 clusters in the Basque economy, which has fallen from almost 83% in 1995 to 75% in 2012 (Orkestra Tools 2015). Among the priority clusters, which established their cluster associations in the first years of the cluster policy, in particular **paper and hand tools** sector have experienced serious decline with decrease in employment and turnover (Faña et al. 2010).

Table 24 Change in % of export (based on total export value) the Basque Country, 2012-1995, 2000-1995, 2006-2000, 2012-2006

Cluster sector	2012-1995	2000-1995	2006-2000	2012-2006
Metals and manufacturing	↓ -3,50	↓ -4,82	↑ 1,81	→ -0,49
Automotive	↑ 3,45	↓ 8,66	↓ -1,23	↓ -3,97
Production technology	↓ -1,50	→ -2,39	↑ -0,34	↑ 1,22
Engines and equipment	↓ -3,69	→ -3,49	→ 0,20	↓ -0,40
Heavy machinery	↑ 3,64	↓ -0,64	↑ 0,82	↑ 3,46
Oil and gas	↑ 1,63	↑ 1,14	↓ 2,11	↓ -1,61
Forestry	↓ -1,38	↓ -0,61	→ -0,80	→ 0,04
Agriculture	↑ 1,29	→ -0,07	↑ -0,14	↑ 1,50
Prefabricated buildings	→ -0,41	→ -0,69	→ 0,12	→ 0,16
Plastics	→ 0,30	→ -0,01	→ 0,23	→ 0,09
Lighting and eq. electric	↑ 0,98	→ 0,06	↑ 0,19	↑ 0,73
Food	↑ 0,58	↓ -0,04	→ 0,62	↓ -0,01
Construction	→ -0,03	→ -0,22	→ 0,06	→ 0,13
Instrum. analytical	↑ 0,85	→ 0,25	↑ 0,09	↑ 0,51
Fishing	→ 0,07	→ 0,18	→ -0,47	→ 0,36
Chemistry	↓ -1,43	→ -0,29	↓ -0,48	↓ -0,66
Aerospace vehicle	→ 0,39	→ 0,34	→ 0,10	↓ -0,05
Eq. building	↓ -0,54	→ -0,37	→ 0,05	↓ -0,21
Eq. communication	→ 0,36	↓ 1,11	→ -0,85	→ 0,10
Jewelry	→ 0,47	→ 0,34	→ 0,07	→ 0,06
Energy	↑ 0,63	↑ 0,24	→ 0,51	↓ -0,12
Furnishing	↓ -0,87	↓ -0,11	→ -0,58	↓ -0,18
Aerospace engine	↑ 0,62	→ 0,23	→ 0,20	→ 0,19
Art. Sports and leisure	→ -0,11	→ 0,03	→ 0,03	↓ -0,17
Textile	↓ -1,40	→ -0,91	→ -0,45	↓ -0,04
Marine Equipment	→ 0,10	↓ 2,28	→ -1,87	↓ -0,31
Biopharmaceutics	→ 0,26	→ 0,12	→ -0,03	→ 0,17
Graphics	→ -0,33	→ -0,14	→ -0,12	↓ -0,08
Clothing	→ 0,03	→ -0,03	→ 0,02	→ 0,03
Medical instruments	→ 0,06	→ 0,04	→ 0,07	↓ -0,05
Tecn. information	→ -0,34	→ -0,06	→ -0,07	↓ -0,21
Footwear	→ -0,07	→ -0,08	→ 0,01	→ 0,00
Leather	→ -0,04	→ -0,05	→ -0,01	→ 0,02
Eq. reproduction	→ -0,09	→ 0,00	→ 0,12	↓ -0,21
Coal	→ 0,02	→ 0,01	→ 0,00	→ 0,01
Tabaco	→ 0,00	→ 0,00	→ 0,00	→ 0,00

Note: up green arrow >0,5%; horizontal yellow arrow between 0,5% & -0,5%, down red arrow <0,5%; methodological classification of cluster sectors is proposed by Orkestra-Basque Institute of Competitiveness

Source: Authors' development based on data provided by Orkestra (original data: UN-Comtrade y la AEAT)

In reference to Table 24 the increased export value share since 1995 to 2012 can be seen in all earlier leading clusters such as **automotive** (3.45%), **heavy machinery** (3.64%), **oil and gas** (1.63%). Furthermore, the rise was also seen in such clusters as **agriculture** (1.29%) and **food** (0.58%), **lightning and electrical equipment** (0.98%), **energy** (0.63%) and **aerospace engine** (0.62%). The cluster review on the basis of the identified cluster policy periods has shown that by the end of the first period (1995-2000) most of the leading clusters have shown a loss in their share within the regional export value in favor of smaller scale clusters. This similar trend was pursued in

the second period (2000-2006), whereas three leading clusters: oil & gas, heavy machinery & metals and manufacturing have renewed their portion within the exports. At the same time some middle scaled clusters have further increased their export scale, e.g. food or energy. In the third period there was almost no significant change by most of small and medium sized clusters, which is probably due to general reduction in global trade as of the financial crisis.

Another measurement to identify and observe the development in clusters is based on **employment data**. However, as we do not have long term aggregated employment data, for clusters we made only a short review of the employment in sectors based on A-38 classification. Along with other data and indicators it will assist us in providing a better and deeper review of sectors and clusters development in the Basque Country. Referring to Table 25 we can see the highest number of employees in such sectors as **trade and repair of motor vehicles, construction, metallurgy and metal products, education, public administration and defense services** as well as in different other types of services. From 1995 to 2012 the highest increase was observed particularly in such sectors as consultancy and technical activities (2.7 times), electrical equipment and material (1.8 times), recreation and cultural activities (1.7 times), informatics (1.9 times) and scientific research and development (2.4 times). This is exactly the areas, in which pro-active government support through science, technology and innovation, as well as cluster policy has been targeted. At the same time we can see also the progress in many of the service related sectors. This is a global trend since the end of the 90s.

Indeed, the Basque Country, and its cluster policy in the earlier years has dedicated less attention to the role of services and service related industries in their programmes. In the period from 2006 to 2012 we can see the negative trends in terms of employment in most of the industry sectors. The rationale for these is the financial crisis, which has had stronger negative impact on industry and export oriented producers in all countries of the world. The promotion of interrelation between the service and industry sectors should stimulate faster improvement of the situation.

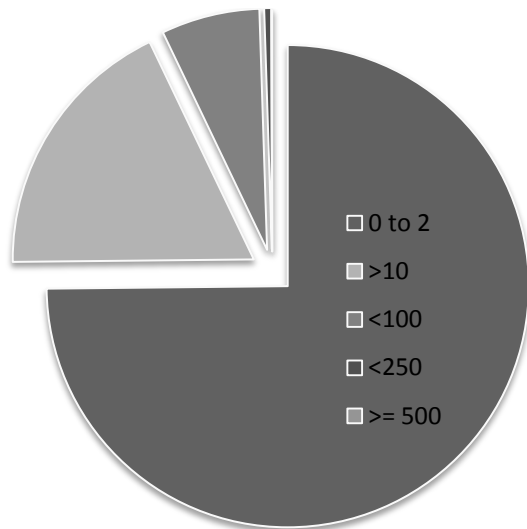
Table 25 Number of employees per sector, the Basque Country, 2012

Sector / Year	2012	2012/1995	1999/1995	2005/2000	2012/2006
Trade; repair of motor vehicles	132279 →	1,2 →	1,1 →	1,2 ↓	0,9
Construction	68285 →	1,2 →	1,2 →	1,3 ↓	0,7
Metallurgy and metal products	68245 →	1,1 →	1,2 →	1,1 ↓	0,8
Education	67752 →	1,5 →	1,2 →	1,1 →	1,2
Public administration and defense	56668 →	1,2 →	1,0 →	1,1 →	1,1
Support service	54366 ↑	2,4 ↑	1,6 →	1,3 →	1,0
Hostelry	51549 →	1,5 →	1,1 →	1,1 →	1,1
Household activities	49858 ↑	1,8 →	1,2 →	1,3 →	1,2
Health Activities	44256 →	1,4 →	1,0 →	1,1 →	1,2
Consultancy and technical activities	41249 ↑	2,7 ↑	1,7 →	1,3 →	1,1
Transportation and storage	40405 →	1,2 →	1,1 →	1,1 ↓	0,9
Other services	24647 →	1,5 →	1,1 →	1,2 →	1,0
Social Activities	23880 →	1,4 →	1,1 →	1,1 →	1,1
Machinery and equipment	20513 →	1,2 →	1,2 →	1,1 ↓	0,9
Rubber, plastic and other non-metallic	19795 ↓	1,0 →	1,1 →	1,1 ↓	0,7
Electrical equipment and material	19795 ↑	1,8 →	1,2 →	1,0 →	1,3
Financial and insurance activities	19511 ↓	0,9 →	1,0 ↓	1,0 ↓	0,9
Agriculture, forestry and fishing	17476 ↓	0,7 ↓	1,0 ↓	0,9 ↓	0,9
Transport material	16822 →	1,1 →	1,2 →	1,0 ↓	0,9
Food industry, beverages, tobacco products	14399 →	1,2 →	1,1 →	1,1 ↓	0,9
Furniture and other manufacturing	13838 ↓	1,0 →	1,2 ↓	1,0 ↓	0,8
Recreational and cultural activities	13089 ↑	1,7 →	1,2 →	1,2 →	1,1
Timber, paper and printing and reproduction	12814 ↓	1,0 →	1,1 →	1,0 ↓	0,7
Informatika	12141 ↑	1,9 →	1,5 →	1,2 ↓	1,0
Other professional activities	10774 ↑	2,0 →	1,5 →	1,2 →	1,0
Scientific research and development	6837 ↑	2,4 →	1,3 →	1,1 →	1,4
Real estate activities	6113 →	1,5 →	1,2 →	1,4 ↓	0,8
Water supply and Sewage	6094 →	1,5 →	1,1 →	1,1 →	1,1
Publishing, image, radio and television	5711 →	1,1 →	1,1 →	1,2 ↓	0,8
Chemical industry/ 8. Pharmaceutical	4476 ↓	0,7 ↓	1,0 ↓	1,0 ↓	0,7
Computer products & electronics	4476 ↓	1,0 →	1,2 →	1,0 ↓	0,7
Telecommunications	2841 →	1,3 →	1,1 →	1,1 ↓	0,9
Textiles, clothing, leather and footwear	2619 ↓	0,7 →	1,0 ↓	0,9 ↓	0,7
Electricity, gas and steam	2328 ↓	0,9 ↓	0,9 →	1,1 ↓	0,9
Manufacture of coke and refined petroleum	1150 →	1,3 ↓	0,9 →	1,2 →	1,1
Mining and quarrying	540 ↓	0,7 →	1,1 ↓	0,9 ↓	0,7
Total	951139	1,3	1,1	1,1	0,9

Note: up green arrow ≥ 1.5 ; horizontal yellow arrow between $< 1,5$ % and 1, down red arrow ≤ 1 ; A-38 classification

Source: Authors' development based on Eustat, 2014

Another approach to map and observe cluster development is to use the **number of establishments** in defined sectors or clusters. This we will also use for our analysis, but due to data availability, only two years will be compared: 2011 and 2005 (Table 26). At the same time we also take into consideration the weaknesses of this measurement method, which can be misleading. In some of the industries despite having the high number of the companies, their turnover can be very low and on the contrary only several big companies can make the biggest export or GDP contribution in the region. This could be particularly the case for the Basque economy as almost 45% employees are working for companies, which are composed of up to 2 employees (Graph 45).



Graph 45 Share of establishments as of number of employees, the Basque Country, 2014, Source: Eustat, 2014

Studying the number of companies is also relevant particularly to see types of clusters with high numbers of SMEs. This is particularly relevant considering one of the aims of the cluster policy in the Basque Country – promotion of SMEs collaboration and competitiveness. Referring to the Table 26 we can further see in 2011 the large share of previously mentioned cluster sectors, such as **metal manufacturing, building fixtures, agriculture**. At the same time due to this type of indicator other clusters come to be more evident, in particular **tourism and hospitality** (3686 entities), **media and publishing** (2789), **entertainment**

(1863), **maritime** (1058), **furniture** (764) or **IT** (660). In most of these clusters we can also find a priority or pre-cluster associations. Such coherence with existing cluster associations makes clear that the sector and cluster promotion was mostly based on the perspective / existing industrial capacities of the region. The available data can also provide us information for the change taking place as a result of the second or third period of the cluster policy. We can see that the increase in number of establishments is often observed in the pre-cluster sector, e.g. **tourism and hospitality** (+167 entities), **transport and logistics** (+107 entities) or **biotech** (+17).

Table 26 Number of establishments in clusters, the Basque Country, 2011, change 2011/2005 and absolute change in number of establishments (2011-2005)

Cluster label	2011	2011/2005	2011-2005	
Construction	8576	↓	0,89	-1102
Tourism and hospitality	3686	↑	1,05	167
Business services	3529	↑	1,15	468
Metal manufacturing	3127	↓	0,86	-500
Distribution	2924	↓	0,99	-26
Financial services	2857	↑	1,11	272
Media and publishing	2789	↑	1,07	182
Entertainment	1863	↑	1,46	590
Transportation and logistics	1743	↑	1,07	107
Processed food	1272	↑	1,02	29
Building fixtures, equipment and services	1104	↓	0,89	-132
Maritime	1058	↓	0,92	-88
Agricultural products	929	↑	1,15	118
Education and knowledge creation	800	↓	0,95	-42
Furniture	764	↓	0,86	-124
IT	680	↓	0,99	-9
Paper products	606	↓	0,82	-129
Production technology	584	↓	0,69	-258
Apparel	419	↓	0,90	-46
Telecom	397	↑	1,81	178
Automotive	343	↓	0,91	-36
Medical devices	309	↓	0,97	-11
Plastics	241	↓	0,84	-46
Construction materials	226	↓	1,00	-1
Textiles	160	↓	0,94	-11
Chemical products	148	↓	0,96	-6
Jewellery and precious metals	133	↓	0,96	-5
Heavy Machinery	113	↓	0,62	-69
Lighting and electrical equipment	93	↓	0,74	-33
Power generation and transmission	79	↓	0,73	-29
Instruments	65	↓	0,79	-17
Sporting, recreational and children's goods	60	↑	1,07	4
Leather products	51	↑	1,28	11
Biotech	44	↑	1,63	17
Stone quarries	31	↓	0,78	-9
Aerospace	24	↑	1,26	5
Pharmaceuticals	22	↓	0,92	-2
Farming and animal husbandry	8	↓	0,62	-5
Footwear	7	↓	0,54	-6
Oil and gas	6	↑	2,00	3
Tobacco	0		0,00	0

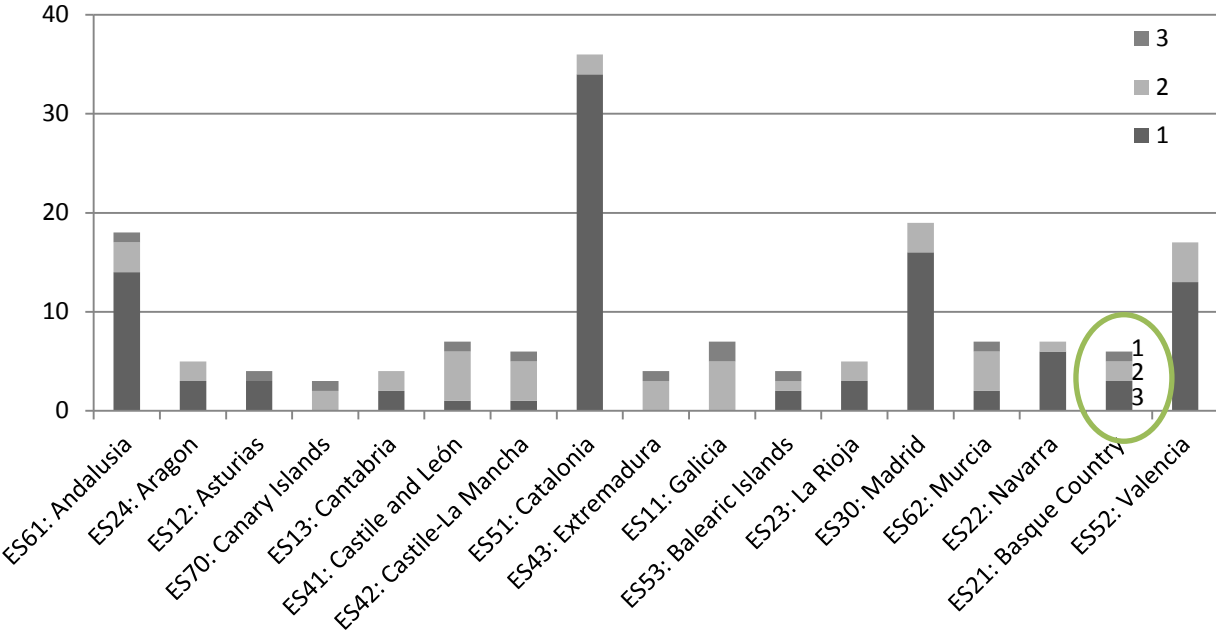
Note: up green arrow >1, down red arrow <=1, classification of cluster sectors is based on the methodology of European Cluster Observatory

Source: Authors' development based on European Cluster Observatory, 2014

The European Cluster Observatory has also developed indicators not only assisting in mapping and analyzing the clusters in the territory, but also evaluating the performance of clusters based on their own star typology system (Annex 6). While applying this methodology to the Basque Country, the small size of the region as of national and European, has to be kept in mind. Although the Basque country was one of the earliest to launch the cluster policy within Spain the region (with only 6 star-

marked clusters) is not leading one in terms of cluster sectors with stars, in contrast to other Spanish regions, such as Catalonia (36), Madrid (19), Valencia (17) or Andalusia (18) (Graph 46). However if we observe only 2 and 3 star ranked sector in Spain, the picture changes. The leading role is taken by Galicia (5 sectors ranked with 2 and 2 with 3 stars respectively). Here the Basque country with 2 clusters marked with 2 stars and 1 cluster with 3 stars can be placed in the middle group within Spain.

Graph 46 Number of star marked clusters, Spain and Spanish autonomous communities, 2011



Source: Authors’ development based on European Cluster Observatory, 2014

The sectors, which have been marked with 2 and 3 stars are all in priority clusters of the Basque country and have their cluster associations: **metal manufacturing, maritime and power generation and transmission** (Table 27).

Table 27 List of star-marked clusters, the Basque Country, 2011

Sector/ Stars
Basque country, total
Business services *
Construction *
Metal manufacturing ***
Production technology *
Maritime **
Power generation and transmission **

Source: Authors’ development based on European Cluster Observatory, 2014

Concluding, as we don't have further data regarding the star-marking of clusters in the earlier years we can't make broader comments in terms of the progress of Basque clusters. Nevertheless, considering such a low number of clusters with stars it can be an indicator for a low efficiency level of the clusters and hint on a poor effectiveness of cluster associations towards the promotion of clusters. This opinion should be done considering the scale of the Basque country within Spain. Moreover, although the clusters marked with stars are priority clusters, they belong to the group of traditional industry sectors of the Basque country. At the same time, several clusters, such as: **automotive, aerospace, energy, forestry, biosciences, electronics or maritime clusters** have shown strong growth and significant progress in their development. This is in contrary to the previous statement and may be a sign of correct sectoral prioritization for the cluster policy, which was developed in recent years. The mixed progress among clusters may be the result of too general approach to the development of all clusters in the regions. This can be improved by developing a more individual policy targeting to cluster promotion.

3.3. Composite influence of factors on regional economic growth

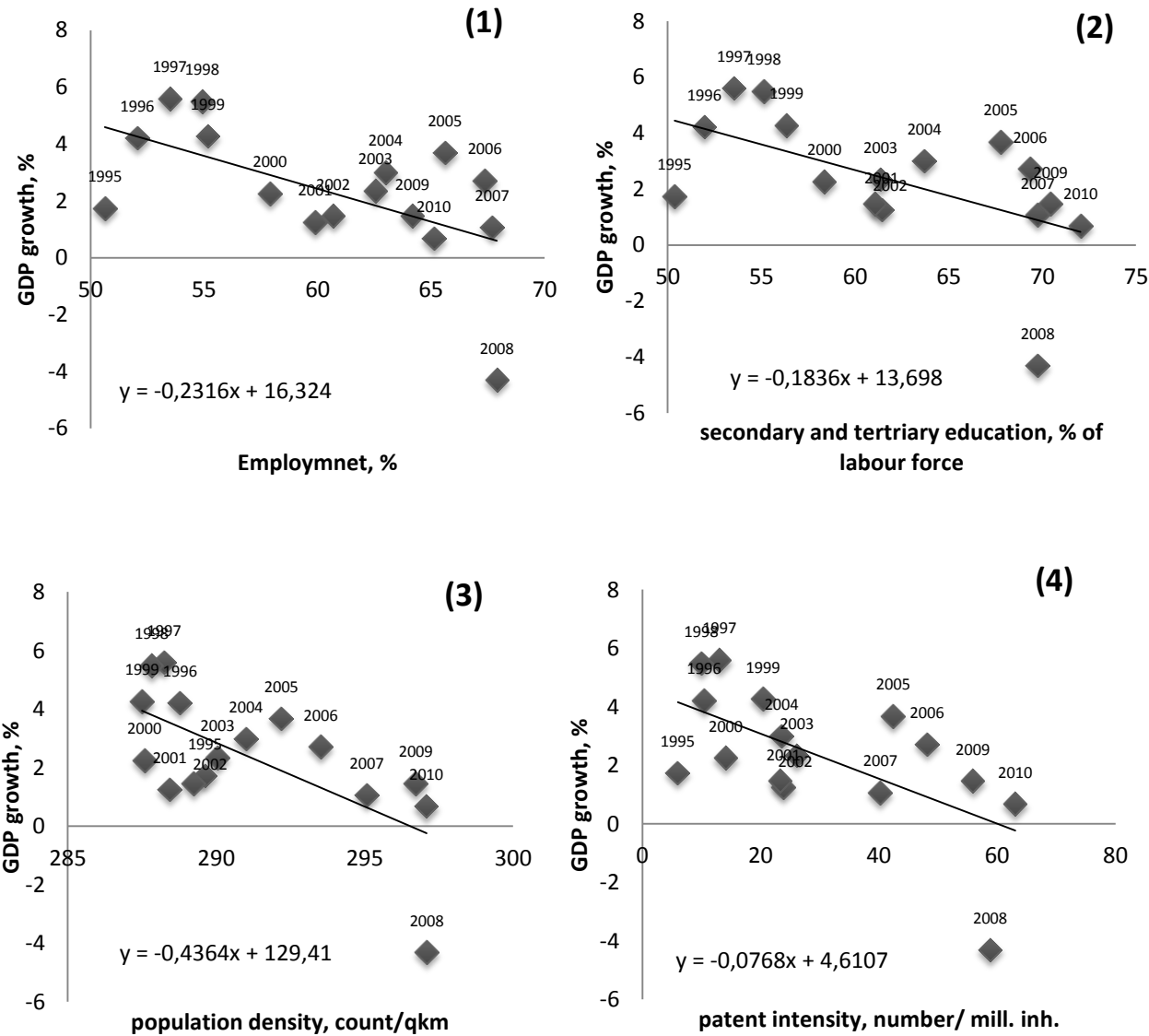
In the previous parts of this chapter the review of selected key factors determining economic growth has been done. Here we present the main outcomes, which have been extracted from the multiple linear regression models that we used in order to observe the relations between explanatory factors and GDP growth. It is important to highlight that the presented results should be taken with high caution as the number of observations is very low with respect to the number of the independent variables integrated in the models. At the same time we find the results useful, especially for complementing the descriptive analysis and driving conclusions in terms of regional economic performance. Also we considered sub-models based on the reduced subsets of explanatory variables. Note the tables, which are presented below only include the most significant results, i.e. the ones with the biggest adjusted R-squared value. For economic reasons some exoplanetary variables (population, patenting, co-patenting, infrastructure, education, specialization and clusters) might have an impact on the growth with time lag. Therefore we also consider such extantion of our model.

Before proceeding to multiple regression we will observe the relation between the GDP growth and each indicator separately in Graph 47. Based on a visual review we can already derive some conclusions.

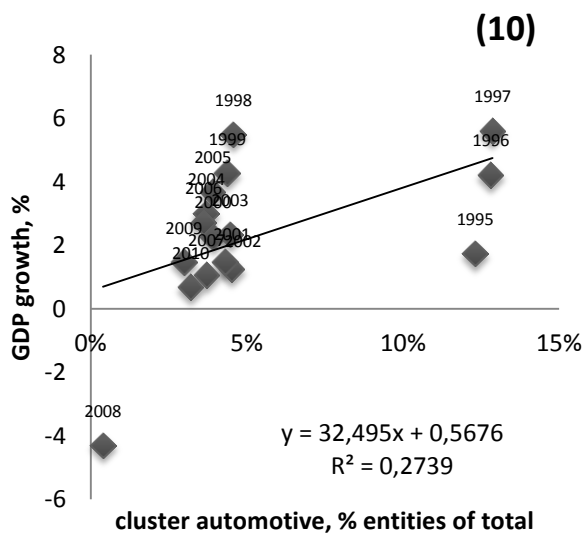
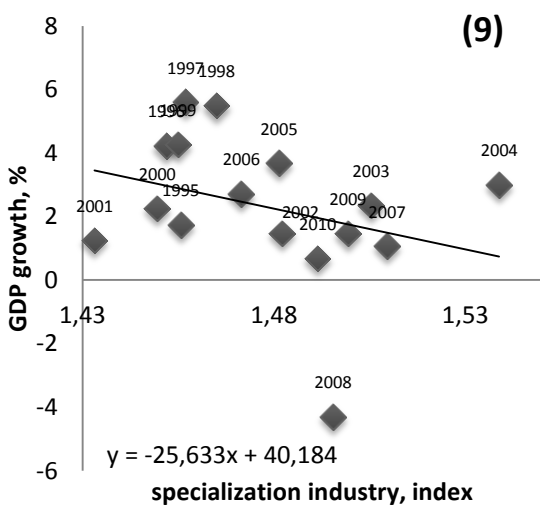
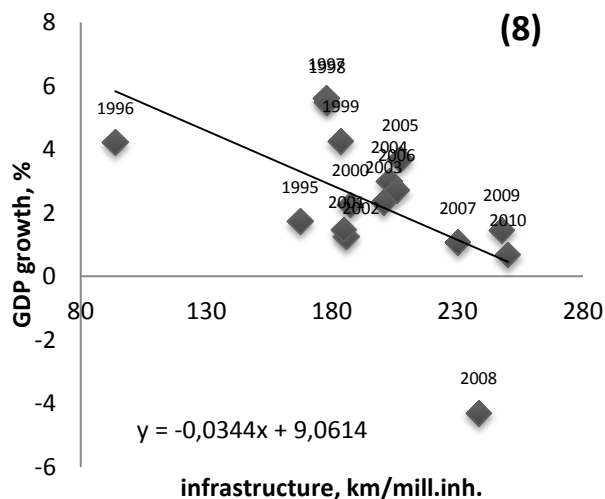
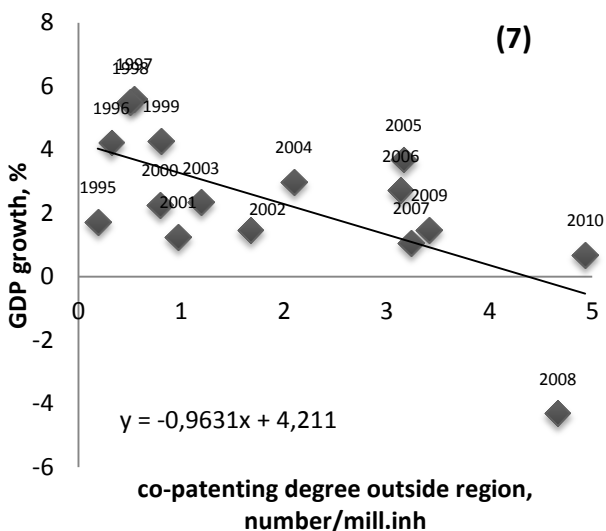
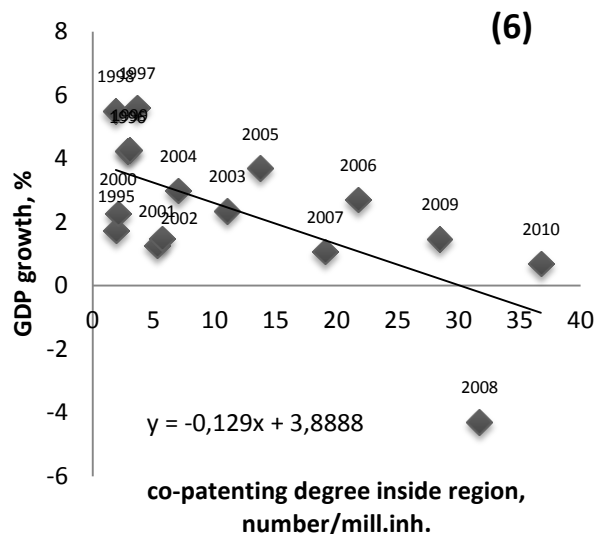
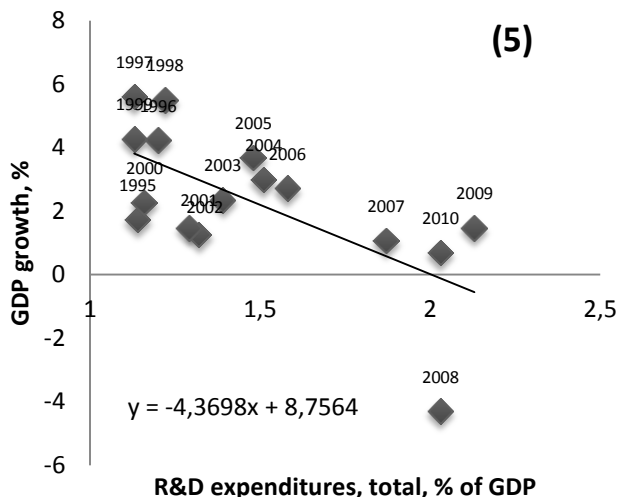
First of all the relation between most of the selected variables and GDP growth in the Basque country seems to have been negative. At the same time two positive relations were observed in the case of our cluster related indicator. The positive trend appears in both variables reflecting to the automotive cluster – based on number of entities and on employment number. This can indicate that

the developments in the automotive cluster were positive and could have contributed to the economic development in the Basque country. Considering that the automotive cluster has also been supported within the cluster programme of the Basque Government and has its cluster association, we can make a link with the possible effective implementation of the cluster policy in the regions. However, the successful development of the automotive sector could also be related not only to the cluster policy but general industrial policy of the Basque country and opportunities for this sector in the beginning of the 90s. Nevertheless, the general selection of the automotive sector as a priority due to cluster policy made important regional focus for the development of the sector and consequently the region as a whole. Another conclusion, which can be drawn from the graphs, is the deterioration of the results due to the financial crises, causing the bias development since 2008.

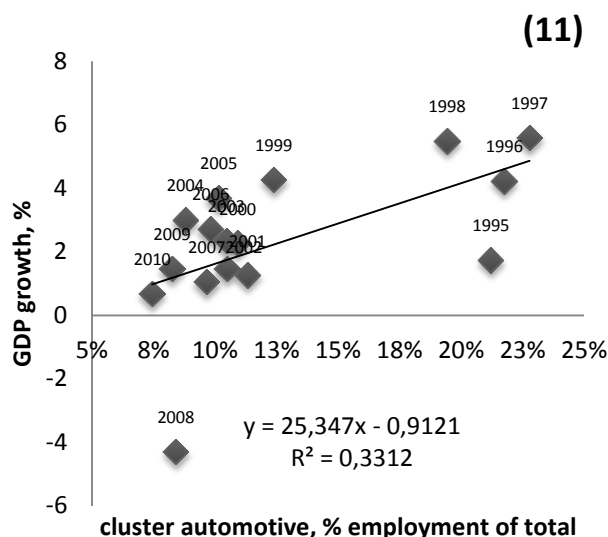
Graph 47 GDP growth versus variables selected for regression model: employment (1), secondary and tertiary education (2), population density (3), patent intensity (4), R&D expenditure (5), co-patenting degree inside the regions (6), co-patenting degree outside the region (7), infrastructure (8), specialization industry (9), cluster automotive entities (10), cluster automotive employment (11), the Basque Country, 1995-2010



Graph 47 (Continuation)



Graph 47 (Continuation)



Now we review the results from the regression composing of variables, which were identified in the theoretical part.

Table 28 reflects the results from the multiple regression, performed on data for the case of the Basque country. Here we can observe that **education** tends to show one of the most firm **positive influences** on the economic growth in the Basque country. It especially appears while being observed together with industrial specialization or the automotive cluster, reflected by share of employment. Apart from education a positive relation has been seen for regional **specialization in the industry**. At the same time only specialization and/ or clusters on their own don't reflect any relation to economic growth. Another positive association to economic growth can be seen with the **automotive cluster** which is in particular reflected through the employment share. Yet, it important to notice, that this is in combination with other variables and not on its own. However, neither the sub-model with only the cluster variable nor in its combination with other variables has a significant level of R-squared.

The **convergence** of regional economic growth can take place, but only in the sub-models without the innovation related indicators, such as (co-)patenting or R&D expenditures. Increase of **population** seems to have a **negative** influence on growth, though, it is to observe in sub-models in the absence of variables corresponding to education or co-patenting. A negative effect on economic development comes from the co-patenting with foreign regions and **R&D expenditures**. However this possible negative impact from **co-patenting** with foreign regions is surprising.

Finally, no significant relation was tracked between economic growth with **co-patenting inside** of the region, nor with the share of number of **establishments** representing the automobile cluster. The sub-model composing of variables such as **employment** along with education, industrial

specialization and employment within automotive cluster seems to have positive relation on economic growth.

Table 28 Regression results, the Basque Country, 1995-2011

<i>Models</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
<i>Intercept/ Constant</i>	20,727	21,743	25,541	23,283	25,514	9,102	-3,399	-3,318
	3,649**	3,532**	5,133**	4,642**	3,011	0,723	-0,466	-0,409
<i>Y</i>	-0,528	-0,591	-0,581	-0,207	-0,508	0,305	0,466	0,453
	-2,574*	-2,449*	-2,690*	-0,606	-2,538*	0,465	1,361	1,187
<i>EmplRate</i>	0,081	0,159	-	-0,543	-	-1,391	-1,487	-1,531
	0,235	0,414		-1,381		-1,377	-2,839*	-2,595*
<i>Edu</i>	1,067	1,085	1,363	1,349	1,298	1,408	1,789	1,832
	2,872*	2,816*	3,964**	4,112**	3,257**	3,658**	8,030**	6,960**
<i>Pop</i>	-2,836	-2,929	-3,725	-3,956	-3,840	-2,272	-0,524	-0,512
	-3,523**	-3,450**	-5,195**	-5,623**	-2,736*	-1,318	-0,523	-0,459
<i>Pat</i>	-	-	-	-	-	-0,011	0,074	0,070
						-0,225	2,247*	1,844
<i>R&Dexp</i>	-	-	-	-	0,475	-9,295	-14,888	-15,529
					0,102	-1,258	-3,634**	-3,269**
<i>Co- Patin_o2</i>	-	-	-	-	-	0,013	-0,023	-0,018
						0,381	-1,165	-0,780
<i>Co- patout_o2</i>	-	-	-	-	-0,001	-	-0,064	-0,064
					-0,076		-3,827**	-3,422**
<i>Infr</i>	-	0,017	-	-	-	-0,026	-0,025	-0,028
		0,548				-0,699	-1,304	-1,253
<i>Spec.</i>	-	-	0,415	0,477	0,397	0,608	1,050	1,056
			2,637*	3,047**	2,268*	3,094**	6,822**	6,150**
<i>ClustEst_o2</i>	-	-	-0,137	0,030	-	-	-	-0,086
			-0,594	0,118				-0,480
<i>Clust1Emp _o1</i>	-	-	0,256	0,436	0,231	0,688	0,923	0,942
			1,315	1,923	1,120	1,968	4,827	4,353
<i>R Square</i>	0,70	0,70	0,84	0,87	0,83	0,91	0,98	0,98
<i>Adjusted R Square</i>	0,58	0,56	0,73	0,76	0,69	0,72	0,92	0,91
<i>F</i>	6,28	4,76	7,88	7,71	5,75	4,81	17,65	13,08
<i>N</i>	16	16	16	16	16	16	16	16

Note: Below the estimated coefficient is given the value of t statistics, this sign * indicates significance at 95%; ** - significant at 99%

Source: Input data is based on OECD 2014 & Eurostat 2014

In Table 29 and Table 30 we present results of the models with time lags. The extracted results from the performed regression reflect a **negative** connection in the long term period between an increase in the **population** and economic growth, which is also similar to the outcomes from the previous regression shown in Table 28. At the same time the effect of 3 years lagged population is noticed to be **positive**. Another negative relation is to be observed for 5 years lagged **co-patenting** with foreign regions.

Table 29 Regression results with time lag, the Basque country, 1995-2011

Models	1	2	3	4	5
Intercept	19,677	25,731	22,961	21,440	24,321
	3,089**	3,963**	4,152**	3,610**	3,874**
Y	0,074	-0,150	-0,079	0,296	0,380
	0,394	-1,240	-0,866	1,513	1,857
Pop	-5,081	-5,307	-5,401	-6,148	-6,539
	-2,922*	-3,380**	-3,657**	-4,387**	-4,269**
PopT3	11,666	10,855	10,433	11,008	10,191
	2,946*	3,618**	3,829**	3,483**	3,278**
PopT5	-10,004	-9,657	-8,757	-8,920	-8,368
	-2,767*	-3,403**	-3,667**	-2,966*	-2,794*
Pat	-	-	-	-	0,008
					0,394
Pat T3	-	-	-	-	0,018
					0,946
Pat T5	-	-	-	-	-0,035
					-1,683
Co-PatIout	-0,014	-	-	-0,038	-0,039
	-0,604			-1,909	-1,471
Co-patIout T3	-0,013	-	-	-0,020	-0,023
	-1,369			-2,290*	-1,910
Co-patIout T5	-0,001	-	-	0,031	0,049
	-0,116			2,038	2,748*
Infr	-	0,027	-	-0,001	0,006
		0,934		-0,049	0,242
Infr T3	-	-0,020	-	-0,099	-0,089
		-0,750		-2,394*	-2,182*
Infr T5	-	0,015	-	0,036	0,017
		0,561		1,627	0,603
R Square	0,815	0,815	0,771	0,930	0,974
Adjusted R Square	0,653	0,653	0,688	0,791	0,805
F	5,037	5,028	9,259	6,664	5,749
N	16	16	16	16	16

Table 30 Regression results with time lag, the Basque country, 2000-2011

Models	1	2	3	4
Intercept	7,659	-5,331	11,188	4,289
	4,129**	-2,627*	6,425**	3,706
Y	-0,652	0,779	-1,039	-0,323
	-3,633**	3,307**	-5,811**	-2,883
Spec.	-	-0,211	-0,057	-
		-1,987	-0,329	
Spec.T3	-	-0,868	0,503	-
		-3,636**	2,925*	
Spec. T5	-	-0,084	-0,106	-
		-1,129	-0,885	
Clust2Est	-	3,420	-	1,459
		6,315**		5,006
Clust2Est T3	-	0,528	-	0,232
		4,121**		1,703
Clust2Est T5	-	-0,006	-	0,056
		-0,047		0,399
Clust1Emp	1,101	-	0,294	0,408
	1,892		0,663	1,352
Clust1Emp T3	-0,290	-	-0,423	-0,235
	-1,843		-2,954*	-1,708
Clust1Emp T5	-0,610	-	-0,665	-0,447
	-3,083*		-5,152**	-3,297
R Square	0,752	0,980	0,953	0,975
Adjusted R Square	0,587	0,932	0,843	0,918
F	4,548	20,508	8,670	16,941
N	11	11	11	11

Note: Below the estimated coefficient is given the value of t statistics, this sign * indicates significance at 95%; ** - significant at 99%

Source: Authors' development based on input data from OECD 2014 & Eurostat 2014

Furthermore, similar to the results in Table 28, the positive trend is also kept in the observation of the relations between the share of **establishments** in the automotive cluster and economic growth. This is also seen within 3 years-time lag together with specialization. However specialization shows

in contrast to Table 28 a negative connection. Another difference to Table 28 can be seen in terms of **employment in automotive** cluster. In contrast to the previously positive trend, here in long term lag it tends to show a negative correlation with GDP growth.

These results, due to their significant limitation caused by extremely low level of observations can't be generalized. However they still provide valuable insights into the studied factors of economic growth in the Basque country. Moreover, they enable us to draw limited but first cluster-driven seemingly positive trends observed in the region. Along with this the results might hint on the relevance of education and specialization in the industry for the further policy makers.

3.4. Summary of the economic development part

In this part we conducted a static and a dynamic review of the Basque economic development based on the observation of its main factors of influence in the last 20 years. Our main focus was concentrated on such factors as capital, human and labour force, education and technological progress, cluster development and indicators directly related to the cluster policy. After that, based on the regression model we deepened our analysis through a review of the main implication trends of all defined factors on the economic growth in the Basque country.

The main outcomes of these studies suggest that the Basque country has one of the industrially strongest and vibrant economies in Spain (GDP per capita in Graph 19 and disposable household income in Graph 22). Even considering the latest financial crisis the Basque economy seems to have recovered faster than Spain as a whole. In addition to the financial crisis over the last 20 years the Basque economic growth has experienced several stagnations. First was at the beginning of 90s and the second - during the 2000 – 2003. The highest growth rates were observed during the first period of the cluster policy and by the end of the second period leading to several years of constant medium growth rates until the beginning of 2007.

Most of its factor-related indicators have shown excellent performance in comparison to other Spanish regions. Although at the end of the 80s the Basque country was already positioned in the group of the leading Spanish regions, over the last decades it managed even further improve its development especially reflected through its innovation (Graph 40), labour costs (Graph 35), unemployment (Graph 32) and education (Graph 37) related indicators (being highest in Spain). At the same in comparison to leading industrial and technologically strong EU regions the Basque country is still slightly underperforming. Reviewing the factors in the dynamic perspective and in periods based on cluster policy (cluster periods in Table 20) we pose that in the first and second period of cluster policy the better performance can be observed by basic factors, such as labour, education and capital formation development. Surprisingly GDP (Graph 21) growth rates and GVA

(Graph 24) were also higher in the first years of the cluster policy. The progress by the end of the second and third period of cluster policy is more evident in term of innovation-related indicators.

The conclusion from the cluster related indicators poses the right prioritization of sectors in the Basque country, which was done both in the first years of the cluster policy implementation, as well as in the later years in the framework of pre-cluster support. In most of the traditional industrial sectors, especially in **automotive aerospace, production technologies, energy, electronics and IT** (Table 24 and Table 26) we see the progress over the last years. This positive trend is especially evident in the first and second periods of the cluster policy. Among these clusters in particular, **maritime, metal and metallurgy** as well as **power generation and transmission** have been start-marked by European Cluster Observatory (Table 27). The second and third periods of cluster policy are marked by the growth of pre-clusters, which are especially represented by small and medium side enterprises (Table 26).

In particular the advancement in the automotive cluster has been evident. The positive relationship between the change in employment rate, establishment to the number of projects in collaboration or project funding has been further supported by the observations performed in the regression model and on individual sector observations (Graph 47, Table 28, Table 30). This allows us to claim that the development of the automotive sector, which was chosen as a priority cluster by the Basque Government, could have contributed to the economic growth in the regions. This also suggests that the actions developed in the framework of the cluster policy have been effective for the growth of this cluster. However, that it is exclusively the result of the cluster policy in the Basque country can't be fully claimed.

Finally, we think that the Basque country has generally (with exclusion of several crisis years) experienced a positive trend in the development of its main factors, which had a clear influence on the economic development in the regions. Nevertheless, the direct links between the cluster policy and the performance of the factors or / and economic growth apart from the first period of the cluster policy are not very evident and cannot allow us to provide definite conclusions. At the same time the validity of the results regarding the study of factors influencing the economic growth on individual and in composition is very questionable due to deficiency and lack of data, especially up to 1995 and from 2012, and the influence of several crises, in particularly the latest financial crises on the permanency of the economic progress in general and selected factors in particular. Nevertheless we think that sector specialization especially at the beginning of the 90s assisted the private and public sector in realization and focusing on their possible industrial strengths. Due to this focus, most of the economic agents in the Basque country have realized their strengths and managed to upgrade them, which should be further ensured in the forthcoming years.

4. Main findings and conclusions

In this chapter we presented the case study of the regional cluster policy in Basque country with the main objectives to learn about the cluster policy evolution over the last 20 years and to study the possible implications of this policy on the regional economic development. Here we summarize the main conclusions.

Cluster policy in the Basque country was launched at the beginning of the 90s. The motivation for the cluster policy was the need to define and enhance competitive strengths of the Basque country, whose economy was in decline at that time. The cluster policy was initiated by the Basque Government and until 2013 was almost fully coordinated and monitored by the officials from the Department of Economic Development and Competitiveness. On the regional level the main actions, which were taken for the enhancement of clusters during the last years were 1) the mapping and selection of existing clusters potential for policy support, 2) establishment of cluster associations, which have served as a “facilitator” of the sector/ cluster and “broker” between the business and the public/ government sector. The communication with cluster associations took place through the matrix of technical officials, which were built up within one of the Departments of the Basque Administrations. Since 2013 this matrix of cluster-specialists is established within the regional business development agency, SPRI. The Basque Government is still involved but only in normative and financial matters. Cluster associations are public-private institutions, which up to September 2014 are established in 11 priority and 11 pre-clusters. Although the establishment of cluster initiatives was more of a top-down approach, the original development of clusters, selected in 1991, was driven by path-dependency mechanisms.

Based on our interviews and literature review we have identified **4 periods of cluster policy evolution**, they are I) 1989 – 1999: Grounds building, II) 2000 – 2005: Improving and polishing, III) 2006 – 2013: Giving new opportunities and IV) Since 2013: Re-management boost (Table 20). All four periods of the cluster policy have almost the same time duration and often included all stages of the cluster policy process. Based on these policy periods we can study the evolution of the cluster policy, which coincides with the evolution of the main sectors of the Basque economy. Furthermore, we conducted an in-depth analysis of each of the **7 stages of cluster process in each of the 4 periods** of cluster policy evolution. The main findings can be found in Annex 9.

Generally we can conclude that each policy period has passed through almost all stages of the cluster policy process. Although in each subsequent period the number of key components in each stage of the cluster policy has varied, we couldn't identify the direct link between them, defined factors and the economic development. At the same time we think that although the first period of the cluster policy is associated with the introduction of the cluster policy in the form of a pilot

project, the cluster policy until 2000 was well planned. Moreover we can also see one of the highest economic growth rates during this time. In addition to this most of the clusters, which were prioritized during the first period have developed into mature and competitive sectors (**aerospace, machinery tools, maritime, automotive, energy**) and along with several new sectors will be building the basis of the Basque competitiveness in the forthcoming years (RIS 3 main areas are: energy, advanced manufacturing and biosciences). Apart from the first period, we think that the third period is also worth strong attention. Despite coinciding with the financial crisis several identified pre-clusters turned out to be very effective, especially in terms of the integration of SMEs and stimulating inter-clustering collaboration. Finally after the crisis the Basque economy is recovering faster than Spain. The credit for this is often given to clusters and innovation system.

In our opinion, within the stages of the cluster policy process a **specific attention** should be addressed to the **policy review stage** and the **monitoring and evaluation stage**. In particular the need to develop a unified platform and methodology for data gathering and evaluation in regard to cluster policy progress and its impact, as well as sharing of these information on a systematic basis.

Based on the policy review we have noted several main changes and permanent aspects of the cluster policy. Among the **permanent aspects, the** following issues should be highlighted:

- Prioritization of industry for regional development
- The main objective of the cluster policy: strengthen regional innovation and competitiveness through enhancement of collaboration between companies, especially SMEs, and other regional actors, in particular technological centers
- Core thematic areas for projects/ collaborations in clusters: internationalization and technology
- The funding for clusters and projects has been initially cumulated from both sides: the public and private sector

The mains **changes** within the Basque cluster policy are highlighted in the Table 31 below. Basically the core pipelines of the cluster policy have been maintained and the changes took place, e.g. the character of activities proposed by the cluster association or additional thematic areas for the development of activities and projects.

Table 31 Main changes introduced in the cluster policy in the Basque country since 1991

Area	Description
Regional level	
Number and character of cluster sectors	Along with primary defined priority clusters new groups of promising clusters have been identified and supported as pre-clusters;
Role of the Government	Although the Government has constantly played an important role within the regional policy making, its influence on the coordination of cluster policy implementation has been reduced
Communication between regional level and cluster associations	The matrix of the officials from the Government was replaced by the matrix of the officials from the regional development organization, which is able to provide cluster participants with better networking and project funding opportunities
Participation of regional institutions	Although in 2014 we have identify three main agent groups in the regions: government, research institutions and firms' associations, which reflect classical triple helix model for the realization of the cluster policy in the region, it has not always been like this. Moreover, the participation of some of the institutions have been increased only in the lasts years.
Cluster associations	
Activities	The number and spectrum of the cluster activities offered to its members is very broad and has been developed based on the member's needs and interests
Members	The character of member organizations has been changed from only leading and big companies to multiple typed of companies and other types of type of institutions
Maturity level	Cluster associations has evolved from being guided by the Government to an independent institution being able to assist its companies on their own

Source: Authors' development

The review of **economic development** showed us that the Basque country has one of the **highest levels of economic performance** in comparison to Spain. Although in the Basque Country the average growth rate for period 1991-2011 (Graph 21) was slightly lower than in Spain, at the same time Basque GDP per capita (Graph 19) was the highest in 2011. Moreover, the increase of GDP per capita from 1995 to 2011 was also the highest in Spain (Graph 20). At the same time in comparison to leading EU industrial and technologically strong regions the Basque country is still slightly underperforming, whereas its position is similar or better in comparison to the EU28 average.

The study of **key economic factors influencing economic growth** has indicated that the most of them were also **significantly improved** during the first years of the cluster policy. An example can be given the unemployment rate (Graph 29 and Graph 32), labour costs (Graph 35), education in tertiary sector (Graph 37), number of patents (Graph 40) and/ or employment in R&D sector (Graph 43). The growth in clusters (measured in terms of export value - Graph 44 Table 24, employment - Table 25 and establishment - Table 26) has been positive in most of the priority clusters, especially **metal and manufacturing, automation, production technology, engines and equipment, heavy machinery, oil and gas, forestry**. At the same time only 6 clusters are star-marked in the Basque country (Table 27), which also represents an average performance for Spanish regions.

The examination of the **composed influence of the selected factors** (capital, labour and human resources, education, technology and innovation as well as clusters) on the economic growth **hasn't provided us with definite results** (Part Composite influence of factors on regional economic

growth in Chapter 6). The main outcomes hinted that the education and industrial specialization might have had a direct positive influence on economic growth. At the same time surprisingly negative connections could be seen regarding the co-patenting with foreign and national regions. The only **confident conclusion** that can be drawn is in regard to the **positive connection of the performance of the automotive cluster and economic growth** in the Basque country. This can be seen on the individual as well on the composite basis. Based on the positive result in the automotive cluster, which is a priority cluster in the Basque country and has been supported since the beginning of cluster policy, we can assume the effectiveness of cluster policy. At the same time considering the specifics of this industrial sector, its growth might not be only attributed to the cluster policy in the region.

Furthermore, reviewing the factors in the **dynamic perspective and in periods based** on cluster policy (cluster periods Table 20) we propose that in the first and second period of cluster policy a better performance could be observed by basic factors, such as labour, education and capital formation development. GDP (Graph 21) growth rates and GVA (Graph 24) were also higher in the first years of the cluster policy. The progress by the end of the second and third period of cluster policy is more evident in term of innovation-related indicators. In combination with the review of the key factors in stages for these periods of cluster policy we think that the implementation of cluster policy at the beginning of the 90s was an important element for the sector specification of the regions in the forthcoming years. Along with other industry and science-related policies cluster policy assisted the Basque country to make a **significant developmental leap up to the year 2000** (end of the first period of the cluster policy). Another important cluster related boost took place since 2006, butn was hampered by the last financial crisis. The introduction of new pre-cluster sectors was important for the smart specialization and further regional diversification.

Generally drawing stronger conclusions especially regarding the impact of cluster policy on the regional economic and cluster development is hampered by data validity and limitations. In particularly the following limitations emerge: 1) lack of sustainable data for the observed indicators until 1995 and after 2012/2013, 2) the disturbance of the economic development trend due to the financial crisis 2008 as well as by the oil, Russian and Asian crises of 1997 – 1998 and 3) the absence of long term indicators related to cluster policy implementation. The first two aspects limit our 20 years period of cluster policy observation by almost 10 years and the last one impedes the quantitative observation and interpretation of cluster policy related data.

All in all we observe **positive implications** of the **cluster policy on the economic development** and its factors. At the same time we stress that a positive influence should be recognized only in combination with other existing policies in the region, especially science, technology and innovation. Furthermore we see cluster policy as especially **successful** in terms of:

- Setting sector priorities for regional development
- Linking innovation and technological development institutions closer to the real needs of the business sector
- Turning clusters-based vision of economy as components of the competitiveness strategy of the Basque country
- Introducing or strengthening (depending on the sector) the sector-based vision among companies and introducing the benefits and culture of collaboration
- Cluster policy has passed from being something external to internal for the regional actors
- Creating a platform for the communication between different public and private agents, where the real needs, interests and visions can be discussed, highlighted and listened to
Increase of satisfaction and interest level of clusters members to the work of their associations

From our point of view the following **factors have contributed** the most on the **effective implementation** of the cluster policy in the Basque country:

- Pro-active participation and strong character of the Basque Government
- Selection of clusters for the support based on the existing regional strengths and combining them with the regional public and business interests
- Existence and support of innovation and science related infrastructure, which has contributed to the development of technological projects within clusters and as a consequence restrained most of them from the industrial decline and path-dependency problems
- Subsistence of social aspects and values embedded in the Basque culture, which are essential for the cooperation within clusters, e.g. trust, compromise and reciprocity
- Generally low input costs for policy implementation

At the same time, despite the positive outputs achieved from the implementation of the cluster policy, we think that its results could have had stronger inputs on the economic development. We consider the following **aspects to be hampering** the effectiveness of cluster policy:

- Insufficient integration of SMEs into the traditional industrial sectors
- Weak cooperative ties between big companies and SME's, which haven't been resolved
- Inaccuracy in number and character of clusters in the region, especially since around 2005
- Absence of clear overall regional strategy/ picture covering all clusters for inside and outside display
- On the regional level too general approach taken to all clusters and cluster associations

- Incoherence between the roles set by the regional government to clusters associations and roles that cluster associations have taken for themselves
- Insufficient amount of systematic long term evaluation studies or monitoring on clusters and cluster policy, which would enable the observation of main trends and changes

In this regard the cluster policy related **recommendations** for the Basque Country are to be proposed after the review of the second case study, cluster policy in Upper Austria, in the **Final Conclusions**, which is the final chapter of this dissertation.

1. General overview of the region and cluster policy

Upper Austria⁸² (in German: Oberösterreich) is one of the 9 federal provinces (Bundesland) in the Republic of Austria. It has held the name Upper Austria since 1918, before which it was called “Land ob der Enns” (land on the high side of the river Enns) (Amt der Oö. Landesregierung, Direktion Inneres und Kommunales 2006, p. 7). The size of Upper Austria in terms of the EU is relatively small, 11 979.91 sq. km (Statistic Office of the Republic of Austria 2014), but at the same time it makes almost 14.3% of total area of Austria. Based on population, Upper Austria (QI 2014 was slightly above 1.4 million inhabitants, which is about 16.8% of the Austrian total - 8.5 million inhabitants) is the third after two other regions: Vienna and Lower Austria. Linz is the capital of Upper Austria and has a very central location within the region. There are two other important cities in the region, Wels, and Steyr. At the same time most of the political, cultural and economic related activities take place in Linz. Within Upper Austria there are 15 districts, 3 statutory cities and 444 municipalities (Amt der Oö. Landesregierung, Direktion Inneres und Kommunales 2006).

Graph 48 Geographical position of Upper Austria



Source: Authors’ development based on map provided by Center of Academic Analysis⁸³

⁸² Also can be referred as Oberösterreich, AT31, OÖ

⁸³ <http://worldmap.harvard.edu/maps/>

Upper Austria has a very favorable and central geographical location within Europe, while being on the main connection lines between the bordering region of Bavaria (Germany) to the west and the capital of Austria, Vienna, towards the east (Competitiveness 2008; Hubinger 2012). In the south, the region borders with other well-developed Austrian federal provinces, such as Styria and Salzburg. In the north Upper Austria also has a border with the Czech Republic. The landscape of Upper Austria is mountainous combined with valleys. This has partially effected the distribution of production in the region. The climate in Upper Austria is more continental with less rainy weather, as in the most Alpine dominant states of Austria.

The main rivers are the Donau, the Inn, the Enns, the Traun and the Steyr. The Donau River has always been seen as an important transport river connecting Upper Austria with south-eastern countries and the Black Sea and integrating in Danube bigger region. Upper Austria has a high-quality transport system (motorways, railways) which ensures good connections with the neighboring countries and provinces of the European Union, e.g. speed train connection ensures in around 3 hours connection Linz – Munich and in 4.5 with Budapest. These connections have contributed to the economic development of the region since earlier historic times. At the same time the region doesn't have natural access to the sea or ocean and has only one airport for commercial airplanes, Linz Blue Danube Airport.

Upper Austria is a federal province, which enables the region to have its own elected legislature, government and governor. Despite the federalization structure of Austria, most of the taxes are raised on a national level and are fixed based on the agreements between provinces and the state. Although regional authorities have a right to introduce some additional taxes, this is seldom exercised in practice, to not reduce the province's competitiveness with regard to others (Interview 2F). The Upper Austrian Parliament (Landtag) is elected by its citizens every 6 years. The last elections to the Parliament were on the 27th of September 2009 and ensured the entrance of 4 political parties: with 28 representatives from Austrian People's Party (Österreichische Volkspartei, ÖVP⁸⁴), 14 - Social Democratic Party of Austria (Sozialdemokratische Partei Österreichs, SPÖ⁸⁵), 9 - Freedom Party of Austria (Freiheitliche Partei Österreichs, FPÖ⁸⁶) and 5 - the Greens (Die Grünen Oberösterreich⁸⁷). It is important to stress that in Upper Austria is high level of affirmation to certain parties in addition to low political confrontation, which smoothes the decision making process (Interview 1D) (Maier et al. 2012). For this reason, the current (November 2014) Governor, Dr. Josef Pühringer (ÖVP), has already been re-elected for 3 times since 1995. This has ensured stable long term internal and external perception of Upper Austria. In addition to passing

⁸⁴ For more information see <http://www.oevp.at/>

⁸⁵ For more information see <http://spoe.at/>

⁸⁶ For more information see www.fpoe.at

⁸⁷ For more information see <http://ooe.gruene.at/>

resolutions, another important responsibility of the Parliament is to pass the budget, which composes the programs' funding in the region. The Government of Upper Austria (Landesregierung) (buildup of 9 members, which are a Governor, 2 Vice-Governors and 6 Ministers) is elected by the Parliament. The Administration/ Office of the Government is an implementation institution of the Government. It has the executive power for many administrative affairs except justice, security, military, foreign affairs, etc. The Governor (Landeshauptmann) is another important political figure and a central agent of the Federal administration in Upper Austria.

In reference to statistic information (OECD 2014) and interviews (2F, 2D) Upper Austria is industrially one of the strongest federal provinces in Austria and has managed to overcome its structural problems since 1980s, ensuring its above Austrian average performance since 2000. Kaufmann and Tödting (1999) mentions that the region “has a differentiated economy and quite dynamic political actors” (p. 14). Indeed, in 2013 the nominal GDP (Table 32) of Upper Austria was one of the highest in Austria and surpassed only by the Vienna area. At the same time in terms of GDP per capita, the state was only the 5th with EUR 38 500. It is slightly higher than Austrian average, and almost 30% higher than EU 28. Unemployment in Upper Austria is lower than Austria and EU28.

Table 32 Key economic indicators, Upper Austria and Austria

Indicator	Upper Austria	Austria
GDP current prices (mill. EUR) 2013	54 806 (17%)	322 594.6 (100%)
GDP per capita (EUR) 2013	38 500 (%)	38 100 (100%)
Area (sq.km) 2014	11,979.91 (14.3%)	83.878,99 (100%)
Populations (thsd.)	1,425,422 (16.8%)	8,507,786 (100%)
Unemployment (%) 2013	4.1	4.9
Sector composition, GVA , current (%) 2008		
- <i>Agriculture</i>	2.07	1.71
- <i>Industries</i>	32.73	23.22
- <i>Construction</i>	7.87	7.07
- <i>Wholesale and retail trade</i>	17.72	23.71
- <i>Other services</i>	38.5	44.4

Source: Authors' development based on Statistic Office of the Republic of Austria & OECD, 2014

Upper Austria has been viewed as a leading industrial region (Table 32) with “a long industrial tradition in manufacturing, primarily based on metal and steel” (Kaufmann, Tödting 1999, p. 14)(Stahlercker 2012; Tödting, Kauffmann 2002). This is reflected both in the export and employment based indicators. The industrial strength of Upper Austria was mainly created in the post Second World War period (Maier, Tripl 2011). Upper Austria has historically dominance in machinery, transport, and mining area with respect to the Austrian industrial structure. Looking into detail at the most important industrial sectors in Upper Austria, the following can be highlighted: the automotive sector, machine building, metal processing and manufacturing, chemicals, plastics, paper, wood, furniture, and automation (Interview 2C, 2A, 2D). As will be seen later, in all these

sectors cluster associations have been created. The region also has a large share of the agricultural sector (above 2% of GVA and with 13% of labour force employed; Competitiveness 2008, p. 13). From the service side of the economy, the emphasis is mainly focused on business-orientated services, wholesale and retail of motor vehicles (Stahlercker 2012). In 2013 Upper Austria had the highest number of exports of all the regions in Austria with total exports of EUR 31 229 477 (25% of national exports). Moreover Upper Austria is one of the several Austrian regions with positive trade balance.

An entrepreneurial spirit has been fostered in the region since the beginning of 1990s. SME's were also the focus of different regional programs. Out of around 70 thousand companies more than a half is one or two people companies. That is why SMEs make up a large share of the market and have managed to develop a long term perspective in business planning. In reference to Hubinger (2012) many companies have learnt to perform well on the market, meaning that they have well-developed competencies in strategy building and market positioning. At the same time the R&D funding within these companies is very conservative (Interview 2N).

On the other side there are also giant enterprises, like Voestalpine or BMW, with more than 15 thousand employees (Interview 2F). Nevertheless on the business sophistication index (Annoni, Dijksra 2013), which is composed of variables such as employment, GVA, and number of foreign owned firms, Upper Austria has been ranked only 129 (with -0.21) out of 261 territories and is placed in the medium group of comparable regions. In addition the region has also a strong traditional cultural atmosphere. The corporation tax⁸⁸ is 25% and VAT⁸⁹ - 20%. The role of the trade unions is also very influential in the regions, which hampers the resolution of related issues (Interview 2N).

Referring to numerous interviews (Interview 2A, 2C, 2D, 2F) this federal province has minor weaknesses. Among the most relevant are low migration and region's internationalization and openness, educational unbalance in technical as well as academic grades of labour force and potential better links between production and service companies.

Overall Upper Austria has a good infrastructure, suitable geographic location, well-developed labour market and well-structured economy. All these factors have a positive influence on the regions economic development and competitiveness. Below in Table 33 the main aspects of Upper Austrian competitiveness are written down based on Porter's diamond.

⁸⁸ <http://www.kpmg.com/Global/en/services/Tax/tax-tools-and-resources/Pages/corporate-tax-rates-table.aspx>

⁸⁹ As above

Table 33 Upper Austria competitiveness overview based on the Porter's diamond, main strengths and weaknesses, Upper Austria

Context for firms strategy & rivalry	
<ul style="list-style-type: none"> - Centralized allocation of some taxes* - The dominance of SMEs on the market - Government programs in support of big & small companies - Government stable and has a system of strategic planning - Companies have a good knowledge in strategy building and market identification <ul style="list-style-type: none"> - Opened free market for foreign investment - High credit ranking is stable Aaa (Moody's), AA+(S&P) 	
Factor conditions	Demand conditions
<ul style="list-style-type: none"> - Central European geographical location, on the transition roads between East and West, South and North, closeness to well-developed European regions - Due to federal state system – region has a lot of tasks and activities, which are the responsibility of regional authorities - High levels of employee qualifications and motivation - Landscape suitable for different industrial activities - Motorways and railways have created a broad network for transport communication - Small territory scale* Opportunity: 1) easy for networking; 2) easy to reach companies; Weakness: 1) small market demand, herewith dependence on exports & foreign demand 	<ul style="list-style-type: none"> - Limited internationalization of companies* - Standards – European and international - Small market for the demand but at the same time integrated in a bigger market of the European union, especially <ul style="list-style-type: none"> - Sophisticated demand through neighboring countries, especially Germany - Big potential for the demand comes from the countries of Eastern and Central Europe
Related & relative sectors	
<ul style="list-style-type: none"> - Existence of around 10 clusters and network institutions, support specific industries <ul style="list-style-type: none"> - Several research centers and laboratories at the university - Educational system in generally well developed, thus only one big universities <ul style="list-style-type: none"> - Number of education institutions with specific focus is limited - Both heavy industry and the service sector is developed, thus requires stronger linkages between them 	

Note: Aspect marked with * can be also considered as weaknesses

Source: Authors' development

All this in one or another way influences the competitiveness and economic development of the region. Although Upper Austria is now considered to be well-developed and -structured, at the beginning of 1990s it had experienced a severe economic decline. The main reason behind it was the slump of traditional industries, especially steel and mining. That is why in the last 20 years the Government of Upper Austria has implemented various restructuring and innovation oriented programs, aiming to rebuild competitive potential of the region. One of the core elements of the reforms was the application of strategic planning along with the cluster policy. The launch of the cluster policy took place after the entrance of Austria to the European Union in 1996. Since then the region has managed to create a broad and effective system of clusters and networks (Clusterland Oberösterreich GmbH 2013).

The main rationale for the choice of the cluster based approach towards regional development in reference to Competitiveness report (2008) was the desire of the former regional Minister of

Economy to ease the strong regional dependency on heavy industry and to build a competitive economy with a diverse spectrum of strong industries. The same is mentioned by Hubinger (2012), who stresses that the main aim of the cluster policy has been “strengthening the regional competitiveness” (which was at the top list of any agenda) by building new regional strengths based on preexisting ones in Upper Austria (Interview 2F, 2H). In particular regional competitiveness had to be ensured by “activation of innovation and market potential of synergies based on cooperation between companies and regarding science-business interaction” (Stahlercker 2012, p. 19) That is why the slogan, which was developed to accompany the cluster program, “innovation through cooperation” (TACTICS 2012, p. 23), is still in force and has been deeply rooted into mind all regional actors. In addition to this, cluster policy saw two areas of interaction: 1) the branch and 2) the enterprise level. Both were in stagnation in the mid- 1990s and needed to be addressed (Interview 2F).

As of November 2014 a total of 9 cluster initiatives and 3 networks have been created in Upper Austria. At present cluster associations are representing all core industrial sectors, namely automotive, plastics, eco-energy, furniture & timber construction, food, health technology, mechatronics, environmental and information technology. Existing cross-branch networks, e.g. on human resource or energy efficiency, were created in order to create overlaps among the core sectors (European Commission 2011). The majority of clusters were established during the first strategic program. Up to November 2014 there have been 4 strategic programmes developed and introduced: “Innovative 2000+”, “Innovative 2010”, “Innovative 2010+” and final one “Innovative 2020. The coordination of almost all cluster initiatives is achieved through the cluster managing organization Clusterland Upper Austria GmbH, which is composed of different divisions in charge of each cluster. In the framework of the first program “Upper Austria 2000+” one of the departments of Technology and Marketing Company Upper Austria (TMG) was responsible for the development and implementation of the clusters. The core task of the cluster association is to create and strengthen “network-capacity” (Stahlercker 2012, p. 19) between firms and other relevant institutions.

European Commission (2011) in particular considers the cluster policy in Upper Austria successful in ensuring companies sustain innovation and competition. The leading cluster association in Upper Austria also claims that “nowhere else is the industry as efficiently networked and the cooperation environment as friendly as in this Austrian region” (Clusterland Oberösterreich GmbH 2013, p. 1). Therefore we will focus on in-depth analysis of the cluster policy evolution and implications on economic development in the next parts of this dissertation.

2. Cluster policy review

In this part of the case study we will make a review of the general context of the cluster policy in Upper Austria. This part is centered on the analysis of the cluster policy related institutions, periods of cluster policy evolution and the 7 stages of the cluster policy in each of the defined evolution periods. We will establish the main cluster policy related conclusions after highlighting factors, specifically mentioned by interviewees, as important for effective implementation of the cluster policy.

2.1. Historic overview of public policy interventions

The modern history of the state of Upper Austria is related to the unification of the Austrian state in 1955. Until 1955 big number of large enterprises in iron and steel industry, especially with a focus on defense products, were established in Upper Austria. Other leading industries at that time were transport, minerals, ceramics, textile and paper. This strong industrial base in the region was one of the motives for country from 1938 until 1945. The Second World War had several positive and negative effects on the socio-economic situation in Upper Austria. On one side, due to military based production low level of unemployment was ensured, on the other side it created large, centrally regulated companies with products of a very specific demand and led to the neglect of many sectors serving the needs of civil society. Strong financial support was targeted at machinery, metal and steel, engines, guns, chemicals. The allocation of firms was concentrated around main cities such as Linz, Steyr and Wels. Linz in particular, turned into almost the most industrialized location in Austria. Furthermore, after the Second World War most of the territory was destroyed and was partially overtaken by the Soviet side. The Soviets nationalized production, which led to strong economic decline in one part of the region (Kaufmann, Tödting 1999). The other part of Upper Austria, which was under the control of American troops, received financial assistance for structural reforms. These reforms led to diversification, decentralization and enhancement of entrepreneurial spirit. In reference to Lackinger (1997), Kaufmann and Tödting (1999) and experts from Österreichisches Institut für Wirtschaftsgeschichte⁹⁰ (ÖIfW 2011) this period can be considered as an economic miracle and a golden age for Upper Austria. The prosperity of one part of Upper Austria assisted a relatively smooth unification of the region in 1955, when Austria regained its full independence.

Around the 1980s the traditional nationalized Austrian large companies started to experience extensive decline and stagnation. Upper Austria was very affected as it had several big enterprises in the traditional industrial sector. One of the key companies in the region, Voestalpine AG (steel, around 80 000 employees), was particularly affected (Tödting, Kauffmann 2002). Considering the

⁹⁰ Austrian Institute of Economic History

companies size relative to the total regional employment, the economy of Upper Austria was very sensitive to company's decline. At the end of the 1980s the structural weaknesses resulted in a serious crisis of the nationalized sector. The state could not any longer compensate for the huge losses. Finally, the conglomerate had to be split up and privatized. Many parts were sold to foreign companies (Lackinger 1997). The privatization gave the chance to earlier state-owned firms to become privatized and additionally provided the regional government with additional money, which was accumulated under "future funds (Zukunftsfonds)" (Interview 2H). From these savings the first strategic planning and clusters were funded. The breakdown of the Soviet Union ensured further restructuring changes for the Upper Austria. It led to intensive wave of privatization and the appearance of SMEs. Kaufmann and Tödting (1999) think that most of the companies (especially in manufacturing sector), which were established after restructuring and re-organization of large state enterprises, could redefine their competitive strengths very fast. At the same time, there were still high unemployment rates and overall industry sectors were very fragmented.

Upper Austria's entrance to the European Union brought new positive expectation and at the same time fears to the region. On one side it opened new, bigger markets, and eased access of foreign companies, such as BMW, MAN and Siemens to enter the region and gave access to additional financial resources. On the other hand, it demanded re-positioning and re-definition of the region's strengths and competitiveness. That is why it was clear for many regional policy making institutions that it was time to redefine the region's positioning on the national, international and global markets. In order to deal with these questions at the beginning of the 1990s the Technology and Marketing Company was established (Interview 2D). The agency, which was still in force, was set up to deal with enhancing regional competitiveness and image (Part 2.2.2. Upper Austria Business Agency, Technology and Marketing Company in Chapter 7). One of the key steps towards strengthening regional development and competitiveness, especially in the forthcoming wave of internationalization and globalization, was the decision to apply a strategic approach to regional planning, Zukunftsprogramme (future programs) (Interview 2F). The main benefits of this approach were seen in:

- Providing transparency to activities, objectives, tools, implementation/ responsible bodies, funding of the program and herewith helping all participants realize what are the key priorities, especially in the opinion of the state authority
- Ensuring the program's accessibility by various stakeholders and the public
- Reporting on all existing programmes and excluding overlap of different programmes
- Building a systematic, long term vision of the regional development and responsible attitude to the realization of the reforms

Along with the decision to introduce reforms into the policy planning system the approach to regional economic development had to be chosen. The clear focus was on defining and ensuring competitiveness, strengthening innovation and achieving socio-economic prosperity and economic growth in Upper Austria. After a set of studies (Table 37) the cluster approach was chosen as a baseline for industrial restructuring and, herewith from the start cluster policy was strongly integrated within regional strategic plans. Strategic programs include not only development of clusters, but also address core lines of other policies in the areas of innovation and technological, education, infrastructure, marketing, entrepreneur development, etc. In order to have a better understanding of the cluster policy in this context, first the review of the four strategic programs will be done. The key aspects of these programs are summarized in the Table 34.

2.1.1. Strategic Program “Upper Austria 2000+”

In 1998, for a period of 5 years, the first strategic program “Upper Austria 2000+” (UP 2000+; Program 2000+) was launched. It was the first program that **introduced the cluster notion** to the region. The development, coordination and follow-up actions of the program were the responsibility of the earlier established regional agency, TMG (Maier et al. 2012; TMG 1998). The coordination of the programme drafting was organized by Ramsauer & Stürmer Consulting⁹¹.

The vision of the program was to place Upper Austria in the **top European regions** of the 21st century, which was definitely too ambitious considering that only 6 years were given for the program’s implementation. The program consisted of activities in three core areas (TMG 1998): 1) **Technology** (addressing clusters), 2) Vocational Qualification and 3) Location Marketing. The program included 12 strategies to achieve the objectives. It was therefore recognized from the start of the plan that clusters would play an important role in the region’s technological development. Clusters were covered under the action title: **Innovation through co-operation**. The rest of the activities were related with strengthening technology and knowledge transfer, development of human resources, promotion of entrepreneurship, export and international collaboration. Overall, the promotion of clusters was seen as crucial for the **strengthening of regional competitiveness**, in particular through increase of productivity, innovation, creation and assurance of workplaces, ensuring the attractiveness of Upper Austria as an economic location for investors and securing of the level of well-being (TMG 1998). The selection of clusters as an instrument of change was related with its capacities to address the firms/ SMEs and the technological centers at the same time. Boosting SMEs was crucial as they were seen as a “Herz (heart)” (Interview 2D) of the Upper Austrian economy. In addition, the whole regional development was aiming to strengthen the region based on its existing strengths. The re-definition of the regional vision and potential was seen as key to ensure its successful development in the forthcoming years (Interview 2D).

⁹¹ For more information see <http://www.rs-consulting.com/>

For the implementation of the above mentioned principles and strategy goals, three main organizational measures were established: 1) Working group for technology and location policies (aimed at constant improvement and adaptation of the programmes and its action fields), 2) Annual technology and location report (the annual reporting to contractual partners, OO Government and Parliament, and complementation of UP2000+), 3) Future Academy Upper Austria and Upper Austrian Future Forum (form of consultative council and creation of institution to deal with future strategy questions, issues)(TMG 1998, p. 175).

The funding for this program was provided from the regional fund, federal sources and EU Structural funds. Based on the information provided in report (TMG 2005) the State of Upper Austria has contributed EUR 80 Millions and the rest came from other sources.

2.1.2. Strategic Program “Innovative Upper Austria 2010”

In 2005, two years after the end of the first program, the second strategic program “Innovative Upper Austria 2010” (UP 2010; Program 2010) was launched. Strategic program 2010 was developed under the slogan: “**Shaping the future together** (Zukunft gemeinsam gestalten)”. The programme was already more specific and built up of more concrete topics and branches (Maier et al. 2012). It had 5 priority areas: Professional Qualification, Networks, Economic and technology location Upper Austria, EU networking and Research & Development. The programme included 18 strategies and 43 measures (TMG 2005). The core vision of this program was taken from the first program: “**Upper Austria – one of the leading innovation regions in Europe**” (TMG 2005, p. 4). Moreover only three core postulates for future action were set up: 1) Consolidate existing strengths and exploit new opportunities, 2) Use of measures with a high leverage effect, 3) Practicality for the transition into market success. One of the main objectives of this program was to achieve economic reshuffling in order to further strengthen competitiveness of companies, create and secure working places and increase welfare in the region. At the center of the program was placed not only research and development but innovation. **Innovation** was seen **as a core element**, a basis for competitiveness of the economy, prosperity, business success and promotion, and employment, etc. as it was recognized that “you need innovation every day” (Innovation jeden Tag notwendig) (Interview 2H)(TMG 2005, p. 5). The program was also targeted to stronger business expansion to European and international markets and better alignment with EU funding schemes.

The program also had a clear emphasis on cluster and network development. The cluster issue and network development was covered under the strategy area “**Network**” (TMG 2005). In this program the establishment of networks was also seen important for the enhancement of innovation. The clusters had to be further strengthened, stabilized and developed. Another essential change was the transformation of the existing technology network to an innovation network, incorporating research,

technology and education institutions. Consequently, the creation of a common positioning of all R&D institutions was seen as next step.

The program also explicitly stressed the intention to eliminate overlaps in measures not only within the elaborated program, but also with others. For example, the support in the area of energy and environment, which was also regulated under the Energy-concept “Energy 21⁹²”(TMG 2005, p. 15). Finally the main guideline for all regional actors was further strengthening and consolidation of innovation in Upper Austria with a special focus on the development of a cooperative feeling between the actors, as well as on cluster promotion to enhance innovation.

2.1.3. Strategic Program “Innovative Upper Austria 2010+”

In 2010 the previous strategic program 2010 was replaced by strategic program “Innovative Upper Austria 2010+“ (UP 2010+; Program 2010+), which lasted for 3 years, up to the end of 2013. It wasn't a completely new program but rather represented a more of a follow-up document to the previous one. The decision to develop program only until 2013 was connected with the objective to align it closer with the European and national programs, in particular with the termination of the EU 7 CORDIS Framework program⁹³ and the first phase of co-financing the COMET (Competence Centers for Excellent Technologies) Centers program⁹⁴ in Upper Austria (TMG 2010). Based on (TACTICS 2012, p. 24) (Interview 2F) the good alignment with the national and EU-level funding periods is the program's biggest advantage.

Similar to the previous one, the innovative Upper Austria 2010+ program consisted of five thematic areas, which were also ideologically similar to the previous one 1) Research & Development 2) Education & career, 3) Networks, 4) Upper Austria as a business and technology location and 5) EU networking. The total number of measures was reduced to 37 with only 14 strategies. The strategies were also grouped based on their financing volume, from XS to XL size (XL – more than EUR 100 Mill.) (TMG 2010, p. 18). Clusters, innovation and qualification were seen as key factors for the further regional development especially in terms of strengthening regional competitiveness. This represented the main objectives of all activities. Research and development was placed at the center of the program's activities and objectives. Furthermore, here it can be seen that a much greater focus was given to education, although the issue arose in the previous program as well. The core motto of the program “**Building future together**” (ibid.) Facilitating collaboration between regional stakeholders was kept in order to enhance the integration of the needs of regional representatives from economy, research and education.

⁹² More information on the program Energy 21 www.esv.or.at

⁹³ More information on the programme http://cordis.europa.eu/fp7/home_en.html

⁹⁴ More information on the programme <https://www.ffg.at/program/comet-competence-centers-excellent-technologies>

Along with the core principles (strengths strengthening, dare to do new things and considerable leverage effect) two more were added (TMG 2010): 1) **Think globally** and act to promote local interests and 2) **Benchmarking** and reevaluation of goals. Program 2010+ also had a stronger focus on internationalization, which was especially in line with the European internationalization strategy of DG-Enterprise and Industry⁹⁵ (TACTICS 2012). Another new focus was energy (Interview 2F) (TMG 2010). Finally the main program's target was kept from the first strategic program - **Upper Austria - leading innovative region in Europe**⁹⁶.

2.1.4. Strategic Programme “Innovative Upper Austria 2020”

The strategic programme “Innovative Upper Austria 2020” (UP 2020; Program 2020) (TMG 2013, p. 9) is the latest one. It began in 2014 and will continue for the next 7 years. This program follows the core principle of “**Strengths, strengthening and demand for new**” (ibid). The main goal of the program is to pursue the strengthening of regional competitiveness by improving the efficiency of production and development of radical new technology in order to pass from a region labeled “Smart Follower” to “Front-runner” (TMG 2013, p. 11). Similarly to the previous programs, Innovative Upper Austria 2020 includes 4 core strategies 1) Location Development, 2) Industrial Market Leadership, 3) Internationalization and 4) Future Technologies. These areas have been proposed based on the recommendations provided within the EU strategy, Austrian Council for Research and Technological Development⁹⁷ (Rat für Forschung und Technologieentwicklung) and Upper Austrian Council for Research and Development⁹⁸ (RFT OÖ). Moreover, in the drafting of the Program 2020 the broader public was also involved.

At the same time the new action fields within this program go beyond economic development of the region as they also stress the social issues. Hence the program also raises the problems and actions related to demographic change, energy efficiency and health system (Interview 2F). Moreover they also aim to respond closer to international and European economic and political strategic demands, especially in terms of the more specialized development of the Upper Austria. That is why this program includes both horizontal and vertical thematic lines of regional development. Cross-cutting issues remain similar to the previous ones, e.g. Research & Development, Networking and Professional Qualification. Program 2020 is also more sector and/ or industry precise, concreting on 5 core fields of action such as **Industry Production Processes, Energy, Health/ Aging Society, Food/ Nutrition and Mobility**. The definition on the fields of action is based on regional technological core-competences and their critical mass within Upper Austria and very closely reflect the focus of the established clusters in the region (TMG 2013)(Interview 2F).

⁹⁵ More information on the strategy http://ec.europa.eu/enterprise/index_en.htm

⁹⁶ “Oberösterreich als führende innovative Region in Europe” TMG, 2010, p. 19

⁹⁷ For more information see <http://www.rat-fte.at/>

⁹⁸ For more information see <http://www.rftoee.at/index.htm>

Table 34 Evolution and main aspects of the strategic regional programmes in Upper Austria

Policy stage/ Strategic program	1998-2003 (6 years) UP 2000+	2005-2009 (5 years) UP 2010	2010-2013 (4 years) UP 2010+	2014-2020 (7 years) UP 2020
Strategic areas:	3	5	5	4+5+3
Thematic Areas	1) Technology (1.2 Clusters) 2) Vocational Qualification 3) Location Marketing	1) Research & Development 2) Professional Qualification, 3) Networks, 4) Economic and technology location Upper Austria, 5) EU networking	1) Research & Development 2) Education & career, 3) Networks, 4) Upper Austria as a business and technology location 5) EU networking	1)Location Development 2)Industrial Market Leadership 3)Internationalization 4)Future Technologies
Strategies	12 strategies	18 strategies	14 strategies	4 strategies
Measures	33 measures	43 measures	37 measures	19 measures + Projects-dependent
Cluster relevant measures	3 measures a)Pilot umbrella projects b)“soft” cluster assistance c)Competence centers	4 strategies with 5 measures a) Stabilization and further development of “Clusterland” Upper Austria b) Inter-branch theme networks 2b) Continuation of inter-branch theme networks c)Concentration of corporate and R&D facility research activities in R&D groups d) International corporate co-operation	1 strategy with 2 measures a)Further development of the Upper Austrian cluster initiatives and networks b) Direct subsidies for innovative cooperation projects within the framework of the Upper Austrian Cluster and Network Initiatives	Cross-area/ Economy chain: Further development of clusters; topic orientation & connections within relevant clusters
Core objectives	Innovation Investment Competitiveness Employment Income	Innovation Competitiveness Employment (Social) Welfare	Innovation Education Competitiveness Employment Welfare Energy	Innovation Leader Education Employment Action fields 1)Industrial Production Processes, 2) Energy, 3) Health/ Aging Society, 4) Food/ Nutrition 5) Mobility/ Logistics
Innovation-platform	Technology network	Innovation network	Innovation network	Innovation Chain (Education-Research-Economy)
Amount (total): Upper Austria Government share: Clusters:	EUR 300 m EUR 80.8 m EUR 20 m	EUR 600 m EUR 200 m Approx. 5%	EUR 450 m EUR 150m n.d.	EUR 1.35 mlrd EUR 225 m n.d.

Source: Author’s development based on the indicated strategic programs

Another novelty of Innovative Upper Austria 2020 is in its in-built result orientated approach, participation methodology and monitoring. The measures, which are defined within each element of the above mentioned areas, are open and need to be specified based on active participation of all actors through submitted projects. This requires high grade of coordination, controlling and self-participation of partners. Furthermore, the implementation of the program also incorporates a midway-evaluation. At the end of 2016 the evaluation of projects and measures will be done, based

on which further actions fields of the program will be revised. At the same time an ex-ante evaluation was also already performed by experts from the national Institute of Economic Research (WIFO). Financially, the program is directly in alignment with national and European funding periods (e.g. “Horizon 2020” and Common Strategic Framework (CSF) funds).

To conclude, we can highlight that the decision to apply strategic planning for regional development has given all actors in Upper Austria a clear path for the enhancement of regional strengths. It is especially important to note that all the programs have maintained the same principals and visions: strengthening competitiveness, making Upper Austria one of the leading innovation regions in Europe, building economic and social growth on existing regional strengths. Each new strategic program in Upper Austria has constantly improved, particularly in the following aspects: drafting of the program, preciseness of actions and targets, level and indication of engaged regional actors and financial consolidations. Innovation and clusters have been always seen as central for the regional competitiveness strategy. Especially in recent years clusters have further ensured their role in the region by integrating into the core specialization areas of Upper Austrian development in the forthcoming decades.

2.2. Regional institutions involved in the cluster policy making

In reference to Annoni and Dijkstra (2013) the institutional system in Upper Austria is very well developed, as the region with 0.93 points has taken 61st out of 258 other compared regions. Thus Upper Austria is position in the second best group based on the institutions-related indicator of RCI index, which includes such sub-variables as corruption⁹⁹, rule of law¹⁰⁰, government effectiveness¹⁰¹ and voice account¹⁰² (ibid.).

As of April 2014 we could identify three core groups of institutions (reflecting a triple helix model), which influence the cluster development in Upper Austria (Graph 49). They are related to following groups 1) **Government/ Public:** Government Upper Austria, its Department of Economy and other departments, development agency - Technology and Marketing Company; 2) **Firms:** Clusterland Upper Austria, which coordinates 7 cluster associations and 2 networks, Chamber of Commerce of Upper Austria - cluster association in food sector, Association for Network Logistics - Network Logistics, Upper Austria Energiesparverband - Eco-energy cluster and Federation of Austrian industry in Upper Austria; 3) **R&D/ Education relevant institutions:** Universities mainly represented by JKU and Research & Technology centers and Upper Austrian Council for Research and Technology.

⁹⁹ perception of corruption in public services, especially in the local public school and healthcare systems

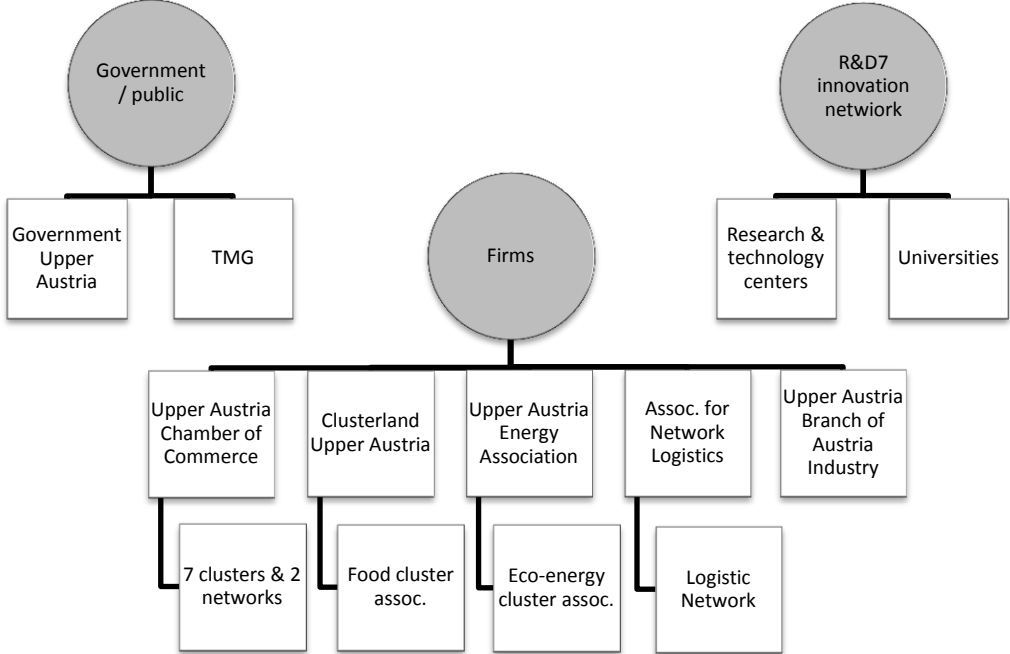
¹⁰⁰ quality and fairness of local police force

¹⁰¹ quality and fairness of local public school and healthcare systems

¹⁰² fairness of elections and neutrality of mass media

At the same time it should be recognized that these structures have not always been the same. For example the public-private organization Clusterland Upper Austria was only established in 2004. Before that all activities related to organization, developing and coordination of clusters were performed by TMG.

Graph 49 Key institutions in the cluster policy making in Upper Austria



Source: Authors' development

Despite the high number of institutions most of them are much interconnected. First of all as the representatives from one organization often form a part of an advisory board or committee of another. Secondly, the close geographic location of these institutions contributes to such close communication, as most of these institutions are not only located in one/ or around one city, Linz, but also often in a close proximity within the city. This is especially relevant for organizations, which belong to Innovation Network¹⁰³ (established since 2010), e.g. TMG, tech2b incubator GmbH, Upper Austrian Research GmbH, Clusterland Upper Austria, etc. which are located in one or two closely situated buildings. This enables day to day communication between the experts from the organizations. Finally, as there is limited numbers of institutions in a small scale regio, people know each other very well through official and non-official communication channels. The organizations will be discussed in more detail below.

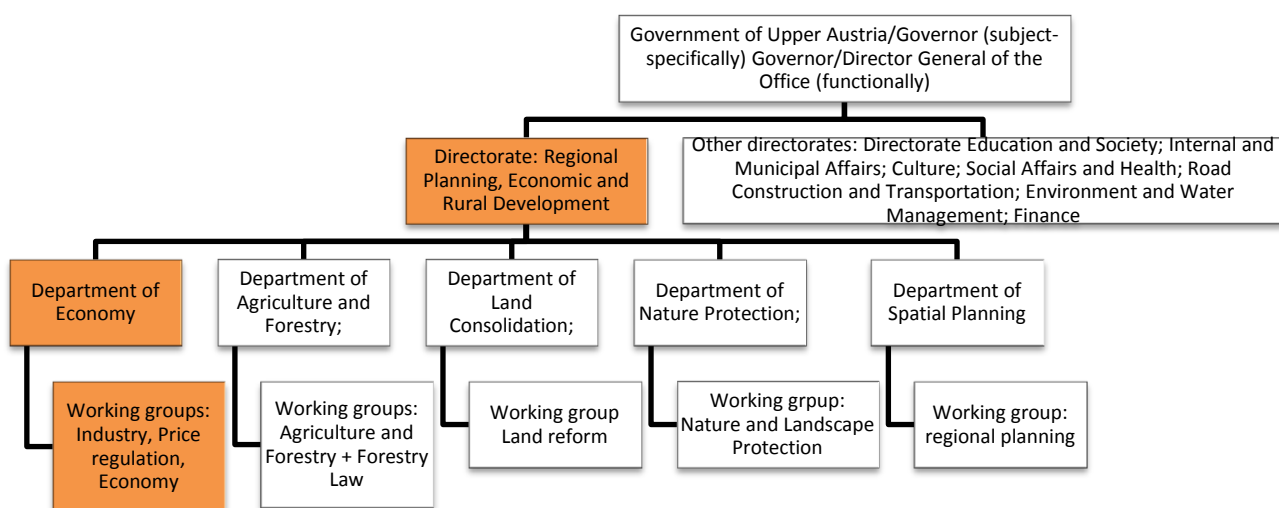
¹⁰³ For more information see http://www.tmg.at/media/090130_ooe_innov_u_forsch_nw.pdf

I. Government and public institutions

2.2.1. Administration Office of the Government, Economic Department

Government of Upper Austria in reference to Maier and Trippel (2011) is the key player in setting the guidelines for the regional economic development in the federal province. Its members meet every week in closed meetings in the city hall (Landhaus). In these meetings there is always a representative from the Administration/ Office of the Government (Amt der OÖ Landesregierung, Abteilung Wirtschaft), which is an implementation institution of the Government. The implementation and development of programs, which is initiated by Government of Upper Austria, takes place in its Administration Office. The cluster policy is developed within the Department of Economy, which is a part of the Directorate for Regional Planning, Economic and Rural development (Graph 50).

Graph 50 Responsible for cluster policy within the Office of the State Government of Upper Austria



Source: Authors' interpretation based on Amt der OÖ Landesregierung Homepage, 2014

This current structure of the Administrative Office is the result of changes (known as “New Public Management” (Licka 2009) introduced in the 1990s. The basis for these changes was the Swiss model. There is a strict hierarchy with regard to planning and controlling. As such all policies have long-term business plans, which include clear objectives (Licka 2009). Below in Graph 51 is the scheme of regional planning in Upper Austria.

Graph 51 System of planning in Administration of the Government in Upper Austria



Source: Based on Licka (2009)

Apart from initiating the strategic planning and being in charge of the normative legislation for province policies, the Upper Austrian Government and its working group Economy within the Department of Economy¹⁰⁴ has functions in the following areas: economic development, economic crisis management, tourism and foreign trade, such technical regulation as metrology, standardization and accreditation, funds management and European integration.

2.2.2. Upper Austria Business Agency, Technology and Marketing Company

Technology and Marketing Company Upper Austria¹⁰⁵ (Technologie und Marketing Gesellschaft) (TMG) is a service-orientated, non-profit regional business agency, which was established in 1991 with the aim “to boost the competitiveness of Upper Austrian business and industry in the global location contest” (TMG Homepage 2014). Until now it has been one of the key organizations in Upper Austria in terms of regional development, especially due to responsibilities in organization and drafting of strategic programs (Maier, Trippl 2011; Maier et al. 2012; Tödting, Kauffmann 2002; Tödting 2001; TACTICS 2012; Stahlercker 2012). Overall TMG works along three core areas: 1) Investor location, 2) Innovation and Technology location and 3) Networking location. More information on these areas is reflected in Table 35.

The TMG budget is composed of 65% contributions from the Federal State of Upper Austria, 15% from Upper Austria Chamber of Labour and another 15% from the Upper Austria Chamber of Commerce (TMG Homepage 2014). The Upper Austrian branch of the Confederation of Austrian Industry also contributes 5%. TMG activities and policy is guided through the Supervisory Board, which is represented by regional actors coming from diverse regional institutions, like academia, research centers, unions, etc.

¹⁰⁴ More on other areas can be found at <http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LROO&Gesetzesnummer=20000773>

¹⁰⁵ For more information see <http://www.tmg.at/>

Table 35 Main thematic areas of TMG activities, Upper Austria

TMG Group comprises		
Investor location	Innovation and technology location	Networking location
TMG Upper Austria acts as a one-stop-shop, providing support during company settlement and enlargements and the development of business and industry locations. Some 300 firms with a workforce of around 1,900 are active at the Technology and Impulse Centres in which TMG has a participatory interest. Apart from assisting the foundation and development of innovative companies, as a link to TMG, the centres contribute to regional economic development and technology transfers.	Incorporates measures aimed at enhancing the attractiveness of the business location and its national and international marketing, as well as the preparation, implementation and further development of economic programs by TMG. CATT Innovation Management GmbH furnishes companies and research bodies with free advisory services in matters relating to research funding and technology and know-how transfers.	With Clusterland Upper Austria, Upper Austria has positioned itself throughout Europe as an example of best practice in the field of cluster and network initiatives. Automotive, plastics, furniture and wood construction, health, mechatronics, environmental technology, human resource, energy efficiency and IT clusters have all been founded. In addition, the tech2b high-tech incubator accompanies academics from the high-tech sector during company foundations and supports them with a unique starter package. The Hagenberg Software Park is one of Austria's most successful technology parks and an ideal location for IT companies.

Source: Author's development based on TMG Homepage (2014)

At the beginning of cluster policy and until 2004 TMG departments were responsible for the development and implementation of the cluster policy (Hubinger 2012; Maier, Tripl 2011). During that time 5 cluster associations within TMG were established. Due to the size and lack of capacities to manage a separate organization, Clusterland Upper Austria, was established to coordinate and manage these cluster initiatives. Until 2004 3 innovation networks were also initiated and managed by TMG (TACTICS 2012). The agency has maintained close relations and communication with CEO of Clusterland Upper Austria and other cluster managers to the current day. They have regularly meetings and work closely in different day to day projects.

II. Firms and firm-related institutions

2.2.3. Upper Austrian branch of the Confederation of Austrian Industry

The Confederation of Austrian industries has one of its branches in Upper Austria¹⁰⁶ (Vereinigung der Österreichischen Industrie Landesgruppe Oberösterreich). It is a volunteer-based institution, which represents the interests of Austrian industry. This means that it is operated by a small team of volunteer-professionals. The group engages in the interest of Austrian companies not only within the country but also on the European level. Each Austrian province has its own representation, which is more concerned with the local needs and developments. Their activities include market studies, marketing, financial and informative support for industry and other information-related materials on industry development in Upper Austria (interactive mapping, structure, reports, videos,

¹⁰⁶ For more information see <http://www.iv-oberoesterreich.at/>

etc.). The Confederation has contributed to areas such as tax reform; labour and working conditions; education of employees; industry related support, promotion of innovation and development of future markets, etc.

This institution has a very strong influence on the policy making in the region, as almost all leading companies are its members, e.g. its Presidium (as to December 2014) was chaired by key Upper Austrian industry players, such as Greiner Gruppe, Voestalpine AG, ENGEL Holding GmbH.

2.2.4. Upper Austrian Chamber of Commerce

The Upper Austrian Chamber of Commerce¹⁰⁷ (Wirtschaftskammera Oberosterreich) (WIKOO) is an institution that provides support to the companies, especially SMEs, in the region. It is subordinated to the national Austrian Chamber of Commerce, which is located in Vienna. In each province the national chamber has similar representation. Similar to the national one, the Upper Austrian Chamber of Commerce works along 7 Industry sectors (Crafts and Trades; Industry; Commerce; Banking and Insurance; Transport and Communications; Tourism and Leisure; Information and Consulting), and aims to provide links to Trade Organizations.

In Austria the Chamber of Commerce often plays a very significant role in strengthening companies, especially those of small and medium size. Based on the interviews (Interview 2H, 2D, 2G) Upper Austria Chamber of Commerce has initiated and monitored the implementation of the cluster policy in the region during its first program 2000+. Moreover, within the chamber the crucial role of Dr. Christoph Leitl should be especially stressed. As to April 2014 he is a President of the Austrian Chamber of Commerce and was actively involved in the promotion of the cluster concept during his different posts in Upper Austria. Indeed, Mr. Dr. Leitl mentions himself that „I confess to be the father of clusters, the child has developed successfully and I am very happy about it (Ich bekenne mich Gründungsvater zu sein, das Kind hat sich prächtig entwickelt und ich freue mich darüber)“.

Although most of the cluster associations by August 2014 are managed by Clusterland Upper Austria, the Upper Austria Chamber of Commerce still directly coordinates one cluster association in the **food sector** (Lebensmittelcluster). Such allocation of the cluster management was politically driven and based on the mutual agreement between regional actors in the region (Interview 2D, 2G).

The main guiding principles of the Chamber are based on the strengthening of companies´ and the economy´s competitiveness, ensuring sustainable economic growth, financial and informative support of companies, setting framework for the labour market protection, development and

¹⁰⁷ For more information see

https://www.wko.at/Content.Node/service/ooe/Service_Reiter_Startseite_Oberoesterreich..html

promotion of innovativeness, technology, cooperation and communication. The important role of the Chamber in the Upper Austrian economy is connected with its functions. In particular the Upper Austrian Chamber of Commerce has also developed numerous activities and programs, which stimulate the development of SMEs, companies' cooperation and networking, internationalization, technological progress and R&D support. Thus, it is not as sector specific as in the case of cluster associations (Interview 2D, 2G).

For this reason, apart from industry sectors there are also departments within national and Upper Austrian Chamber, which are responsible for (economic, social, environmental & regional, national, European, etc.) policy planning & engagement. That is why the slogan used by the Chamber of Commerce, which is always visible is "Alles Unternehmen" (from field trip), which can have a ambiguous meaning: do everything possible or everything is companies. Such word play as well as its stressing can serve as an element of a good marketing campaign.

2.2.4. Clusterland Upper Austria

Clusterland Upper Austria Ltd.¹⁰⁸ (Clusterland Oberösterreich GmbH) was established in December 2005 by the TMG department that was responsible for the coordination of clusters and networks. Clusterland is an Ltd company meaning that it enjoys several economic benefits. The outplacing of cluster department from the TMG was due to its 1) big scale – it was turning into an enormous department (from 10 to around 30 employees, Interview 2D) within the organization, whose prime role was/ is regional promotion and not cluster development, and 2) a need to increase independence of the private sector in coordination and strategy building of the clusters ("position the clusters more closely towards companies and industry." TACTICS 2012) At the same time due to political decisions several cluster associations were taken over by other more cluster-related organizations, such as Energieverband, Logistik Network, etc (Interview 2N).

Clusterland Upper Austria is mainly owned by TMG (61%) with the equal contribution of the Upper Austrian Chamber of Commerce (19,5%) and by the Federation of Austrian Industries (19,5%)(cluster-excellence.eu 2012).

The organizational structure of Clusterland is very flat. It has a CEO, (November 2013) Werner Pamninger, who has been in this position for over 10 years and is well-known not only in Upper Austria but also nationally and internationally as a main contact point for many clusters in Upper Austria. Before entering the position as a CEO he worked within TMG. Since August 2014 he is also an Executive Manager of TMG. This supports the fact of close communication and networking of different institutions in Upper Austria. The Clusterland Advisory Board is elected by the members and is formed of representatives from industry and other organizations such as TMG,

¹⁰⁸ For more information see <http://www.clusterland.at/>

Upper Austrian Chamber of Commerce and the Federation of Austrian Industry. It has regular meetings up to 4 times a year during which the main questions regarding strategic development and approaches to innovation are raised.

Clusterland Ltd. is considered as “the single umbrella for cluster organisations and networks” (Clusterland Oberösterreich GmbH 2013, p. 1). It is the core institution in the region in terms of cluster policy implementation, at the same time it is not in charge of all cluster organizations and networks in the region. It has about 40 employees and is composed of divisions, which establish initiatives and manage identified clusters or networks. As of November 2014 there were 7 departments/ division, which are coordinating 7 clusters in following sectors: **Automotive, Plastics, Furniture and Timber Construction, Health Technology, Mechatronics, Environmental Technology and Information Technology**. Each department has its own cluster manager and assisting personnel. Apart from the cluster manager, each cluster has an Advisory Board, which is built up of experts in the cluster field. Managers make the decisions on the thematic areas and long term development of clusters, and assist by analyzing of existing and developing activities of the association (Clement et al. 2009). The main role of the managers and further technical personnel is to stimulate collaboration, generate contacts and to spread information among the members of the cluster association to operate receive funding from the budget of Upper Austria, it is still not enough, and therefore the members are also required to pay fees. The fees are based on the size of the company and are seen as the company’s motivation for active participation in the association (Interview 2H).

In addition to the departments, which are in charge of clusters, there are two more departments, which coordinate 2 innovation networks: **Human Resources and Resource- & Energy Efficiency**. Although some clusters are managed by other organizations, still they are also presented on the homepage of Clusterland Ltd. The full list of clusters, networks and its main characteristics can be found in the Annex 8. Most of the clusters associations are established based on the natural clusters. Detail information on cluster mapping and establishment of cluster associations is presented in Part Policy implementation stage and Clusters of this Chapter 7. The following activities can be attributed to the Clusterland (cluster-excellence.eu 2012): coordination of cluster associations/ clusters, inputs and consultation on regional strategic programs, involvement of clusters in different international events and projects (3 Interreg IIC projects, FP6/FP7/ Horizon 2020 projects, Leonardo da Vinci, EuropeAID). With regard to the opinion of different experts (Sigl et al. 2007) (Interview 2C) and companies the work of cluster associations has proven to be very effective.

2.2.6. Association for Network Logistics

Logistics cluster-network is managed by independent Association of Network Logistic¹⁰⁹ (Verein Netzwerk Logistik). As stated on the Homepage (November 2014) of the Association, it sees the initiative as “an inter-sector platform for producing companies, industry and trade, education and research facilities, service providers in the logistics sector, transport-shipment-storage-logistic service providers, logistics technology suppliers and integrated logistics service providers”. The organization of the association is similar to Clusterland or most of the European cluster associations – it has a Management Board and an Advisory Board, which is composed of experts from all areas of logistic related fields. The members of the association pay their annual fee and receive services in return. At the same time the membership for education and research institutions is for free. The Network has been established in framework of EU-Programmes "Competitiveness of Upper Austria 2007 - 2013 (Regio 13)" with the money from European Fund for Regional Development and the State of Upper Austria.

2.2.7. Upper Austria Energiesparverband

The Eco-energy cluster is independently coordinated by Upper Austria Energiesparverband¹¹⁰, which is an energy agency of Upper Austria. The agency was established by the Government of Upper Austria in 1991 with the aim to “promote energy efficiency, renewable energy sources and innovative energy technologies” (Homepage Upper Austria Energiesparverband, 2014). The role of Energiesparverband has grown in the last years due to increased business and public attention on energy related issues. This institution has a wide range of activities, e.g. from organization of events like World Sustainable Energy Days, to stimulation of projects between members of the cluster associations and other associations. Apart from companies the agency also works with private households and public bodies on local, regional, national and European levels.

III. Education, Research and Development institutions and Technological centers

Since 2010 within the strategic Programme 2010+ the Government has initiated the consolidation of different research and educational institutions into an Upper Austria Innovation Network (Innovations- und Forschungsnetzwerk). This Network includes basically all institutions, which are engaged in the innovation promotion in the region, namely Research and Education entities, Clusters and Networks, Impulse Centers and International and consulting bodies.

¹⁰⁹ For more information see <http://www.vnl.at/>

¹¹⁰ For more information see <http://www.esv.or.at/>

2.2.9. Research and education related institutions

First of all the role of **Upper Austrian Council for Research and Development**¹¹¹ (RFT OÖ) should be stressed. This institution was established in 2003. A similar council exists in every Austrian federal province and in general actively participates in regional policy decision-making. In particular the role of the Council for Research and Development is to consult the Upper Austrian Government and Administration on different technology and innovation related aspects of the regional development. That is why the Council is also involved in many discussions related to strategic planning or cluster policy, e.g. in the suggestions related to establishment of Clusterland Ltd, etc. (Interview 2D).

One of the leading roles in knowledge generation and diffusion in Upper Austria is played by the biggest University in the region, **Johannes Kepler University**¹¹², which is located in Linz. It was established in 1966, initially with a focus in social sciences and economics which has been extended while including other areas of specialization as well (Maier, Trippel 2011; Tödting 2001). Apart from knowledge sharing the University also has several experts in the field of economic policy and economics, who contribute to the development and evaluation of programmes in Upper Austria. Moreover, some of them participate in the Advisory Boards of the cluster associations (Interview 1A).

In addition to universities the Austrian education system has created conditions for the development of more technically oriented educational institutions, e.g. Universities of Applied Sciences (Fachhochschule). In the region there are 4 universities of this type: at least one in each of the big cities of Upper Austria. Their role in cluster development is essential, as the acquired knowledge is very practical and can be directly applied in the companies. Moreover, most of the students during their studies take part in diverse projects with the companies and as a consequence develop close relations with companies during their education. This on one side eases the search for jobs upon graduation and on the other side prepare employers with practice relevant skills.

2.2.10. Impulse centers

Development of cluster-based projects takes place also in collaboration with technological or impulse centers¹¹³. The consolidation of existing centers was initiated in 2007. This joint positioning increased external and internal visibility of centers and aligned the information sharing between them as well. Technological centers are situated all over Upper Austria with a closer allocation to central cities (Interview 2D). The main objective of the centers is to conduct research and development, which is later to be applied by companies or other institutions in society. They

¹¹¹ For more information see <http://www.rftoee.at/index.htm>

¹¹² For more information see <http://www.jku.at/>

¹¹³ For more information see <http://www.technologiezentren.at/>

also serve as enhancer of innovation, technology and knowledge transfer to companies on a regional and international level.

As an example of an impulse center, which grew into technological parks, we bring up the case of **Softwarepark Hagenberg**¹¹⁴ that has played an important role in the establishment and development of the Information Technologies cluster in Upper Austria. At the beginning of 1990s Upper Austria had a limited number of experts in the area of informatics or IT. However favorable conditions led to the building of Softwarepark, which was developed as a spin-off of Johannes Kepler University Linz (JKU). In order to stimulate the economic development of the declining town of Hagenberg Dr. Bruno Buchberger, Professor of Computer Mathematics at Johannes Kepler University, moved his Research Institute for Symbolic Computation (RISC) to the town in the framework of the plan developed together with the Government of Upper Austria. 20 years later this Faculty, Research Institute and the city have developed into the best reference center for information technologies in the whole Austria. The Softwarepark Hagenberg (Softwarepark Hagenberg Homepage November 2014) is composed of 12 research institutes, several comprehensive educational programs (e.g. International PhD Program in Symbolic Computation, JKU International Master's Program Informatics, Bachelor's and Master's Degrees in Informatics and Mathematics at JKU Institutes) and around 70 companies. Such successful growth has led to the establishment of a cluster in Information Technologies in 2013. The reason for the launch of the cluster association was the desire to broader regional and inter-regional opportunities for local companies in IT sector (Interview 2L). The cluster is also coordinated by Clusterland Upper Austria Ltd.

2.2.11. Management and innovation consultancy institutions

Companies or centers, which provide consultancy for companies in management related topics, are also relevant in terms of providing support for the clusters. Among them two are particularly worth mentioning: **CATT Innovation Management GmbH**¹¹⁵ and **TIM – Technology and Innovations-Management**¹¹⁶. The core aim of CATT is to support local companies and institutions “in matters relating to national and international innovation management with a focus on research, mobility and innovation funding, technology transfer and assessment” (CATT Homepage 2014). Herewith the activities of this company are targeted to connect and assist companies, universities and research centers to find the right partner in Upper Austria. TIM is a newly established organization, which helps companies to implement their ideas in reality for free.

¹¹⁴ For more information see <http://www.softwarepark.at/>

¹¹⁵ For more information see <http://www.catt.at/>

¹¹⁶ For more information see <http://www.tim.at/>

To conclude the review of institutions we should stress that from the beginning of 1990s up to 2014 a vast number of different institutions related to cluster building have been established. Three main groups of actors are involved in the development of natural clusters, e.g. cluster associations, Upper Austria Chamber of Commerce, TMG and the Government of Upper Austria, which represent the leading institutions, engaged in cluster policy making. Most of the technological centers have been built within the technological and innovation support programs in the regions or on the initiative of the university. Nevertheless, especially since 2010 they, along with clusters, represent a comprehensive innovation and technological network in the federal province of Upper Austria.

2.3. Evolution of cluster policy

The cluster policy in Upper Austria was introduced together with the first strategic programme in 1998. However, the first discussions and studies to analyze the economic potential and strengths of the region were initiated at the beginning of 1990s. The regional authorities took time to study and develop new approach for regional development. As such cluster policy has been in implementation in Upper Austria since 1998 and has resulted in the identification and establishment of 9 clusters and 3 networks. More detail on the initiation and the process of cluster policy is to be presented in the next Part Reviewing stages of Chapter 7.

Since the start of the cluster policy in Upper Austria the policy has passed through three evolutionary periods. These periods of cluster policy are: I) 1992 – 2003: Ground building, II) 2004-2012: Re-structuring management and going internationally, III) Since 2013: Cross vertical-horizontal specialization boost (Table 36).

Table 36 Identified periods of the cluster policy evolution in Upper Austria

Period	I	II	III
Years	1992-2003	2004-2012	Since 2013
Duration	11	8	7
Name	Ground Building	Re-structuring management and going internationally	Cross vertical-horizontal specialization boost
Action	Cluster (initiatives) Establishment; launch of cooperative projects	Further cluster development; Internationalization; Learning; innovativeness; cross-cluster spillovers	Further development of clusters; topic orientation & connections within relevant clusters
Core objectives	Identification; Concept integration; cooperation, competitiveness	Cross-clustering; internationalization; networking, innovation	Planning flexibility, knowledge sharing, innovation, specialization, competitiveness
Funding of cluster development	Almost only Public	Public + Private	Public + Private

Source: Authors' development

Below the main features of each evolutionary period of cluster policy in Upper Austria are categorized.

I. 1991-2003: Ground building

This period of the cluster policy is associated with bringing the cluster concept to the regions. In the 1990s the region experienced economic decline, which along with the increased competitiveness from foreign companies due to Austria's entrance into the European Union in 1995, would intensify further. In this wave of changes the regional authorities were required to re-think and re-shape the industrial and competitive strengths of Upper Austria. In order to build the regional development strategy different economic approaches were considered. After an extensive review a choice was made in favor of the cluster concept.

The cluster approach was seen as especially favorable for the reshuffling of regional economic sectors without resulting in high public spending. As such clusters took a central and explicit role within the first strategic program "Upper Austria 2000+". Overall the main activities within the program were targeted to realize and explore the main economic advantages of traditional sectors/cluster of Upper Austria and to prepare the region for intensive innovation and R&D focus, which was, and still is, seen as key to competitiveness. The development and enhancement of clusters, first labeled as competitive industrial complexes, was the Strategy Nr. 2 within the first program's priority area, **Technology**. Clusters have been associated not only with the strengthening of regional competitiveness, but its innovativeness as well¹¹⁷. It was clearly stated in the 2nd program's strategy, named "Cooperation in Cluster", **that regional competitiveness depends on the innovativeness of industrial complexes, which in turn depend on the ability of these complexes to develop innovative products from enhanced cooperation**¹¹⁸. That is why the slogan of the champagne was and remains: Innovation through Cooperation (Innovation durch Kooperation).

In this period of cluster policy evolution of all the activities was targeted towards the identification and establishment of clusters (Interview 2A). That is why most of the cluster initiatives were initiated during this time. The development and promotion of the clusters was coordinated exclusively by the regional agency, TMG. The funding for clusters was public. Most of the activities were connected with the identification of the main economic actors, establishing contact with them and identifying and addressing their needs.

¹¹⁷ "Zur Steigerung der regionalen Wettbewerbsfähigkeit soll die Kooperation und Kooperationsfähigkeit öö. Unternehmen verbessert und damit die Innovationskraft der industriellen Strukturen (Cluster) gesteigert werden" (TMG 1998, p. 33)

¹¹⁸ "Der wirtschaftliche Erfolg dieser bestehenden oder entstehenden Cluster wird ganz wesentlich von ihrer Fähigkeit abhängen, innovative Produkte im Rahmen von Kooperationen zu entwickeln und zu vermarkten" (TMG 1998, p. 47)

II. 2004-2012: Re-structuring management and going internationally

The beginning of this period is associated with the review of the policies and actions implemented within the first strategic program. This evaluation was aimed at studying the effectiveness of cluster policy and reconsidering its implementation. It was important to draw conclusions from the first years of cluster development in order to decide on the next policy steps, as Upper Austria was facing a new wave of challenges and opportunities arising from enlargement of the EU. It was considered that in order to succeed during this time the region had to intensify its innovation, R&D capacities and boost international orientation of local companies and technological centers. That is why the second program “Innovative Upper Austria 2010” and its followed up third program “Innovative Upper Austria 2010+” were more focused on placing innovation at the center of all the activities. This was even seen from the titles of the programs, where in comparison to the first program the word “innovative” wasn’t present.

Under this framework and after the review of the cluster policy, clusters were convincingly seen as a central component to further strengthen regional innovation and competitiveness. Since 2005 a separate organization, Clusterland Upper Austria Ltd. was established with the aim of further strengthening and developing the clusters. These steps were necessary as the cluster associations were becoming bigger and more mature and the continuation of the pure public support would hamper their evolution. The founding of independent cluster associations gave the companies and other cluster members an opportunity to have more control over their own development, activities and decision making process. In addition to this it facilitated the international communication and visibility of clusters, which was essential for cluster growth in the middle of 2000’s (Interview 2F). Clusterland was mostly built up of TMG personnel, who were earlier working in cluster promotion. Besides a managing director, each cluster association established its own cluster director and Advisory Board per cluster. Along with public funding, the cluster associations have introduced fees for its members. By this time the number of members had almost doubled. Since the second evolution period the goal of the cluster policy was strengthening and discovering the potentials of the existing clusters. Therefore, all projects and cluster association based activities were targeted towards technological upgrading, internationalization or advance in business management. The attention to SMEs development also further increased. Along with already developed traditional cluster sectors, several other industrial priorities were set, namely **mechatronic, ICT, life sciences, new materials and logistics** (TMG 2013).

Although clusters were further supported, the role of education and self-learning was also seen as important for innovation and enhancement of industrial strengths. In particular it was claimed that innovation is composed of two types: technical and administrative (Interview 2A). That is why the Government of Upper Austria under the support of the EU 6th R&D Framework program, in

particular, the Network of Excellence (NoE) initiated the launch of vertical networks in 1) human resources and 2) business management. Their main role was to assist clusters in upgrading their vertical innovation.

III. Since 2013: Cross vertical-horizontal specialization boost

In 2013 the drafting of the new regional strategic program “Innovative Upper Austria 2020” was initiated. Along with it began the latest period of cluster policy in the region. This period is associated with stronger globalization trends in terms of industrial production, radical innovation and technological leadership. Within it the focused regional sector specializations is seen crucial to ensure regional competitiveness and occupy high-quality-niches on the global market. This trend is especially guided under the framework of RIS 3 Strategies proposed by European Union.

Although in the latest strategic program clusters are still seen as extremely important for regional competitiveness, **within the program paper there are no more separate actions or thematic lines, which separately address clusters.** On the contrary, they are viewed as integrated part of the bigger regional innovation systems, which is possible only through ensuring cluster and network related strengths. The program doesn't define new clusters or sectors, but rather stresses the need for stronger inter- and cross-border horizontal and vertical cluster cooperation in order to increase internationalization and overcome globalization challenges.

Indeed this period of cluster policy shows that clusters have grown to be very mature and independent. They don't need to be explicitly supported and developed, on the contrary they have already developed all the capacities needed to shape and endogenously strengthen regional development. That is why the smart specialization of Upper Austria (Goals and clusters of Innovation Upper Austria 2020 are Industry Production Processes (automotive, mechatronics, plastic cluster), Energy (eco-energy cluster), Health/ Aging Society (health cluster), Food/ Nutrition (food cluster) and Mobility (logistic network)) is built on the strengths of the existing clusters (Interview 2A). Overall in reference to the Interview 2A in the forthcoming years cluster policy will aim to stabilize the development of clusters. It is expected that some clusters will have more international orientation, while others will have more relevance at the local and regional levels. At the same time cluster policy continues to promote initial concepts and ideas, such as innovation through cooperation and their importance for regional competitiveness, focus on SMEs and network promotion (Interview 2D).

Summing up, we see that the cluster policy in Upper Austria has passed through several changes since its launch in 1998. Although its main industrial clusters were identified within the first period of cluster policy, several other cluster initiatives were established later. Moreover several networks with vertical thematic lines, such as human resources, logistics and business management, have

been also established for the enhancement of cluster performance. These policy changes respond to the maturity of the region's clusters. Another sign for clusters' growth and the market driven character of cluster policy can be also seen through the establishment of their own coordination agency, Clusterland Upper Austria, in 2005 and member's willingness to pay membership fees. Finally, although we think that cluster policy has maintained its main objective, such as innovation through cooperation ("Koooperation war das Herzstück dieses Werk am Leben hält" (cooperation as a heart that gives life to this mechanism) (Interview 2D) with the final aim of ensuring competitiveness, we claim that it passed from being **cluster based technology policy to a smart cluster-based specialization strategy** for Upper Austria.

2.4. Reviewing stages of cluster policy

In this part of the chapter, we perform an in-depth review of the 7 stages of the cluster policy process in each of the aforementioned 3 periods of the cluster policy evolution. The detailed information on the methodology of the policy stages is reflected in the Chapter 3 and 5 of this thesis. The summary table of the main findings from each policy stage in each of the periods can be found in the Annex 10.

2.4.1. Discussion initiation stage

The cluster concept was brought to Upper Austria in the general wave of cluster popularity resulting from the works of Michael Porter (1998b, 1998a). The first attempts to view economy of Upper Austria through the prism of clusters were done within the Austrian innovation research program ("TIP" – "Technology, Information, Policy Consulting"¹¹⁹), which since around 1992 in reference to Peneder (1999) served as "a major vehicle" (p. 339) in the promotion of the clusters. The implementation of this national program took place under the coordination of the Austrian Institute of Economic Research¹²⁰ in co-operation with the Austrian Center Seibersdorf¹²¹ (ARCS). The main objective of the program was to provide "information and recommendations relevant to Austrian technology policy, based on analysis of technological change and its impact on the national system of innovation" (Peneder 1999, p. 340) at the macro-, meso- and micro levels. The study of clusters was one of the program's themes.

The beginning of 1990s was associated with structural problems and economic decline in Upper Austria caused by the downfall of the big state-owned industrial companies in the 80s. In order to tackle it, it was clear that the region had to re-think and redefine its development and overall

¹¹⁹ Research and consulting programme, developed by Austrian Federal Ministry of Science and Transport and the Austrian Ministry of Economic Affairs, which started in 1992 and was running until 2009, based on the projects & publications listed on their homepage, <http://www.tip.ac.at/>

¹²⁰ For more information see <http://www.wifo.ac.at/>

¹²¹ For more information see <http://www.ait.ac.at/>

positioning within Austria and the EU (Interview 2D). That is why the period from 1991 to 1996 was followed by numerous studies on regional and cluster development (Table 37). The studies were dominantly done within the TIP program.

As mentioned by Peneder (1999) these studies used Porters methodology as well as methodology of other economic schools. Overall, the TIP program made a significant push for the launch of the clusters and the establishment of informational learning platform on clusters and regional developing policies in Austria as well as in its regions. Thus at that time it resulted in the launch of the national cluster policy. Tödting (2001) assumes that the main reason behind that was hesitation of the state authorities to focus everything (the whole national economic development scheme) on this concept.

At the same time, Austrian federal provinces found the cluster approach very interesting and decided to apply at the regional level. Before the decision to apply cluster policy in Upper Austria was approved a set of discussion tool place. The leading actors in this discussion were representatives from the Upper Austria Chamber of Commerce and the Upper Austria Government and the Upper Austrian Branch of the Confederation of the Austrian Industry. The final decision to apply the cluster approach within their regional planning was backed up by 1) existence of **broad learning and informational platform** due to earlier conducted research publications; 2) **national interest and national loyalty** to the application of the concept due to the earlier TIP program; 3) incorporation of cluster ideas in the 1996 national **technology policy** concept, 4) **available industry-related infrastructure** due to established new technological colleges (Fachhochschulen) and “competence centers”, which could serve as a strong basis for supporting regional industrial clusters, and 5) mostly **market-driven character** of cluster policy. In addition to this several key representatives from regional public and private institutions were **familiar with the cluster** concept from their **personal meeting with Mr. Porter** and subsequently convinced others (Interview 2D). Furthermore Upper Austria as mentioned by Tödting (2001) has been particularly **inspired** by the application of the cluster concept in the **neighboring region of Styria**. This served as a last convincing element for several key policy players in Upper Austria to initiate the cluster policy. These events are associated with the **first period of cluster policy** evolution in Upper Austria.

The start of the **second period of the cluster policy** evolution in Upper Austria was based on the positive results from the broad analysis performed after the application of the strategic program “Upper Austria 2000+”. Due to the time spent on the policy evaluation analysis and political considerations there was a 2 years delay period before the start of the second strategic programme “Innovative Upper Austria 2010”. In reference to policy program (TMG 2005) the decision to continue the strategic policy planning and cluster policy was because of the positive results received from the evaluation and a support from the Government and other involved institutions. In addition

to this the decision to prolong the cluster-based economic development in Upper Austria was also connected with the positive experiences of other regions within the European Union (ibid.).

The new strategic program was drafted during 2004 and resulted in the elaboration of 5 strategic lines. The development of action within the cluster-related themes in “Innovative Upper Austria 2010” was done in several stages based on working groups composed of cluster specialists, TMG, Upper Austrian Council for Research and Development and Policy Committee representatives, which then reported to the main manager in charge of the whole program¹²². The drafting of Program 2010 was done together with the group of around 247 regional exports representing different regional actors. The ratio between representatives from economy, social partners and location & technology institutions was 40:20:40. At the same time it was clearly stated that each cluster can delegate 1 member of its advisory board to the group of regional experts¹²³. They were invited by the Province Minister. Later on they were mixed in the working groups under each topic. For example under topic “Network” (responsible for cluster policy elaboration) the group was built up in a following way: 31 from economy, 5 social and 15 – professional establishments. The process of the experts’ selection was transparent and the Annex A of the published strategic plan “Innovative Upper Austria 2010” includes full list of name, who were engaged in these working groups. These experts dealt with the development of strategic fields and set the main measures for regional development. Based on these we can claim that the discussion and elaboration of the main strategies was done in close communication with regional experts from various professional backgrounds. At the same time the issue of choosing whether to focus on the development of clusters or not wasn’t a matter of discussion anymore. There existed an informal mutual agreement on cluster support among most of the regional actors. Here again, similar to the previous policy, innovation was seen a main component to achieve competitiveness.

During the second period of the cluster policy evolution another, third strategic program “Innovative Upper Austria 2010+” was also implemented. It addressed clusters in a very similar way to the second program. The launch of the third strategic program wasn’t associated with the discussion on whether or not to follow a strategic planning approach in Upper Austria. Its main purpose was to cover the transition period, so that the fourth program could start at the same time as other funding schemes on the national and European levels.

The **third period of cluster policy evolution** started with the development of the drafting of the latest fourth strategic program. Based on earlier experience, the review of the previous, third, program and the discussions around the program’s main new concepts started around a year prior to the launch of the fourth strategic program “Innovative Upper Austria 2020”. In the case of the

¹²² For detail see Projectdiagramme UP2010 in TMG (2005, p. 16)

¹²³ For detail see the diagramme in TMG (2005, p. 17)

Program 2020 there were no discussions in regard to prolonging or terminating the strategic planning, as the positive result achieved from the previous programs were convincing enough for many actors. Moreover already in 2009 during the development of the Program 2010+ the necessity of starting a new strategic program in 2014 were declared.

Similar to the previous strategic plans the drafting of the “Innovative Upper Austria 2010” was the responsibility of the TMG experts. Furthermore, consultations with an even broader group of agents were initiated. TMG together with the Department of Economy of Upper Austria were responsible for the identifying the four action fields. For each identified action field a committee was grouped and consisted of the different regional representatives, nominated by RFT OÖ and TMG. The selection of these experts was also transparent and is listed in the Annex of the program paper (TMG 2013). The first program draft was presented to the reflection group of about 28 experts, whose opinions together with other references were gathered and then integrated into the final program. Additionally a public opinion was also taken into the consideration.

Summing up, we can observe that the idea of cluster based economic development was brought to Upper Austria with the support expressed on the national level. Although until around 2005 no specific cluster policy steps were undertaken at the national level, in Upper Austria the extensive discussions among the leading officials in policy making led to cluster policy implementation since 1998. Over the years as the cluster approach has become increasingly incorporated in the minds of local actors, business sector, research and academic institutions have become more participative in the policy making process. Finally due to the small scale of the region and ease of communication the policy related decisions can also take place through non-official routes.

2.4.2. Economy and cluster analysis stage

In the **first period of the cluster policy evolution** before the official launch of the strategic program Upper Austria 2000+ several cluster and strategy development studies were performed both on national and regional level. Most of them were conducted in the framework of the Austrian TIP program, serving as an “umbrella” (Tödting 2001, p. 61) for many activities developed for the economic and cluster development in Austrian regions. Overall the drafting of these studies took place in two stages, first the economic and cluster analysis were done on the Austria level and later on developed into case studies on the regional one. The analyses were performed by the WIFO in corporation with other independent researchers as, within the TIP Program, Austria has participated in cluster relevant OECD projects, e.g. NIS Project “Knowledge Flows in National Innovation Systems”. The full list of the main cluster and cluster policy related studies developed is shown in the Table 37.

Generally the Austrian research institutions tried to apply diverse methods for analyzing existing industrial clusters. In most of the cases the statistical analysis of cluster-related data (mapping of patent activities (Hutschenreiter, Peneder 1994) or trade performance by sector (Peneder 1999) were applied, thus conduction of input-output analysis was complicated due to lack of relevant Input-Output tables, and case studies – due to the high costs connected with the enormous need for research capacity (Peneder 1999). Although most of the studies were strongly influence by Porter’s methodology, Peneder (1999) says that at the beginning the mapping of clusters was more driven by Marshall’s methodology of industrial districts.

Due to lack of financial resources and high costs of contracting Porter’s company Monitor (Interview 2D), the starting point for the identification and later selection of the clusters in Upper Austria was the study (ÖFZS Study 1993) requested by TMG to Austrian Center Seibersdorf (Hesina et al., 1992 cited in Dobusch 2004/2005, pp. 11-12; 16–18). The report (ÖFZS 1993) indicated existing industrial complexes. Among them two clusters, which had at that time of the study (ÖFZS 1993) weak cooperative ties, thus perspective for the further development (below marked with *) and three, which were considered as “related industries” due to appearance in all core clusters (below marked with **) were highlighted. These clusters included the following sectors¹²⁴ (TMG 1998, p. 47):

- Steel, aluminum, metal products
- Machinery and industrial plants (mechatronics CI 2003)
- Vehicles, engines, components (motor CI 1999-2003, after 2003 merged with automotive)
- Plastic products (plastics CI 1999)
- Furniture, windows, doors (furniture & timber CI 2000)
- Pulp, paper
- Foods and beverages* (food CI 2000)
- Chemical products* (health technology 2002)
- Automation** (automotive CI 1998)
- Environmental engineering (environmental technology CI 2006)
- Information Technology** (information technology CI 2013)
- Software** (information technology CI 2013)

As can be seen, those identified have since led to the establishment of a cluster association. The study also included some key characteristics of each sector, e.g. it mentioned that all clusters were in different stage of their economic development and needed to be addressed in individual manner; the co-operation within clusters was very weak, in particular the transmission of technology to

¹²⁴ In the brackets we indicate the year of the established cluster initiative

SMEs. The results of this study have strongly contributed the most to the drafting of first strategic program “Upper Austria 2000+”. Nevertheless around 10 sectors were seen to have potential for cluster support, the first program addressed the priority of only three branches: **automotive, plastic and timber**. Although the number of existing clusters might have been too optimistic, Tödtling and Kauffmann (2002) still thinks that the identification of the sectorial priorities was correct and has given an important input for regional stakeholders to realize sectorial competitive strengths and capacities of Upper Austria.

As soon as the program or policy is in the implementation stage, the economic and cluster analysis stage tends to coincide with the evaluation or monitoring stage of the policy. This is a common trend for most of the policies as the evaluation reports serve as guidance for further programs or policy changes. This is also the case for the cluster policy in Upper Austria as this fact is even explicitly stated in the second strategic program “Upper Austria 2010”.

The conducted economy and cluster studies in the **second period of the cluster policy evolution** were based on different methodological approaches (Table 37). The main focus of this economic review was benchmarking Upper Austria in respect to other European regions and countries and the identification of the main regional weaknesses (TMG 2005). R&D performance and innovation related indicators were specifically highlighted within the studies. Moreover the report provided a special excursion in the innovative structure of system of Upper Austria (ibid.). At the same time although the review of the clusters in Upper Austria was done, based on our opinion looked more like a reporting of their performance, rather than cluster mapping in the region. The information on cluster associations included the core data on the development of these associations, namely the number of the partners, sales volumes, employees. Thus, these are the indicators of the associations, rather than the situation of real clusters. Nevertheless, it is important that the contributing role of the cluster initiatives was recognized and was seen as an important element of Upper Austria’s innovation system.

One of the elements within the economy and clusters analysis stage in the second period of the cluster policy evolution was the application of the “Technopolitical Matrix” methodology (TMG 2005, p. 47). The main purpose of this matrix was the identification of cross issues between existing innovation, research and educational centers with institutionalized clusters in order to define possible gaps and opportunities for enhancing the synergies between these regional organizations. As a result of this matrix-approach it was observed that almost all established cluster associations, except Automotive and Food clusters, could receive potential educational support either from Johannes Kepler University or from the Universities of the Applied Sciences. Furthermore, a set of specialized technological centers, which could offer cooperation incentives for almost all cluster-related branches, was also identified. The institutional weaknesses were seen in automobile, eco-

energy and food clusters. In the food sector especially, there were limited opportunities due to only one center in Wels. Moreover, two clusters, automotive and drive technologies, were merged into one cluster – automotive, as they were showing too many synergies and their production lines could have been placed into one or two very relevant production value chains. Low level of R&D and technological support in all branches was associated with the dominance of in-house R&D and consulting. This was especially the case for big companies. Finally from a cross-cutting perspective some new clusters branches were integrated in the program:

- Environmental technology (environmental technology CI 2006)
- Information & Communication technology (IT CI 2013)
- Industry Mathematics

Most of the findings from this technopolitical matrix along with the recommendations provided by other independent researchers were integrated into the second Strategic Program 2010.

Although the third strategic program “Innovative Upper Austria 2010+” was only the prolongation of the second one, it still included an economic and cluster review in the framework of different evaluation and monitoring activities performed along the implementation of the second strategic program. Furthermore, the introduction part to the third strategic regional program 2010+ similar (to the second program) included a brief overview of economic indicators such as a comparison of Upper Austria with Austria and other countries in terms of exports, number of patents, R&D expenditures, etc. (TMG 2010, pp. 11–12). Economic and cluster analyses were mostly performed by the WIFO institute. The main recommendations offered for Upper Austria were seen in the need 1) to focus on the quality increase rather than price level reduction of the offered products; 2) for more precise branch specification and concentration in order to compete with this branches on the international level; 3) creating a “Technology push” through generation of radical innovation and its penetration in key industry sectors and 4) in upgrade of professional qualification of labour force. All this was seen as key to enhance innovation in the global economy of the 21st century.

The **third period of the cluster policy** is associated with the economy and cluster review of the latest fourth strategic program “Innovative Upper Austria 2020”. In the introduction part of the program we could identify a brief reference (TMG 2013) to the macroeconomic performance of Upper Austria, referring to an ex-ante evaluation of the strategic policy and cluster performance, which was conducted by Johannes Research and Mr. Mayerhofer. We think that having only this review is insufficient, especially considering that we could not identify any other external publication with a deeper review of clusters or the economic situation in Upper Austria.

To conclude the review of economy and cluster analysis stage we want to highlight that the development of the cluster policy in the beginning has been based on extensive studies and analysis

developed in the framework of the TIP Program. As a result of these studies by 2014 most of the existing clusters and cluster association have been established. Although the launch of the strategic programs are always accompanied by the evaluation of the previous one or a brief economic and cluster review, we think that their number and academic depth is still insufficient as the studies don't reflect the possible diversity of different methodological approaches and don't include deep analytical thinking. Finally most of the studies are produced by different external companies and institutions, while in Upper Austria there is no independent academic research institution focused on economic or cluster analysis.

Table 37 Core studies on clusters and cluster policy in Austria during the period 1991-2014

Year	Study
1991	- Grundlagen zur oo Innovations- und Technologiepolitik
1992	- Buchberger, B.: Technologiekonzept für Oberösterreich
1993	- ÖFZS (1993): Study on Industriekomplexe der Oberösterreichischen Wirtschaft
	- Bayer et al. (1993) : Wood & Paper cluster case study* Bayer, K., M. Peneder, F. Ohler and W. Polt (1993): "Zwischen Rohstoff und Finalprodukt: Die wirtschaftliche Wettbewerbsfähigkeit des Wirtschaftsbereiches Holz-Papier", TIP, Vienna
1994	- Cluster Screening of Technological (1 st report) & Economic (2 nd report) Performance* Hutschenreiter, G.; Peneder, M. (1994): "Cluster innovativer Aktivitäten in der österreichischen Wirtschaft", TIP, Vienna*
	- Peneder, M. (1994): "Clusteranalyse und sektorale Wettbewerbsfähigkeit der österreichischen Industrie", WIFO, Vienna*
	- Weiss, A. (1994): "Österreich als Standort internationaler kompetitiver Cluster". IWI Studien, Band XIII, Wien*
	- Leo, H., M. Peneder, N. Knoll, F. Ohler and M. Latzer (1994): "Telekommunikation im Umbruch. Innovation – Regulierung – Wettbewerb", TIP, Vienna*
1995	Jörg, L., K. Bayer, G. Hutschenreiter, and W. Polt (1995): "Spezialisierung und Diversität. Die wirtschaftliche und technologische Wettbewerbsfähigkeit der österreichischen pharmazeutischen Industrie im internationalen Umfeld", TIP, Vienna*
1996	- Strategien und Massnahmen zur Unterstützung des produktionsnahen Dienstleistungsberichtes in Oberösterreich
	- Technologietransfer in Oberösterreich: Ziele-Defizite-Maßnahmenvorschläge, ARGE Forschungs- und Technologiekooperation
1997	Warta, K., N. Knoll and M. Peneder (1997): "Multimedia, Kultur und Konvergenz: Perspektiven einer Clusterbildung in Österreich", TIP, Vienna*
1998	- Hutschenreiter, G., S. Kaniowski and K. Kratena (1998): "Embodied Technology Diffusion in the Austrian Economy", mimeo, TIP, Vienna*
	- Knoll, N. (1998): "Sectoral Analyses and Case Studies on the Diffusion and Utilisation of ICT in Austria: Banking, Mechanical Engineering, Textiles and Clothing", mimeo, WIFO
	- Peneder, M. (1998): "Evolutionäre Ökonomie und Clusterbildung. Dargestellt am Beispiel Multimedia", Wirtschaftspolitische Blätter, 2-3, pp. 160-167
	- Lehner, P., Bergman, E. and Maier, G. (1998): "Business Clusters in der österreichischen Wirtschaft", IMONET zwischenbericht. IIR, Wien
2000	- Technopolis Austria (2000): Standort- und Technologiebericht Oberösterreich
2001	- Ohler, F. (2001): Evaluierung der oö. Cluster-Initiativen
2002	- Industriellenvereinigung Oberösterreich (2002): Technologiepolitik in Oberösterreich, Technologiepolitischer Forderungskatalog der oö. Industrie
	- Johannes Kepler Universität Linz / Ramsauer und Stürmer Consulting (2002): Gesamtstrategie JKU Linz
	- Oberösterreich Technologie- und Marketinggesellschaft m.b.H. / Technopolis Austria (2002): Standort- und Technologiebericht Oberösterreich
	- Wirtschaftskammer Oberösterreich (2002): Rübzig, Günter: Impulse für die künftige Technologiepolitik
2003	- Industriellenvereinigung Oberösterreich (2003): 20 Forderungen zur Sicherung des Industriestandortes Oberösterreich

Year	Study
	<ul style="list-style-type: none"> - Oberösterreichische Volkspartei und die Grünen Oberösterreichs (2003): Regierungsbündnis – Zukunft Oberösterreich 2003-2009 - Schneider F. / Holzberger M. (2003): Volkswirtschaftliche Analyse ausgewählter Maßnahmen der oberösterreichischen Standort- und Technologiepolitik – Eine empirische Untersuchung - Wirtschaftskammer Oberösterreich, Bumberger, H. (2003): Technologiepolitische Vorschläge an die neue Landesregierung - TMG Unterlagen zur Evaluierung der Oberösterreich (2003). <ul style="list-style-type: none"> • Technologie und Marketinggesellschaft (TMG) mit besonderer Berücksichtigung des „Strategischen Programms Oberösterreich 2000+“, Band 1: Struktur-, Potenzial- und Wirkungsanalyse der Oberösterreich. • Technologie und Marketinggesellschaft, Band 2: Abschlussbericht zum „Strategischen Programme Oberösterreich 2000+“ • TMG (2003): Technologie und Marketinggesellschaft, Band 3: Positionspapier zum Strategischen Programm „Innovatives Oberösterreich 2010“ (Optionenkatalog), November, Linz
2004	<ul style="list-style-type: none"> - Technopolis Brighton / KPMG Mödling (2004): Linz, Evaluierung der Oberösterreichischen Technologie und Marketinggesellschaft (TMG) mit besonderer Berücksichtigung des 'Strategischen Programms Oberösterreich 2000+', Mai - Oberösterreich Technologie- und Marketinggesellschaft m.b.H.(2004): Standort- und Technologiebericht Oberösterreich
2008	<ul style="list-style-type: none"> - Clusterland (2008): Analysis of cluster satisfaction
2009	<ul style="list-style-type: none"> - Clusterland (2009): Analysis of cluster satisfaction, - Clusterland (2009): Network Analysis
2012	<ul style="list-style-type: none"> - Stahlercker, T. (2012): Regional Innovation Monitor. Regional Innovation Report (Upper Austria). With assistance of MaastrichtUniversity UNU-MERIT, Fraunhofer ISI. Technopolis. Brussels
2013	<ul style="list-style-type: none"> - Joanneum Research/ Ploder, M./Wagner-Schuster, D..(2013): Innovationsbericht Oberösterreich, Analyse auf Basis der regionalen Hochrechnung und Auswertung des CIS 2010 für Oberösterreich, erste Ergebnisse zu Schlüsselindikatoren, Graz, September - WIFO (2013): Ex-ante Evaluierung - Mayerhofer, P./ WIFO (2013): Strategisches Wirtschafts- und Forschungsprogramm Oberösterreich 2020, Ex-ante Bewertung der bisherigen Festlegungen, Wien, Juni

Note: studies developed by TIP program are marked with*

Source: Author's development

2.4.3. Policy review stage

We assume that the policy review stage **in the first period of cluster policy** evolution took place along with the decision to develop a completely new approach for regional economic development. In reference to the Interviews (2H, 2D) a number of conversations and discussions among leading academic experts from JKU, policy makers from Government of Upper Austria and business representatives from Industry Union or Upper Austria Chamber of Commerce took place (especially Mr. Zerbs, Mr. Leitl, Mr. Pühringer, Mr. Fill). The coordination and review was performed by the regional business agency TMG, which was established in 1991 specifically with the aim to address this and other region related matters.

At the same time the policies review wasn't done in the classical sense of policy analysis. The reason for this was the desire "die Politik neue zu definieren zu gestalten, die neuen Wege zu gehen (to define and make new policy and to take new development roads)" (Interview 2D). Herewith during this period the attention was mostly directed towards the defining the next policy steps. However, the existing economic strengths of the region and the previous policy failures were taken

into consideration. For example the development of the new strategic approach was also associated with the administrative change known as “New Public Management”, which introduced strict hierarchy in regard to planning and controlling of policy making. More detail on this was already addressed in Part 2.2.1. Administration Office of the Government, Economic Department in Chapter 7. The main policy related outcome as stressed by Interviewer 2D was to place successful industrial development of SMEs at the heart of the economic processes and regional prosperity. That is why identification and support of clusters was perfectly aligned with the policy aim to upgrade SMEs.

At the same time the policy review **in the second phase of the cluster policy** evolution was done in a more strategic and organized manner. Apart from the direct policy evaluation of the first strategic Program 2000+, which was done by TMG together with Technopolis, there were also a number of other policy papers, which were developed and analyzed in the policy review stage during the second period of cluster policy. Evidence for this can be seen in the list of about 153 economy and policy papers, which were mentioned in the Annex of the second program “Innovative Upper Austria 2010” (TMG 2005, pp. 139–148). Not all of them addressed clusters or the regional development policy of Upper Austria, on the contrary almost 95% of the publications were reflected the experience of other neighboring European countries. Within them around half the publications were developed by experts from the European Commission and Germany, and around 15 works addressed cluster and policy making in Upper Austria. Within these 15 studies on Upper Austria there was one publication addressing specifically the cluster issue - Technopolis Austria (2001): “Upper Austria – Evaluation of cluster initiatives in Upper Austria (Oberösterreich – Technopolis Österreich, Ohler, Fritz: Evaluierung der oö. Cluster-Initiativen 2001)”

The review of this policy, economy and cluster papers was done in the group of 46 experts, who were specially invited. In order to balance the opinion of all regional actors the groups were composed as following: 46% from economy, 22% - social and 32% - specialized institutions (TMG 2005, p. 81). After the definition of 4 core strategies within topic area “Network”, the group was further split in 4 parts, in order to produce precise program measures. After prioritizing measures around 6 were integrated in the second strategic program.

Although no significant cluster-related strategic changes were developed for the third regional program “Innovative Upper Austria 2010+”, still a short review of the previous strategic program “Innovative Upper Austria 2010” was done. The main objective of this analysis was to monitor the completion of activities and take a decision on their further prolongation or termination. In addition, in order to keep the balance of interests this monitoring was also done in groups of experts representing different regional institutions. Thus, the number of experts as well as the dedicated time was significantly smaller compared to the second strategic program. The coordination was also

done by TMG with the assistance of Ramsauer und Stuermer Consulting and RFT OÖ. Development of activities within the area “Networks” was done by two managers, appointed by TMG and by the RFT OÖ. One of them was the current CEO of the Clusterland Upper Austria¹²⁵. Each team had to provide the TMG management with the report on the measures from the previous program based on which the new ones were developed.

We associate the start of the **third period of the cluster policy evolution** with the drafting of the fourth strategic program. With this period a new route towards the development of clusters was taken. The growth of clusters led to their stronger integration into the regional system. Moreover clusters are seen as a consolidated part of the whole regional industrial, technological and innovation oriented system. They are the basis and the driver of regional competitiveness.

The decision to develop a new approach to clusters is also reflected in the way the review of the previous policies was done. In addition the screening of current/ forthcoming programs on the national and European level was also done. Such a multi-level view on policy making is essential for the harmonization not only of financial resources, but also overall strategic development. Moreover while optimizing and reducing costs, such strategic planning should also increase the impact of the policy. Similar to the previous periods of cluster policy, here the review and coordination of the policy was done with the co-operation with government, public and private actors.

Concluding the policy review stage we want to highlight that the Government authorities as well as TMG from the beginning of cluster policy implementation have controlled and observed the development of the strategic policies. Policy reviews have been conducted both by the experts from TMG as well as external specialists. The opinions of different regional and international actors have been taken into consideration. Moreover the last strategic program already includes the multi-level perspective and review of the policies.

2.4.4. Policy development stage

The main aim of the development stage is the elaboration of the conceptual basis for further actions, realized in the implementation stage. In the **first period of the regional cluster policy evolution** the regional development agency, TMG, was responsible for the development and coordination of general regional development strategy and of cluster policy as well. After the drafting of the main conceptual lines in 1996, a series of consultations and discussions in the form of events, workshops, reviews and presentations, the development of the final version of the first strategic program “Upper Austria 2000+” took place. The elaboration of concrete strategies and measures was done in

¹²⁵ More detail information on the structure and the coordination one can find in Program “Innovative Upper Austria 2010+” TMG (2010, pp. 13–15)

several steps over a two years period, between spring 1997 and summer 1998. In the introduction part to the Program 2000+ detailed information on this process is presented. Moreover the Annex to the program “Upper Austria 2000+” includes the list of people who were engaged in all working groups. Based on this information we can see that the working group in the area of Technology, which was responsible for the cluster policy development, consisted of experts from key regional institutions, such as JKU/ RISC, Voestalpine, Upper Austria Chamber of Commerce and Federation of Austrian Industry. Their names are also explicitly mentioned in the program. National and international experts were also present (TMG 1998).

Based on the interviews (2D, 2F) and as also mentioned by Tödting (2001) the development of the cluster policy in Upper Austria was based on the adjusted replication of an already active cluster policy in another Austrian region, Styria. Mr. Bayer suggested the ideas, which were later supported by TMG Management Board, Administration of Upper Austria and Upper Austria Chamber of Commerce. We assume that the idea of Mr. Bayer was convincing due to 1) his previous CEO position at one of the prominent research institution, Joanneum Research¹²⁶, and 2) the similar character of the cluster, automotive cluster “ACstyria”, on which the cluster policy was tested. Actually, the original idea was to establish a common cluster or a close cooperation between two clusters in Upper Austria and Styria, though this did not come to fruition due to political reasons. Herewith the cluster development in Upper Austria was finally coordinated only by the TMG with the assistance of a consulting company AgiPlan¹²⁷ (Dobusch 2004/2005). AgiPlan had earlier guided the establishment of automobile cluster in Styria.

The development stage in the first period of the cluster policy resulted in drafting the policy paper “Upper Austria 2000+”. The program was designed for 5 years, starting from 1998 up to 2003. It includes core guidelines for further measures/ actions taking place within the cluster policy. We think that although this first strategic program had three strategic lines, it has mainly focused on the two areas for regional development: **technology and clusters**. Around these two areas all further actions and measures took place, - “cluster als wirtschaftspolitisches Instrument eine entscheidende Wirtschaftsrolle spielten (cluster as economic and political tool play a decisive economic role)” (Interview 2D). That is why although the issue of clusters was specifically highlighted primarily in the strategy line “Technology”, activities in other strategic lines also promoted institutions or activities, important for cluster growth, e.g. Competence Centers. The slogan for the cluster policy was underlining “**Innovation through cooperation**”. Herewith it was clear that regional innovation depends on the scope and quality of innovative products and services, which are the outcome of cooperative activities developed between companies, especially **SMEs**, and other relevant

¹²⁶ For more information see <http://www.joanneum.at/>

¹²⁷ For more information see <http://www.agiplan.de/>

organizations. This slogan and vision of the cluster policy has been maintained over the all years of the cluster policy implementation in Upper Austria. At the same time it was also stated that this cooperation is borderless and should not be limited to a particular branch or be exclusive to the administrative region of Upper Austria (TMG 1998).

In this period the cluster policy in Upper Austria was aiming to define, establish and promote clusters, which reflected strong or potentially strong sectors of the regional economy. The reference to these sectors was from the taken earlier cluster publications within the TIP Program, in particular ÖFZS (1993). Although the program highlighted the relevance of all clusters, the program paper set the priority of pilot-cluster initiatives in following three areas (TMG 1998, p. 75):

- Automotive based on in sectors: vehicles, engines, components (cluster initiative (CI) in 1998)
- Plastic cluster based on: plastic products (CI in 1999)
- Timber cluster in reference to: furniture, windows, doors (CI in 2000)

The details on the concrete organizational measures in terms of cluster policy implementation are presented in the next Part Policy implementation stage of Chapter 7.

The cluster policy in Upper Austria in the **second period of the cluster policy** evolution was reflected in two strategic programs “Innovative Upper Austria 2010” and “Innovative Upper Austria 2010+”. At the same time the revised approach towards cluster development was basically elaborated first within the second program 2010 and then only extended into the third program 2010+.

The development of the second strategic program “Innovative Upper Austria 2010” (TMG 2005) took place between 2004 and 2005 after more than a year of an extensive review of the prior policies. Similar to the discussion, economy and policy review stages the policy development stage was coordinated by the regional business agency TMG, but under the guidance of the newly established Upper Austrian Council for Research and Development. Project management part was done by Ramsauer & Stuermer Consulting (same as in the first program 2000+).

The elaboration of the first program draft (which took around 7 months) was followed by a period of amendments based on recommendations produced by different regional experts in their working groups. Overall there were 19 groups within the program¹²⁸. Clusters were further addressed in the area “Networks” and consisted of following strategies (TMG 2005, p. 20):

¹²⁸ In-depth review of the whole development process of the programme “Innovative Upper Austria 2010” can be found in TMG (2005, pp. 11; 19)

- Stabilization and further development of “Clusterland” Upper Austria;
- Inter-branch theme networks
- Concentration of corporate and R&D facility research activities in R&D groups
- International co-operation

In a years time all four groups in the area “Networks” had organized around 50 discussion-based meetings and produced 85 measures. The proposed measures were then reviewed based on the developed evaluation scheme. An important part of the selection process was the argumentation of the suggested measures based on their goals, objectives, target groups, milestones, (financial) resource needs and expected results. At the same time, the measures were also reviewed based on their alignment with the three general program principles. After these evaluations, the measures were finally grouped in 2 categories (1st and 2nd priority) and then after the consultation with the relevant experts were integrated into the policy paper (ibid.).

As such, the strategic program 2010 included all in all 43 concrete measures. Within them 5 had a direct reference to cluster and network building and almost half the other measures were also associated with creating synergies (within research & development and economy & technology areas) for cluster promotion. Below we list the policy measures, which we think are the most relevant:

- Consolidation of Upper Austria’s leading international position in the fields of mechatronics and process automation
- Establish Upper Austrian information and communications technology initiative
- Establish Logistics Competence Centre
- Closer cooperation between university institutes and industry
- Alignment of the educational structure with that of the economy and industry
- Application of innovative economic grant instruments
- Development, upgrading and management of Upper Austrian Impulse Centres

As in the first strategic program 2000+, here cluster policy maintained the focus on the development and enhancement of **cooperation between companies, especially SMEs**. At the same time it was also stressed that **co-operation between companies and research institutions** is needed. Furthermore **international orientation and collaboration** was also highly encouraged. It was considered that cluster associations were mature enough and needed to establish their **independent management and coordination mechanism**, Clusterland Upper Austria Ltd., which would respond better and faster to their members’ needs. Overall innovation was further recognized as a basis for competitiveness and was highlighted in any activity.

Along with the above, the second program 2010 stressed the need for the establishment of non-industrial networks, which should assist industrial clusters in non-technologic innovation. The advancement in non-technological knowledge was also seen crucial for overall regional innovation, as administration or human resources also compose a large part of the technology and/ or R&D project implementation. In reference to policy programme (TMG 2005) these considerations were influenced by the concepts promoted by the European Commission in terms of the 6th R&D Framework program. Particularly Network of Excellence, European Funds for Regional Development, Network of Innovation Regions in European and the Pilot Action of Excellence have played a key role in the establishment of four network initiatives in Upper Austria.

As we already mentioned, the developed regional and cluster priorities within the third strategic program “Innovative Upper Austria 2010+” were very similar to “Innovative Upper Austria 2010”. Most of the activities were focused on finishing or extending the activities initiated by Program 2010. Although for this program the groups of experts were also involved, their number as well as their contribution was significantly smaller. The developed activities within the program 2010+ further highlighted the need to support cluster and network initiatives through direct partial funding of cluster initiatives and projects in cooperation. Since the establishment of the first cluster initiative, several clusters and networks have been merged (e.g. network Environment was renamed into cluster). This shows that the cluster policy institutions followed the market needs and adjusted to them, namely:

- Need in a stronger integration of clusters into the European and international levels
- Further support of networks as they serve as an acceleration elements within clusters and innovation system
- Stressing the need to enhance cooperation between SME and big enterprises, especially through their common presence in foreign markets

In addition to this the establishment of Innovation Network made clusters an important integral part of the whole innovation system in Upper Austria. That is why **innovation is further claimed to be a driver for economic growth** and is reflected in each program activity.

In the latest **third period of the cluster policy** clusters have started to receive less and less exclusive attention from the Government or within the strategic policy, and are viewed more as fully integrated and essential elements of the whole innovation system. This system is based on clusters and networks working harmoniously along with technological/ research centers and

universities. The pipelines for the further cluster-related actions are reflected in the fourth strategic program “Innovative Upper Austria 2020”¹²⁹.

First of all the latest program 2020 is directly aligned with the policy measures and funding schemes of the national and European levels. Secondly, the program is very impact oriented. That is why the program paper includes key indicators and milestones, which serve as a guide and as an objective. Finally the program 2020 incorporates both horizontal (**Industrial production, Health, Energy, Food and Mobility**) and vertical strategic priority lines, e.g. **Economy, Research and Education**, as they are important and should be incorporated within each action and horizontal line.

In the Program 2020 we don't see explicit support of clusters, because they are now a natural and well-developed industrial basis for regional specialization and competitiveness. It is because of this that clusters are seen as a motor for all vertical and horizontal lines (e.g. in Economy part of the vertical Innovation line clusters are seen as an instrument to achieve industrial market leadership). Indeed, each horizontal strategic line is represented by one or more clusters, e.g. Industrial production by automotive, mechatronic and plastic cluster initiatives and clusters, and Mobility line by network Logistics. In this way **cluster policy turns into a smart cluster-based specialization strategy** for Upper Austria. The Program 2020 has no concrete measures, but it consists of measures' pipelines, for which regional actors have to submit their projects and based on project's evaluation receive the financial support. 2016 is set as a first milestone year for the mid-term program's evaluation based on which further modifications are to be proposed.

To conclude, we stress that the development of the cluster policy in Upper Austria has passed through two types of development: organizational and strategic. Strategically: while in the first cluster policy period strategic program along with TMG developed direct measures towards the identification, establishment and cluster support, by the start of the third cluster policy, the clusters are already fully matured and are working independently for the enhancement of the whole regional system. Organizationally: cluster associations have passed from being fully funded by the Government to a highly independent system, when the funding is mostly obtained from the members' fees. Therefore we claim that cluster policy was initiated as a **cluster oriented technology policy and turned into smart cluster-based specialization strategy** for Upper Austria. At the same time the cluster policy in Upper Austria has maintained its core objective: **competitiveness based on innovation through collaboration**. Indeed the implementation of the cluster policy in the last 20 years led to the “philosophischer Wechsel (philosophic change)” (Interview 2H) of actors thinking and acting in the region.

¹²⁹ The in-depth review of the key policy topics, strategies, vertical and horizontal priority lines of “Innovative Upper Austria 2020” is presented in program paper on pages 58-60 TMG (2013)

2.4.5. Policy implementation stage

The information presented in the implementation stage reflects concrete actions, which were taken in order to achieve the objectives of the cluster policy. To make the review of this stage more comprehensible we will first present a general approach in terms of selected instruments to strengthen, develop and promote clusters in the region and then within each instrument discuss its progress over the three identified periods of the cluster policy evolution.

The final objective of the cluster program in Upper Austria is/ was the strengthening of regional competitiveness by stimulating regional innovation through cooperation in clusters. The clusters in Upper Austria are represented by groups of companies, research centers and other institutions, which are related to the main branch of clusters. On the regional policy level two policy instruments were mainly used to enhance cooperation within company clusters in the region:

- i. Establish and support **cluster initiatives**
- ii. Stimulate and co-fund cooperative **projects** between companies and other regional actors

Basically these two instruments were/ are the main component of the cluster policy in Upper Austria during the last years. Both instruments were aimed at strengthening the cooperation between companies and other regional and later supra-regional actors.

I. Cluster Initiatives

In the first period of cluster policy evolution the strategic program “Upper Austria 2000+” highlighted the importance of clusters for regional competitiveness. In particular it stated that in the forthcoming years the competitiveness of Upper Austria will be increasingly dependent on the innovation potential of industrial complexes (clusters) rather than individual companies (TMG 1998, p. 45). This meant that the region had to focus on the identification of potential industries and target the financial and technical resources towards their development.

In order to achieve this goal one of the measures, which was taken by the regional institutions in Upper Austria was the establishment of cluster initiatives. In particular the first strategic program 2000+ stressed that the selected experts in the regional development agency TMG in partnership with the Upper Austrian Chamber of Commerce and the Confederation of Upper Austrian Industry had to develop clusters by providing branch-related information and organizing communication events for companies to stimulate their communication. Along with it the program initiated the development of pilot umbrella projects for the selected clusters. These pilot projects had to be primarily initiated in 3 selected clusters (automobile, plastic, timber) and later on if required in further ones. More detail information is presented in the section on co-operative projects. Other cluster supporting “soft” measures had to be provided by the Upper Austrian Chamber of

Commerce and CATT in partnership with TMG. Under these soft measures the program referred to already undergoing activities (e.g. provision of the cluster specific information, consulting services, education and continues training.), thus with more specialized and cluster oriented prioritizing.

In such for the realization of all cluster-related activities within TMG a group of experts have been established. The group of experts first of all started work within the sectors-clusters, which were the priorities of the Program 2000+. Based on the interviews (2D, 2M, 2H) these activities included first the gathering of statistical information on the companies in specific clustear (in order to understand clearly who, where, what type of companies and institutions there were), feasibility studies, reports, then informing these cluster members by addressing the companies with information on the cluster concept, organization of information activities, such as workshops, trainings, etc. The first activities were targeted towards the cluster in the automotive branch. Already in the first period of the cluster policy the cluster initiative established an Advisory Council for each cluster. The members of this council were representatives of different sector companies. Many strategic decisions and visions were shared during these councils and other meetings.

The successful realization of these activities increased the interest among companies and other regional actors in the automotive sector (during the first two years the number of member rose from 1 to above 200, Interview 2D) and led to the establishment of working groups for other clusters within the TMG. These working groups, which were later labeled as cluster initiatives, were established in the following sectors:

- 1998 AC Automotive
- 1999 CDT Drive Technology
- 1999 KC Plastics
- 2000 MHC Furniture & Timber Construction
- 2000 OEC Eco-Energy
- 2000 LC Food
- 2002 GC Health Technology
- 2003 MC Mechatronics

Although, e.g. steel, aluminum and metal branch were forming a cluster, no specific group was established. The reason for this was the consideration that this cluster was already mature enough and did not need extra government support. Moreover Dobusch (2004/2005) thinks the cooperation between companies in this cluster had already been taking place, just it was done under the leadership of several big enterprises (Voestapline; Chemie Linz; Lenzing). Finally, another reason for the absence of the working group in the steel cluster has been the desire of the Government to discover other opportunities of the region.

The above mentioned structure and system of coordination and communication between the public and private sector (clusters) was in operation until the beginning of the **second period of the cluster policy evolution**. By 2004 as we already mentioned the number of cluster initiatives had increased to 8. Most of them were coordinated by experts within the TMG, which resulted in the growth of the number of employees, who were working on cluster development from around 5 up to more than 30 by the end of 2003 (Interview 2D, 2M). It was clear that the coordination of clusters started to be a dominant part of the organization, whose prime role was more regional development and not only cluster development. In the evaluation of the “Upper Austria 2000+” Program and earlier measures targeted towards cluster support it was identified that the cluster supporting working groups had to be separated from TMG. Besides it was noted that cluster companies wanted to be more independent in their strategic development. This aspect was considered especially important for clusters which were already mature. That is why the second strategic program “Innovative Upper Austria 2010” proposed to separate the cluster working groups from the TMG and to establish an independent public-private institution. This organization is called **Clusterland (cluster country) Upper Austria** and it is in charge of almost all clusters in the region (except for the clusters Food – Upper Austria Chamber of Commerce and Eco-Energy - Energieverband, etc.). The decision of some cluster associations to have another institution in charge had to do either with political interest or with the existence of another association, that was closer to the cluster sector competences (Interview 2D).

Under the framework of Clusterland Upper Austria Ltd. there are several cluster and network associations. Each association has its own staff composing of a leading cluster manager, Advisory Board (built up of cluster members) and assisting personnel. At the top of Clusterland Upper Austria, there is a main executive manager, CEO, Mr. Pamminer, who has been in this position since 2005. In reference to Interview 2D this fact is considered to be positive, due to ensuring organizations’ stability, visibility and trust. Each cluster initiative develops its activities in response to the needs of its cluster members, at the same time they are aligned with the overall strategy of Clusterland Upper Austria.

Besides giving more independence to cluster members the establishment of Clusterland had several other benefits. First of all, it promoted the internationalization of clusters, which was realized by the CEO of the Clusterland Upper Austria. A part of his duties was development of international funding opportunities for companies, clusters and technological centers. Secondly, it facilitated the decision-making process, especially in terms of new projects inside and outside of the region (Interview 2D, 2M). Finally, it also improved the visibility of the region and the clusters as well.

Along with the organizational changes the Program 2010 also stressed the need for inter-branch thematic networks. Based on this guideline the networks in the following areas were established:

- 2004 NHR Network Human Resources
- 2004 NFTI Network Research/ Technology/Innovation
- 2004 NL Network Logistic
- 2004 NDM Network Design & Media
- 2006 UC Environmental Technology (until 2009 as a network)
- 2009 NREE Network Resource- and Energy Efficiency

The establishment of networks was performed to enhance additional innovation capacities of the industrial clusters. European Commission (2011) stresses that cross-branch networks have to produce spill-overs among core cluster sectors. Moreover they also had to stimulate inter-institutional (universities-technological centers-companies) cooperation within the clusters. This was especially relevant considering the need for a more transparent overview of existing regional agents.

As such, since 2005 cluster initiatives (particularly the ones within Clusterland Upper Austria) started to provide services and activities in 5 common fields of action (Hubinger 2012):

- **Communication and information platform** – this set of activities was aimed towards providing various up-to-date information on current events and trends, and sharing the information by means of e.g. newsletters, journals, company visits, interactive website, company directories, etc.
- **Qualification** – Knowledge transfer and networking – activities, which fall under this category are more knowledge and branch specific than the previous ones. Here the aim is to raise the competences of the cluster members and non-members by e.g. providing specific thematic trainings, workshops, company tours, study trips, know-how transfer on trends and technologies, regular specialized events, etc.
- **Co-operation** – Initiating and supporting co-operation projects – here the main goal of the activities is in the enhancement of cooperation projects among firms and relevant institutions, where cluster managers are the main assisting party (More later on in the part co-operation projects)
- **Marketing and PR** – Enhance visibility - activities in this category were strongly connected with building a common image for cluster and supporting companies' market visibility through e.g. common technology presentations, branch image at trade fairs, presentations at major customers.
- **Internationalization** – Supporting companies as they enter new markets – for SMEs entering the foreign markets is always connected with big, diverse costs. Thus the actions that took place within this group were aimed at provision of support in form of e.g.

establishing and looking for international contacts, co-operation with European regions, participation in EU-projects, business trips, and factory tours

All of the activities were highly welcomed by the firms and were seen as useful and supportive for companies' development (Interview 2C). The strategic plan "Innovative Upper Austria 2010+" has further stressed almost the same action pipelines for cluster promotion and support as the previous program 2010. In particular (TMG 2010, p. 93):

- The links between clusters and networks had to be strengthened not only on the regional, but also national and international level
- Cluster initiatives had to turn into the leading/ trend-giving information platform for the companies and research centers in the whole sector by focusing on the education and knowledge generation "competence center for cooperation" in Upper Austria
- Increase their attention to SMEs, and further increase the number of clusters and networks partners from 2 175 to 2 375 members in 2013

It is still too early to say how cluster initiatives are going to behave in the **third period of the cluster policy evolution**, as the latest strategic Program "Innovative Upper Austria 2020" entered into force only in 2014. Moreover in this strategic program the implementation aspects of the cluster policy are not clear. Thus, we claim that cluster associations are becoming more independent and are taking a stronger role in the overall regional cluster policy making. Indeed clusters within this latest program 2020 are very integrated and closely aligned with the main horizontal specializations priority lines, such as Industrial Production Processes, Energy, Health, Nutrition and Mobility. Overall, we think that on the level of coordination and communication no big changes can be expected. The same can be said of the area of activities, which are proposed by cluster initiatives. At the same time we assume that cluster initiatives will intensify their work with different regional actors through serving more as an informational and networking platform for new trends, education of specialists and provision of resources for the regional institutions. This especially goes along with the earlier defined need for cross-branch and cross-cluster cooperation and knowledge exchange on the national and international levels.

Overall by November 2014 9 clusters and 3 network initiatives (total 12) are in operation in Upper Austria. The majority of them (7) were launched during the first strategic regional policy program "Upper Austria 2000+". The full list of cluster and network associations along with brief key information about them is presented in the Annex 8. Cluster associations perform numerous activities, which aim at cluster growth. Their main focus is **SMEs and technological & managing progress**.

Table 38 Evolution of the key implementation instruments of the cluster policy in Upper Austria

Period/ Element of the implementation	I (1992-2003)			II (2004-2012)			III (since 2013)	
Government inv.	Medium			Low			Low	
Cluster initiative								
Membership	Open			Open			Open	
Funding	Public			Mixed			Mixed	
Coordination	TMG			Clusterland Upper Austria + other			Clusterland Upper Austria + other	
Association	1998	AC	Automotive	2004	NHR	Network HR	2013	ITC
	1999	CDT	Drive Techn.	2004	NFTI	Network		Information Tech
	1999	KC	Plastics			Research/ Techn./Innovation		
	2000	MHC	Furniture					
	2000	OEC	Eco-Energy	2004	NL	Network		
	2000	LC	Food			Logistic		
	2002	GC	Health Techn.	2004	NDM	Network		
	2003	MC	Mechatronics			Design & Medien		
Activities		- Information		- Communication	and	- Communication and		information platform
		- Consulting services		- Qualification		- Qualification		
		- Educational and continued Training		- Co-operation		- Co-operation		
				- Marketing and PR		- Marketing and PR		
Projects				- Internationalization		- Internationalization		
Thematic focus	Cooperation and technology			Technology, international cross-branch,			Cross-branch, international, technology, knowledge sharing	
Name								
Involvement of other organizations	Government + leading companies			Government + leading technological centers			Government + companies + technological & research centers	

Source: Author's development

II. Co-operation projects

Within the implemented activities, which are aimed at cluster growth, the support and the development of the co-operation projects is explicitly highlighted in each period of the cluster policy in Upper Austria. Indeed in reference to Interview (2D) **“Förderprojekte - das Herzstück dieser Clusterpolitik”** (co-operative projects are seen as the heart) of the cluster policy. Moreover since the beginning of the cluster policy regional actors are actively promoting the main policy slogan **“Innovation through Cooperation”** (Innovation durch Kooperation). From the Upper Austrian experts' point of view this cooperation is possible only through assistance of companies and related institutions in project management. For this Stahlercker (2012) thinks that

the financial commitment to fund projects in collaboration, which was done by government, played an important role in the success of the cluster policy.

Already in the **first period of the cluster policy** the strategic program “Upper Austria 2000+” highlighted the need to increase cooperative work within selected pilot clusters on the basis of projects, for which realization and management financial resources were provided. The financial contribution came from the Department of Commerce within the Government of Upper Austria (TMG 1998). This financial support was real and was based on the Zukunftfond (future funds), collected from privatization of regional assets in the 1990s. For evaluation of the projects, the Government of Upper Austria created a special advisory council (Vergabebeirat) composed of technical experts capable of analyzing the submitted projects.

The first pilot-activities within the Program 2000+ were specifically targeted toward the enhancement of collaboration within companies of the automotive cluster in Upper Austria. In this framework one of the project related activities was the establishment of Automotive Competence Centres Linz and Steyr. The sponsor and managing parties were Vostalpine, Metallurgie-Forum Österreich, Steyr-Daimler-Puch AG and BMW Steyr. During this period most of the projects were initiated from the side of the cluster manager and were almost always fully funded by the Government of Upper Austria.

In the **second period of the cluster policy** co-operative projects were further emphasized and the Government of Upper Austria ensured the continuation of funding for innovative co-operation projects. At the same time the conditions for receiving project grants was re-shaped. Since the second period of cluster policy there are basically two types of projects related to **product** and **process innovations** in the areas of education, logistics and marketing, etc., which can be submitted by cluster companies:

- a) Organizational – focused on the improvement of the organizational elements within the institutions, companies
- b) Technological – aiming at developing new technology

Besides the thematic and technical justification of the projects, another important part of the application was conformity with the character of the institutions, which were applying for the project. For example in the latest modification of the application form (the Department of Economy develops this application sheet together with CATT) the proposed project had to include at least 3 different participants, among which there had to be one big, one small company and one research institution or university. This constellation of actors is sometimes difficult to achieve. Moreover it was suggested in “Innovative Upper Austria 2010” that the co-operation projects could be developed not only on the regional but also national and international levels. That is why the

projects could have included also international and national partners. This opened the door to cross-border cooperation and international funding.

Overall the development of projects takes place through the cluster manager or his personnel. The ideas and the partners for the projects can be developed on an individual company basis or through the cluster manager. In the case of the cluster manager – they try to link potentially interested companies for cooperation. In order to implement this a cluster-related database, which is/ was composed of key cluster representatives and their competences (a part of this database can be found on the Homepage of Clusterland Upper Austria)(Interview 2D) was developed during the first years of cluster policy implementation. Depending on the size, interest of the company and type of the projects, its price and duration can vary strongly, from half a year to maximum 2 years (Interview 2C, 2D).

As such, in reference to Program “Innovative Upper Austria 2010+” (TMG 2010, p. 94) by 2009 383 projects with 1,616 enterprises were realized in Upper Austrian clusters. Around 70% of the project participants are SMEs. Furthermore, it was stated that almost 77% of companies or institutions continue their cooperation after the projects termination. Moreover 89% of projects’ participants agreed that the realization of the project would not be possible without the financial or innovation support provided by cluster initiatives. Finally the cooperation at the regional level opens opportunities for SMEs especially to cooperate with national and European partners. All this serves for the policy makers in Upper Austria as good indicators for the effectiveness of subsidizing a project. At the same time most of the projects are also co-funded by companies themselves.

Therefore we assume that in the **third period of the cluster policy** the public support for the cooperation projects will be further extended. At the same time we think that the regulation for the application will be modified by focusing more on the horizontal strategic lines of the Program “Innovative Upper Austria 2020” and the need to enhance cooperation within the Upper Austria innovation network.

Financing

In the **first period of the cluster policy** the funding for the implementation of all activities, which were targeted towards the identification and enhancement of clusters came from different regional, mostly public institutions, such as the Federal Government of Upper Austria, the Upper Austria Chamber of Commerce or/ and the Upper Austrian Branch of the Confederation of Austrian Industry. On the Government level the money was assured from the future funds (collected from privatization) (Maier et al. 2012, p. 232). Overall around EUR 20 million was spent on cluster support within the Program 2000+. At the same time some activities, e.g. establishment of Automotive Competence Center Linz-Steyr was also co-funded by leading businesses in the region.

The funding was directed towards the realization of co-operation projects, personnel of cluster initiative and cluster-related activities, which were developed within cluster initiatives, e.g. conferences, reports, information brochures, etc. Excluding collaborative projects, the annual costs for the cluster association was around EUR 1.5 to 2 Mill. (Interview 2H). In general the detail financial information for the period 2006-2013 on some specific programs, activities and companies can be found in annual budgets¹³⁰.

Although in the first period of the cluster policy most of the services for clusters were provided from public money, in the Program 2000+ it was already stated that the funding for the development of the cooperation within clusters will be reduced over time. This approach to funding was selected for the following reasons: 1) regional resources are limited, herewith the consideration of other (national, European, etc.) sources of funding would be needed and 2) membership fees serve as motivation factor for companies, as investing your own money was considered to keep member more active and innovative (TACTICS 2012). The fees are different and are based on the companies' size (calculated by number of employees), e.g. from EUR 1000 to at least EUR 2500 annually.

In the **second period of the cluster policy** the main approach towards funding was maintained. This means that public funding provided for the development of co-operative projects and for the activities of the cluster associations. At the same time its composition and distribution was modified. First of all although the Upper Austria Government maintained its support for the cluster initiatives (especially within newly established organization Clusterland), it also stressed that only 60% of cluster association's budget could have been covered. The rest of the money had to come from the fees, which had to be paid by members of each cluster association. Moreover in the Program 2010+ the public share of funding for cluster initiatives was reduced even further. At the same time more financial support was provided for the established network associations. However, for the building of the networks the resources of the European Fund for Regional Development within the framework of the structural fund program "Regional Competitiveness for Upper Austria 2007 - 2013 (Regio 13) were used (TMG 2010).

In the third strategic program "Innovative Upper Austria 2010+" the overall funding scheme was maintained. For the overall program EUR 150 Mill. out of EUR 450 Mill were provided from the Federal State of Upper Austria and the rest - from other sources. At the same time Division Economy in the Department Regional Planning, Economic and Rural Development was established within the Government Administration in order to overtake the responsibilities for program's

¹³⁰ For more information see http://www2.land-oberoesterreich.gv.at/internetfoerderbericht/InternetFoerderberichtZfi_f_int4SuchenListe.jsp?herkunft=1&jahre=2013&gruppe=7&abschn=78&uabsch=780&tabsch=78030

funding. Moreover in order to assure better allocation of resources, the Program 2010+ measures were first sorted, analyzed and then integrated based on specially developed evaluation scheme (these systems could reflect general features of the projects based on the importance of the activity, costs and status in regard to financial covering). Around 4% of the total program's budget was dedicated to the support of clusters and networks, whereas 67% was used to address issues regarding to research & development.

For the **third period of the cluster policy** evolution it is not yet fully clear how much funding will be available to cluster initiatives. We assume that a similar approach will be followed. Funding for the support of the cluster associations will be reduced and grants for collaborative projects will be maintained. As the overall program 2020 intends to integrate the funding scheme with national and international programs we think so will the funding for research & development projects and clusters.

In order to get funding a proposal for the project has to be submitted. Based on the proposal a decision is taken by the state Division within an approved annual budget. The details of this process can be seen in the graph, presented in the programme paper on page 51 (TMG 2013)

Concluding the information reviewed in **the implementation stage of the cluster policy** we want to highlight that in Upper Austria two main approaches towards the development of regional clusters have been taken: 1) promotion of collaborative projects and 2) establishment of cluster initiatives. At the beginning, the coordination mechanism of cluster growth was more top-down driven. As cluster members have matured this has changed, leading to a more bottom up decision making process in terms of projects and activities needed to be proposed by cluster initiatives. This also led to the change in terms of the funding scheme for the cluster associations (from public in 1998 to private-public in 2013). Finally it is clear that the matureness of clusters influences the policy making on the regional level.

2.4.6. Monitoring and evaluation stage

While analyzing this stage of the cluster policy we have to keep in mind that monitoring and evaluation first of all can take place on macro (regional) and micro (cluster association) levels, and second of all it can also take place along or during any other stage of the cluster policy (not only after the implementation stage). A number of monitoring and evaluation reports can be found in Table 37.

The preparation of annual reports on the implementation of the developed technology and location policy was part of the first strategic program "Upper Austria 2000+" (TMG 1998). As the establishment of clusters was a core strategy line Number 2 in the Program 2000+, we claim to see

this reporting as a **monitoring** mechanism of the cluster policy in the **first period of cluster policy evolution** on the macro level in Upper Austria. This means that from the beginning monitoring was an integrated part of the cluster policy. The monitoring included the information on general economic development of Upper Austria, number and type of new companies, infrastructure development, etc. The report was prepared by the working groups in the TMG and was then presented to the Parliament of Upper Austria.

At the same time a more cluster specific report was produced for other institutions, which were contributing financially to the implementation of the cluster policy. Indeed, the Upper Austria Chamber of Commerce was very interested in the assessment of the effectiveness of the cluster policy. That is why during the first 2 – 3 years after the launch of the cluster initiatives the working groups within the TMG had to report regularly (semiyearly or sometimes even quarterly (Interview 2D)) on the status of their activities.

After the first strategic program 2000+ TMG in collaboration with other institutions performed an intensive **evaluation** of the strategic program in general and cluster policy in particular. Within these reports especially related to cluster performance the following should be mentioned Technopolis Austria – Ohler, F. (2001): Evaluation of Cluster initiatives in Upper Austria.

On the level of cluster associations in the first period of cluster policy no specific evaluation or monitoring measures have been identified. Nevertheless, we still assume that the monitoring of the activities within cluster specific initiatives was taking place in form of regular visits or gathering of statistical data, etc. At the same time, as the cluster concept was relative new, there was difficulty in finding any benchmarking indicators to track the evolution of clusters in Upper Austria (Interview 2D).

In the **second period of the cluster policy** on the regional level the **monitoring** in the form of biannual reports on the strategic program 2010 continued. Moreover it was proposed to develop a more cluster related monitoring system, namely the development of regional branch reports, which were to provide information on the status and key trends in particular industries (TMG 2010).

An **evaluation** of the second strategic program 2010 also took place (TMG 2010). Moreover the results of this evaluation were very valuable for realizing that companies are satisfied with the work of the cluster initiatives.

On the level of cluster association routine **monitoring** has also been introduced. At the same time some of these monitoring activities are often used as an **evaluation** tool as well. Overall, as indicated by Interview (2N) there is a 3 level monitoring system, which was developed within Clusterland Upper Austria. First of all, there is a set of data on cluster performance, which is

collected by the cluster manager. There are around 35 different indicators reflecting such cluster-related information as the number of association members, the number of projects (per type), number of events organized, etc. Moreover the monitoring is also done in regard to the projects in cooperation. The form is similar – an annual report and analysis of the projects effectiveness. Second of all, there are biannual surveys, Kundenzufriedenheitsanalyse (customer satisfaction analysis), in which the opinion and the needs of the cluster members were asked. The surveys are organized by an independent market research institute. These surveys provide cluster initiatives with valuable information, which is later used to adjust the activities of cluster associations. In reference to the Interviews 2D, 2C, 2K these customer satisfaction analyses are sufficient for understanding the member's status and attitude. Although these surveys address only association's members, which doesn't include the opinion of other institutions belonging to a natural cluster. In addition to surveys, cluster managers try to conduct regular visits and maintain direct and communication with cluster members on an individual basis. Through this they are able to collect additional information on current challenges faced by members. Thirdly, another mechanism, which was introduced on the micro-level, is the benchmarking between the cluster associations. These activities have two main objectives: 1) follow the completion of the set tasks and measures on a regular basis and 2) stimulate the learning processes among clusters (TMG 2010). Finally, based on the opinion of several regional actors (Interview 2H, 2N), a key indicator for the successful performance of clusters associations, is the companies' willingness to pay for their services.

The monitoring and evaluation mechanisms, which were proposed on the macro and micro level, have continued to be implemented in the third strategic program "Innovative Upper Austria 2010+".

Significant changes in the evaluation and monitoring on the macro level have taken place since the start of the **third period of the cluster policy**. For the first time in the strategic planning the Program "Innovative Upper Austria 2020" consisted of an ex-ante **evaluation** that was done by the leading Austrian research institution, WIFO (Table 37). Its main objective was to estimate, whether the targeted strategic fields of action together with its measures are effectively reflecting the current challenges of Upper Austria. Furthermore, for the year 2016 there is also a mid-term evaluation scheduled. Its first purpose is in breaking the long term planning period into smaller ones and the second one in checking the progress of the implementation of the program (TMG 2013) Finally, the Program 2020 also consists of milestone **monitoring** indicators, which are determined to guide the policy makers in regard to the objectives, which have to be achieved¹³¹.

At the same time in regard to clusters policy or cluster performance no concrete indicators have been observed in the strategic plan. We assume that this has to do with the high grade of

¹³¹ An overview of the main indicators can also be found in the program paper (TMG, Oberösterreichische Technologie und Marketinggesellschaft m.b.H. Dezember/2013, pp. 58 – 60).

independence achieved by cluster associations in the second period of cluster policy. Herewith, we consider that the launched evaluation and monitoring activities on micro-level will be prolonged in this period as well.

To conclude we want to stress that the **monitoring and evaluation** of the activities related to strategic programs have taken place since the first period of the cluster policy. At the same time this reporting was more related to strategic regional plans rather than to cluster policy. Moreover, as the cluster associations have matured, they have grown to be fully in charge of their monitoring and evaluation mechanism. Although within the regional development agency, TMG, and cluster associations there are experts in cluster management, we think that the regional agents lack the assistance of the regional academic or research institutions, which would be helpful to provide evaluation studies on cluster policy and performance of clusters on a regular basis. In addition to this most of the evaluations performed address the performance of clusters associations, rather than of natural cluster or regional economy as a whole.

2.4.7. Policy improvement stage

Since 1998, when the first strategic program “Upper Austria 2000+” was initiated, the instruments promoting cluster-based economic development of Upper Austria have evolved. Most of the changes have been already addressed in Parts Economy and cluster analysis stage and Policy development stage of Chapter 7. Here we will focus only on the most relevant in the view of our theoretical framework.

In the **first period of the cluster policy** evolution the evaluation of previous actions indicated the need to conduct significant changes in the form of the cluster policy organization. In communication with the representatives of different economic groups major changes were integrated and consisting of following measures:

- Increase the engagement of the regional actors in the strategic regional and cluster policy planning
- The public coordination of cluster initiative would be transferred from the regional development organization, TMG to an independent public-private institution, Clusterland Upper Austria Ltd.
- The reduction of financial support provided for the management of cluster initiatives, in particular through introduction of the cluster membership fees
- The drafting of the new strategic program had to be initiated 12 to 18 months prior to the termination of the previous one
- The establishment of cross-branch networks in the areas

These improvements took place mainly on two levels: on the level of the strategic regional policy making and on the level of cluster associations and their communication with cluster representatives. The changes were developed and introduced in strong communication with different regional institutions (more than 250 participants), who participated in workshops and events during the drafting of the second strategic program “Innovative Upper Austria 2010”. Later on these recommendations were reviewed and integrated in the final paper draft which, before its final approval in the Parliament, was again revised by the experts.

Within the **second period of the cluster policy** evolution the review of the two strategic programs was performed. Although during this period no radical changes were introduced, even the small ones were explicitly mentioned in the program “Innovative Upper Austria 2010+”. This public presentation of the changes in the newly developed program made the information accessible to all regional groups.

It is still early to say whether the improvements within the **third period of cluster policy** are going to take place. We assume they will, as the regional authorities and cluster initiatives in Upper Austria are very pro-active and open to policy change. Evidence for this can be seen in the integration of public opinion in the policy planning. Moreover the latest strategic plan includes the mid-term evaluation in 2016 based on which further policy modifications are to take place.

Finally although we can observe the openness of regional actors to follow the recommendation delivered from the reports and analytical papers, a certain resistance still exists. This can be seen through the prism of the first cluster policy intention to create a joint automotive cluster with the neighboring region, Styria, which wasn't realized due to political interests. However, this united vision of one natural cluster (automotive) indeed would further stimulate the cluster's growth on the national and later on international level.

2.4.8. Factors important during the whole policy process of cluster policy

In this part of the chapter we will present first the factors and then, if applicable, their changes during different periods of the cluster policy in Upper Austria.

The launch of the cluster policy in Upper Austria was initiated from the level of regional authorities. Although in the first period of the cluster policy there were numerous discussions and debates regarding the support of clusters, overall we think that the constant **political support** was expressed by key regional players (Interview 2A, 2C, 2F). This support was especially important from the representatives of the business sector such as the Upper Austria Chamber of Commerce and the Upper Austria Branch of Confederation of Austrian Industry. This political support has not only been maintained, but has even grown and been consolidated over the years of cluster policy

implementation. In reference to 2C – “kein Denkkonkurrenz da ist” (there is no competition in the opinions). Companies have supported this view.

Upper Austria has had a very **stable political situation** during all periods of the cluster policy. Since the initiation of cluster policy during all 3 rounds of parliamentary elections the majority of votes have been permanently received by Austrian People’s Party (ÖVP). Another example of the stability is reflected in the person who occupies the post of the Governor of Upper Austria. Since 1995 this position is taken by the same representative, Dr. Josef Pühringer (ÖVP). Moreover in the latest years the opinions (especially regarding the cluster policy) between different political and business groups have become more consolidated, which is seen from the delivery of similar statements with regards to opinion on the cluster policy.

Although Upper Austria is a federal state within the Republic of Austria, which ensures a strong regional independence of the regional Government and Parliament, we think that particularly the Upper Austria Chamber of Commerce could be seen as a **strong regional authority** influencing the cluster policy in the region. Indeed, it is considered that Chambers in Austria are very pro-active institutions especially in terms of supporting the business sector. That is why one of the main advocates of the cluster policy in Upper Austria was the staff of the Austrian Chamber of Commerce. In the second period of cluster policy its role in cluster development was significantly reduced. Nevertheless it maintained its direct influence over one of the cluster associations.

A review of the regional actors, which participate in policy making on the macro (regional) and micro (cluster association) level can justify the existence of the **triple helix model** in the policy making in 2014. Indeed cluster members as well as their Advisory Boards are composed of the representatives of different regional institutions. At the same time, the dominance is maintained by companies. A similar situation is also observed in terms of strategic regional planning, in which cluster policy is integrated. Since the development of “Innovative Upper Austria 2010” Program more than 250 experts with different backgrounds and from different areas have participated. In addition to this, since around 2010 the institutions involved in the cluster-based technology policy are viewed as a joined regional complex, labelled Innovation Network Upper Austria. Nevertheless we should admit that academic institutions and especially Universities still have low levels of participation in the projects and cluster based events. However, it should be acknowledged that in the first period of the cluster policy evolution the public sector was the most active agent in the development and implementation of cluster policy (Interview 2D). At the same time, the public authorities were also aware that the cluster policy should be more driven by the market itself.

Referring to the **long term commitment and motivation of actors**, three major groups of actors should be recognized: government & public-based institutions, companies, research centers and

academia. We think that in the first period of cluster policy the motivation and commitment was shown predominantly by public based institutions. At the beginning especially, research institutions or academia had less interest or commitment as they were receiving public funding anyway. Based on the interviews 2D, 2C it was mentioned that the presented cluster concept triggered interest for companies, as at that time they were in decline and in need of some support. Cluster policy offered them information and financial assistance. However, the long term commitment to cluster policy has appeared only in the second period, when the cluster associations started to be more company driven. This institutional division increased the level of responsibility and commitment of the companies. The commitment and motivation had also increased among research centers and impulse centers as they started to be more aware that the co-operation with companies offered them better opportunities to receive financial support on a regional as well as an international level, and get access to much more interesting projects (Interview 2D).

Collaboration among companies, research centers and universities had always been present, though overall it had been very weak. Granting of co-operative projects under specific conditions in the framework of the cluster policy has speed up and intensified this collaboration. The reason for this is the conditions which have to be filled in the grant application. In particular, if initially big and small companies had fewer incentives to cooperate, established funding conditions, their choice is limited. A similar situation is also seen between companies and research institutions, which in reference to Interview 2A are “zwei unterschiedliche Welten” (two different worlds). Cluster policies managed to smooth these differences. Overall most of the cluster members are very satisfied in this type of co-operative project. Almost 77% of companies or institutions continue their cooperation after the projects termination and 89% of projects’ participants agreed that the realization of the project would not be possible without the financial or innovation support provided by cluster initiatives (TMG 2010, p. 94). At the same time it should be also recognized that the cooperation is very personnel driven, which often results in permanent cooperation between the same actors.

The **dialog** between regional actors takes place on macro (regional) and micro (cluster association) levels. Cluster initiatives have established Advisory Boards, which are composed of representatives from different companies and institutions. They meet regularly and discuss the existing challenges and opportunities. This information is later delivered through the CEO of Clusterland to the macro level. This vertical communication also takes place permanently. On the regional level the officials from different leading regional organizations also meet in discussion rounds and conferences, and try to directly engage companies and research institutions in the drafting of regional strategic programs. Besides, due to a small regional scale, many of the companies and institutions are situated near to one another (earlier we mentioned that almost all policy related institutions and

cluster associations have their location not only in Linz but even within the same building), an informal communication often takes place as well.

In the interviews with the regional experts (2D, 2A, 2F) in cluster policy it was frequently mentioned that there are no clear conflicts between different public or private institutions. Moreover due to small scale of the region people know each other very well and have developed very **trustworthy** and close relations. Based on this we assume that there is a strong sense of trust, openness and transparency in Upper Austria.

2.5. Policy important factors explicitly mentioned by regional actors

Finally, we want to stress several factors which were explicitly mentioned by regional actors in our interviews as significant for the effective implementation of the cluster policy in Upper Austria.

First of all the decisive **role of people** was acknowledged several times. In reference to Interviews 2C, 2N, the relations between people played a key role in any part of the cluster policy, whether it was the discussion of program's strategic pipelines, development of co-operative projects or organization of the common presence on the international market. Charismatic persons are needed in the first stages of the cluster policy, as they have the capacity to take risks and convince others of their ideas. When the implementation system is developed, the role of people turns to be less relevant for the sustainability of the policy, but it never completely diminishes. Moreover, as Interviewer 2N mentioned - employees are the regions/ companies / clusters biggest asset.

Another important factor was the **long term common vision** of the policy making (Interview 2N, 2F). This was possible in Upper Austria due to the political stability and the integration of cluster policy in the long term program planning. Indeed, for many companies this long term orientation of activities served as a guarantee that cluster policy is taken seriously by the Government and that their investment into projects and activities would also be recognized. This long term vision was also supported by low balanced-rotation level of the personnel, especially in the chief cluster managing positions and on the regional administration level. This stability ensures tight contacts, trust and visibility of clusters on the regional and international levels.

Availability of sufficient **financial and personal capacities** for the implementation of the policies is another factor highlighted by interviewees (2D). A great idea is nothing unless there are resources for its implementation. This is why in the opinion of actors in Upper Austria both these elements were present in the region and made the implementation of the policy possible. Especially the number of people and timeline of activities in the first years of the cluster policy was very balanced. Although public funding is necessary, the regional experts think that the public-private concept for

the cluster policy funding was very effective. The public share gave the organization stability and long-term planning, while private share served as a strong motivational trigger for cluster members.

Finally, it is important to keep in mind that all cluster policy related activities should improve the performance and productivity of its **final consumer** – companies, research centers and universities. These economic actors are the driving force of the successful economic development of the region.

2.6. Summary on the review of cluster policy

The start of the first activities took place only in 1998 with the launch of the strategic program “Upper Austria 2000+”, although the first studies on the identification of clusters in Upper Austria had taken place in 1993 in the Framework of the Austrian innovation research program, TIP. The delay in the implementation can be associated with the novelty of the concept and debates on the way the cluster tool could have been approached.

In the beginning, the priority of primarily three clusters was stressed, while the support of other cluster branches and the level of co-operation (regional, national and / or international) were left open. At the same time the cluster policy made clear the importance of collaboration between all regional actors, especially SME’s, as the driving force of regional innovation and strengthening competitiveness of Upper Austria. That is why the cluster policy in Upper Austria was realized under two slogans “Innovation through Cooperation” and “Strengthening Strengths”. Indeed, the implementation of the cluster policy led to a complete change of mindset among the regional actors. It was clear that the strengths of regions and companies would lie in their collaborative, rather than individual force. Overall we claim that cluster policy in Upper Austria has developed from **cluster based technology policy** to a smart **cluster-based specialization strategy**. Certainly, clusters are seen as an integral part of the whole regional development strategy. Moreover they are building important regional industrial focus that can help other institutions align to.

Two instruments were applied within the cluster policy in Upper Austria: 1) establishment and support of cluster associations and 2) financial support of projects in collaboration. As a result of the cluster policy in Upper Austria 9 clusters and 3 networks have been established. The role of networks is to address cross-branch needs and enhance non-technical part of the innovation. All clusters in the region are established based on natural clusters.

Since the cluster concept was brought to the region, cluster policy in Upper Austria (based on the general strategy the clusters were approached) has passed through three **evolutionary periods**. These periods are: I) 1993 – 2003: Grounds building, II) 2004-2012: Re-structuring management and going international, III) since 2013: Cross vertical-horizontal specialization boost (Table 36).

These periods of cluster policy evolution reflect the level of maturity of the clusters in the region. While in the first period the policy actions were more targeted towards cluster **identification** (raising their awareness on cluster issues, making companies and institutions visible to each other), in the second period policy instruments were more targeted towards **cluster strengthening, growth and their internationalization** (securing growth through attracting new members and new companies, also internationalization and grouped presentation of companies outside the region). In the third period - applying clusters as an instrument for **achieving regional growth, specialization and as an education platform** (cluster members are well aware about the existing and involved institutions, stabilization could be enhanced by enriching the professionalization of the cluster managing personal and company's workers and managers).

We have also conducted an in-depth study of each **stage of the cluster policy process** in each period of the policy evolution based on the developed policy framework. Annex 10 includes the main insights on each policy stage and in each evolution period. Broader conclusions will be presented in Main findings and conclusions of Chapter 7.

3. Influence of cluster policy on economic development

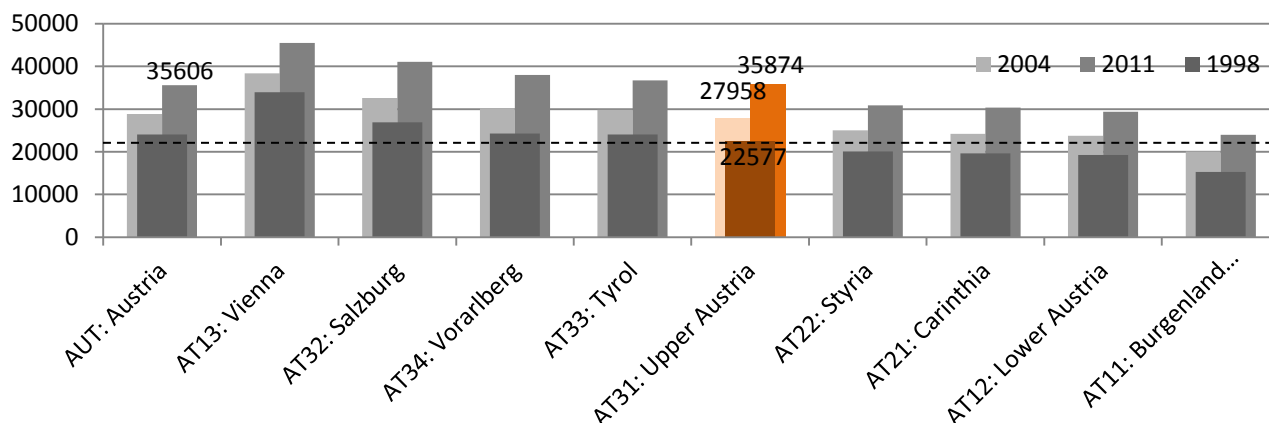
In this part of the chapter we analyze the way selected factors in the theoretical framework influenced economic development in Upper Austria over the last 20 years. Moreover based on the identified periods of the cluster policy we will try to make connections between the economic development and the character of the implemented cluster policy in the region. The main conclusion can be found in the summary part. Note: In the further analysis available statistic data does not always cover the each evolution period of cluster policy completely. As a consequence observation periods were adapted to available data.

3.1. Economic development and growth

In the strategic program "Innovative Upper Austria 2020" Upper Austria indicated the will to strengthen its technological and economic development in order to pass from a region labelled "Smart Follower" to "Front-runner" (TMG 2013, p. 11). Indeed in Upper Austria GDP per capita is on average 32% higher than EU 28 (Graph 80).

At the same time although cluster policy in Upper Austria claims to be a best practice, in 2013 its nominal GDP (Table 32) was one of the highest in Austria and overrun only by the Vienna area (in 1998 the trend for Upper Austria was similar). Although in terms of GDP per capita this federal province was only the 5th with EUR 38,500. Upper Austria took the same position (based on GDP per capita) in 2011 and back in 1998 as well (Graph 52).

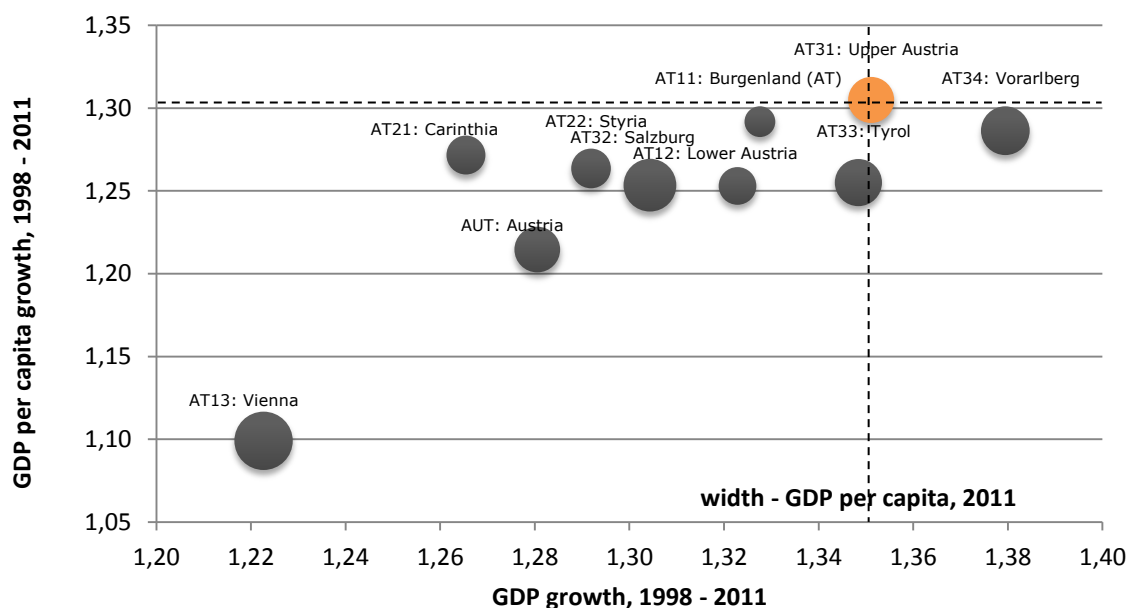
Graph 52 GDP per capita, in EUR, current prices, Austria and Austrian federal provinces, 1998, 2004, 2011



Source: Author's development based on OECD, 2014

We can also see that this stable average positioning of Upper Austria in comparison to other Austrian regions has been maintained since the start of the cluster policy in 1998. At the same time until 2007 based on the GDP per capita Upper Austria was always lower than Austrian, since 2008 it tends to have the same or above Austrian rates (Graph 52 or Graph 80). In reference to Graph 53 it appears that the increase of GDP per capita from 1998 to 2011 in Upper Austria was the highest among all the other Austrian regions. A similar situation can be observed with regard to the GDP growth (here Upper Austria is overrun only by one federal province, Vorarlberg).

Graph 53 GDP and GDP per capita growth (based on EUR, constant, year 2005), Austria and Austrian federal provinces, 1998 - 2011



Source: Author's development based on OECD, 2014

While observing annual GDP growth rates we can note that since 1997, besides the periods which were effected by crises (stagnation 2000-2002 due to the 1990s boom, Asian crisis, introduction of euro and financial crisis of 2008), Upper Austria has experienced constantly increasing GDP growth rates (Graph 54). Moreover since 1998, when the growth in Upper Austria was finally the same as the national one, rest of the time the region experienced higher than the national GDP growth rates. Especially from 1999 to 2000 the growth was noticeably higher than the Austrian national. After a short period of stagnation (2001-2002) Upper Austria again reached very close to the national GDP growth rate. This constantly but slightly increasing rate was maintained until the beginning of the latest financial crisis. At the same time after 2008 Upper Austria has managed to recover faster than Austria total, 4.19% to 2.83% respectively.

During the observation period from 1996 to 2001 the highest GDP growth was observed in 2000 (5.96%) and the lowest – in 2009 with -4.62%. The highest and lowest growth rates in Upper Austria are also higher and lower than of Austria during the observed period of time. Overall the average growth rate for the period (1998 to 2011/ from the start of the cluster policy implementation up to the latest available data) in Upper Austria was slightly higher than Austria as a whole, 2.21% to 2.11%. Moreover, in the second period of the cluster policy in Upper Austria the average GDP growth rates were also higher than the national (Graph 54).

Graph 54 Annual GDP growth rates, Austria and Upper Austria, 1996 – 2011



Average	1998-2011	I	II
AUT	2.11	2.40	1.82
AT31	2.21	2.87	2.11

Note: separation line marks periods of the cluster policy in Upper Austria (Table 36 Identified periods of the cluster policy evolution in Upper Austria) the first period of the cluster policy starts from the year of the first policy related implementation measures

Source: Author’s development based on OECD, 2014

Similar to the previous case study, here we also look at other indicators than only GDP and GDP per capita to observe the economic development.

The study of the recently developed Competitiveness index for NUT regions shows that Upper Austria with an RCI index (Annoni, Dijkstra 2013) score of 0.159 is placed in the middle green group (0 – 0,2) of regions with higher than EU average competitiveness. At the same time, Upper Austria is not the only region in Austria that falls into this group. All other federal Austrian states are also placed in this group. This is an additional example that within Austria the studied region is performing very similar to the others federal provinces.

In order to get a deeper view on the index, we also study the sub-indices of the competitiveness RCI index (ibid.). Upper Austria took 118th (out of 262) place with 0,085 points in the **basic**¹³² sub-index category. The other Austrian regions also belong to this group. The **efficiency**¹³³ sub-index divides the Austrian regions into two parts, whereas Upper Austria with 0,303 points is in the group as Lower Austria and Vienna in the better positioned group. This is the group, in which many of the German, French and Scandinavian regions are also represented. Another sub-index labelled as **innovation**¹³⁴ shows an average position of Upper Austria within its own state and in respect to the EU as well. Here the region is only on the 126 place with -0,031 points.

Summing up, we can see that in overall terms Upper Austria is well developed in social, market and innovation terms. Considering the intensive technology oriented cluster policy, Upper Austria is still not the leading region in Austria in terms of GDP per capita. Moreover with an average good and stable performance the region is often placed above average in comparison to European level. At the same time it is also noted that the GDP growth from 1998 to 2011 was the highest in comparison to other Austrian federal provinces and moved Upper Austrian from below to above Austrian performance. Overall we think that the reason that performance was not particularly outstanding compared to other Austrian region could be the result of either a very the balanced/ harmonized national regional policy or a simultaneous implementation of cluster policies in other Austrian federal provinces as well. Finally, the drawing of the concrete conclusions regarding the cluster policy implications for the regional development are hampered by 1) short period of data observation and 2) at least two stagnation periods caused by various regional/ global crisis. Nevertheless, despite this, especially high growth rates in the first period of cluster policy evolution in Upper Austria hint at positive results related to the cluster policy implementation on the regional

¹³² Based on RCI 2013 index the basic groups is composed of indicators referring to: basic education, health, infrastructure, macroeconomic stability, institutions

¹³³ Based on RCI 2013 index the efficiency groups is composed of indicators referring to: market size, labour market efficiency, high education, training & lifelong learning

¹³⁴ Based on RCI 2013 index the innovation groups is composed of indicators referring to: innovation, business sophistication, technological readiness

development. Further justification of cluster policy related positive impacts can be reflected in the 1) steadily rising GDP growth rate in the period from 2003 to 2007 and 2) faster than national recovery from the crisis 2008.

3.2. Factors of influence

In the theoretical framework we established several factors influencing the economic development. In this part these factors on an individual basis will be studied during identified periods of the cluster policy evolution. We will then observe their relation with the economic growth and finally attempt to establish a link between the periods of cluster policy and their performance.

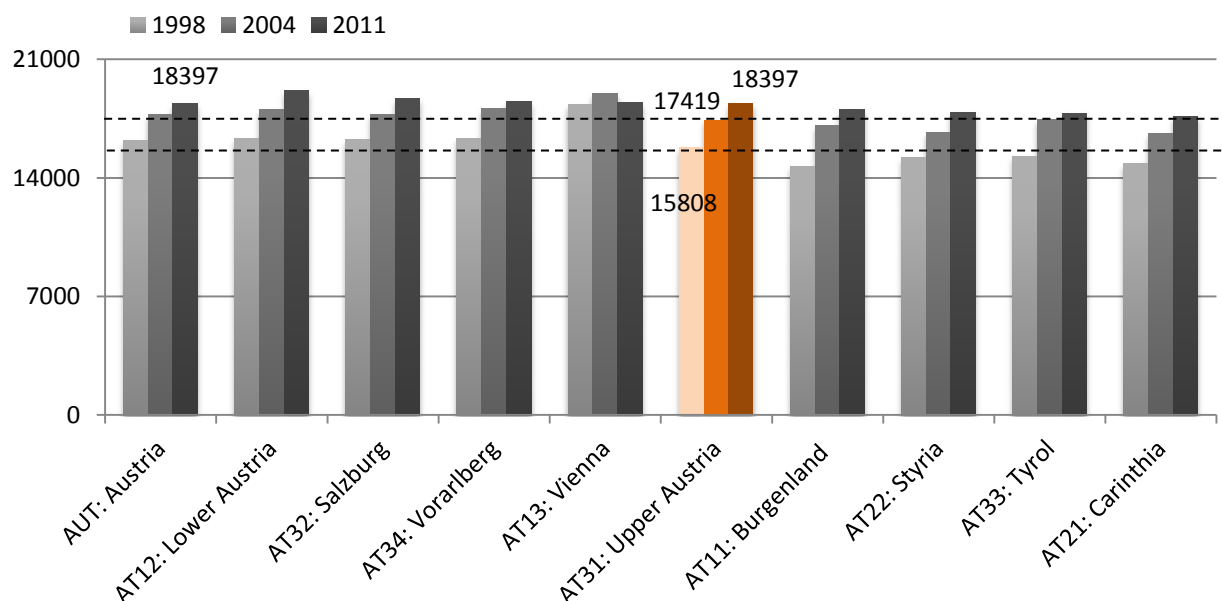
3.2.1 Factor capital and industrial focus

As mentioned in the theoretical framework, capital is considered to be one of the significant factors influencing economic growth. While analyzing it we will mainly refer to three indicators: Disposable household income (amount of money, which is in the position by households after payment of an income tax), Gross Fixed Capital Formation (GFCF, equivalent of spending on capital stock, such as equipment, machinery or land improvements, reflecting net increase in fixed capita) and Gross Value Added (GVA, measures the net value of goods and services in different sectors, or on other words GDP extracting taxes and subsidiaries). Definitions are proposed by the World Bank (2014).

Based on disposable household income the well-being of the population in Upper Austria is also average in comparison to other Austrian regions (Graph 55). Overall, Upper Austria shows similar to the Austrian trend, which has also been maintained since 1998. At the same time in Upper Austria the income growth per head, 23%, from 1998 to 2011 was the highest among all other regions. 20% growth was noticed in Voralbeg. This tendency for Upper Austria is very similar to the evolution of the GDP growth (Graph 53). The period based observation of the income growth shows a higher increase in disposable household income from 1998 to 2003 than from 2004 to 2011, 10% to 6% respectively.

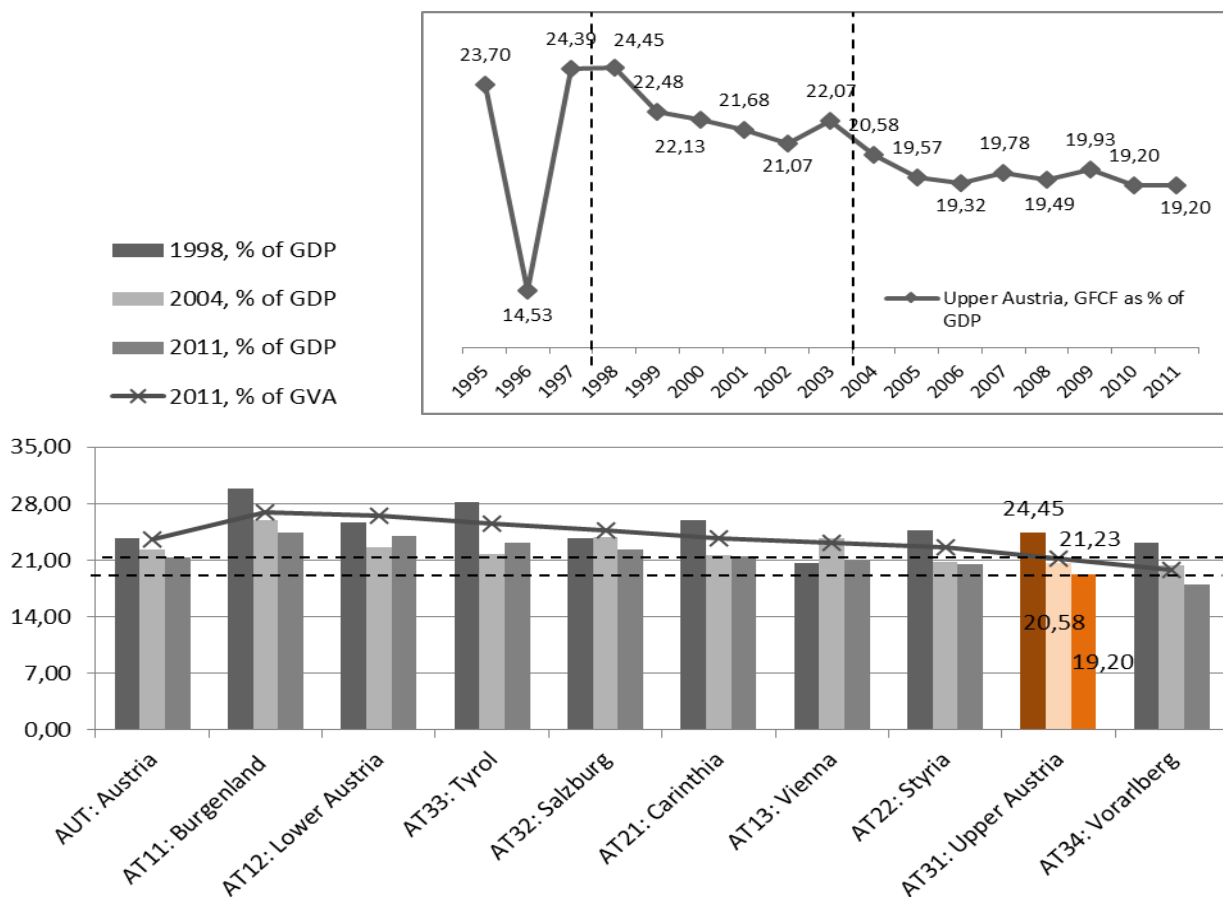
In terms of Gross Fixed Capital Formation as a percentage of GDP Upper Austria along with another Austrian region, Voralberg, in 2011 had one of the lowest rates – 19.20% (Graph 56). At the same time Upper Austria did not always have the lowest GFCF rate among Austrian regions, but since 1998 (24.45%) it has been gradually reducing. Such low rates are characteristic for industrial countries, especially the ones indicating stable medium GDP growth rates. A similar trend is also reflected in terms of GFCF as a percentage of Gross Value Added. In 2011 it was second lowest – 21.23%.

Graph 55 Disposable household income, per head, constant prices EUR, Austria and Austrian federal provinces, 1998, 2004, 2011



Source: Author's development based on OECD, 2014

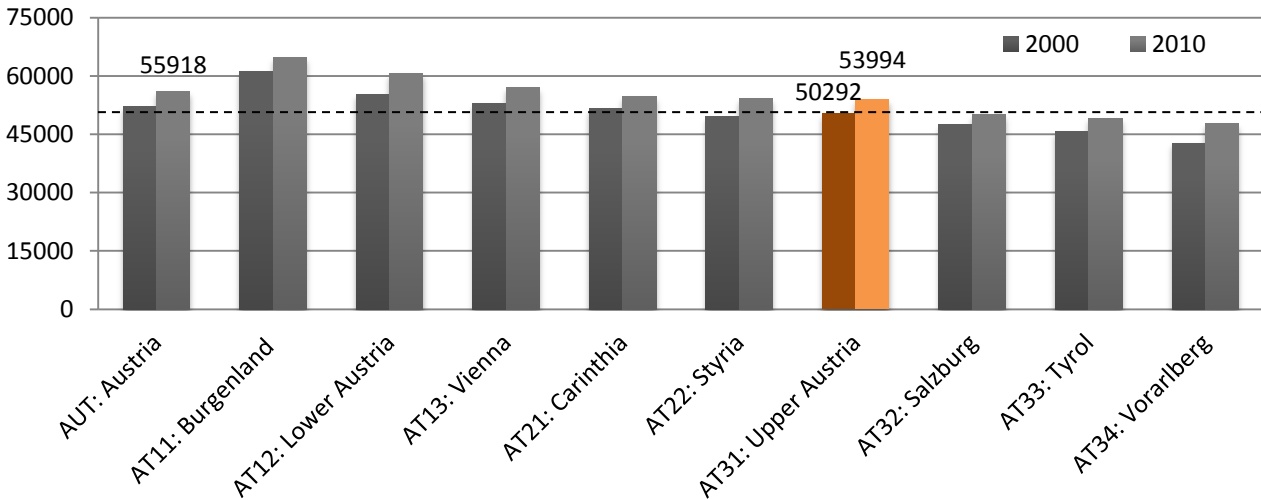
Graph 56 GFCF as a % of GDP current EUR, 1998, 2004, 2011 and as a % of GVA 2011, Austria and Austrian federal provinces



Source: Author's development based on Eurostat & OECD, 2014

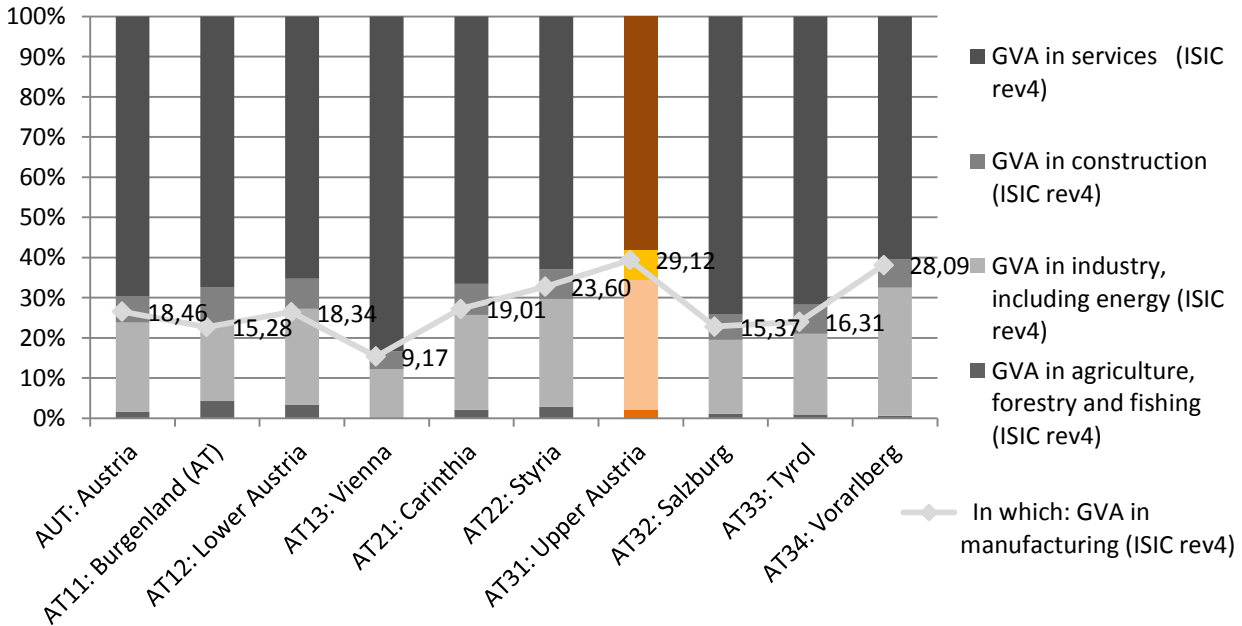
Referring to Gross Value Added as a measurement of purchased goods and services with extraction of taxes and subsidiaries Upper Austria is performing worse than the Austrian total (Graph 57). This situation has been the same since 2000. Moreover the total increase from 2000 to 2010 is also in only around 7%. For example Vorarlberg and Lower Austria increased its GVA per worker in 12% and 10% respectively. At the same time, this may be related to the higher population and labour growth in Upper Austria.

Graph 57 GVA of total activities, per worker in EUR, constant (year 2005), Austria and Austrian federal provinces



Source: Author’s development based on OECD, 2014

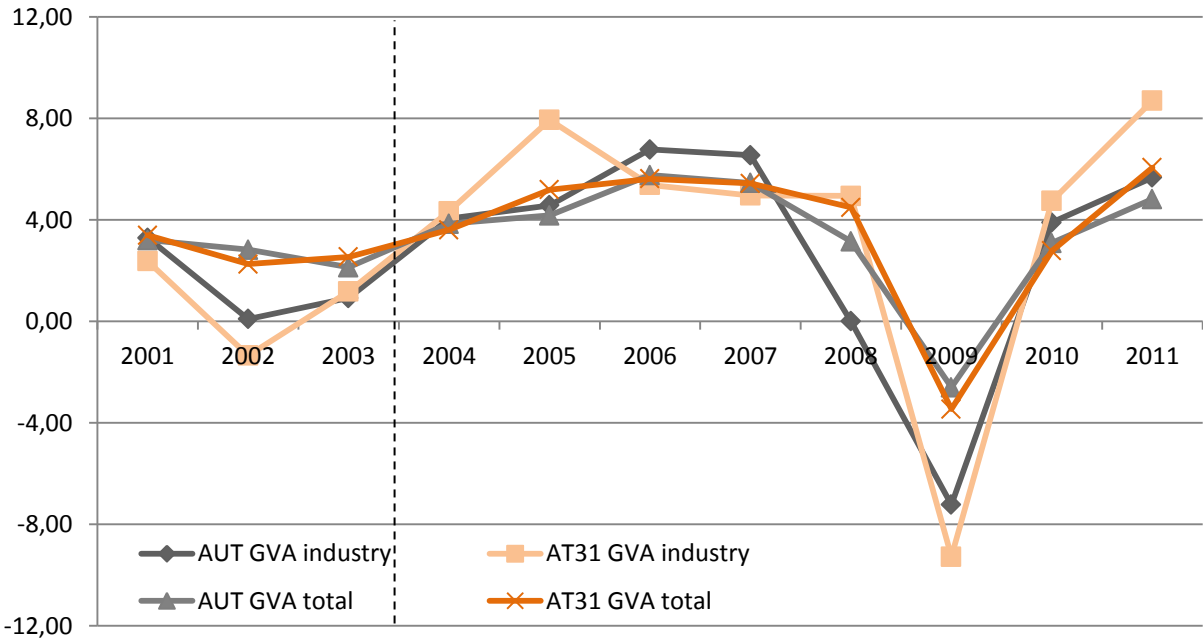
Graph 58 Sectoral GVA as % of total GVA, Austria and Austrian federal provinces, 2011



Source: Author’s development based on OECD, 2014

From the review of the GVA composition (Graph 58) for 2011 we can clearly see that Upper Austria is the most industrially strong region in Austria. Its GVA in industry makes around 32.5% of total GVA, which is almost twice as high as the Austrian national. The only other region with similar industrial share as Upper Austria is Voralberg – 31.9%. The strong industrial structure of Upper Austria is seen by Stahlercker (2012, p. i) as “medium-technology oriented” but “highly innovative”. Moreover this high industrial share has stayed at almost the same level since 2000 (Graph 84). Overall in the recent history Upper Austria has always been considered the most industrial region in Austria (Part Historic overview of public policy interventions of Chapter 7). Finally with 30% in manufacturing (% of GVA in industry) the region is also placed at the top.

Graph 59 Growth rates of GVA total and industry, Austria and Upper Austria, 2001-2010



Source: Author’s development based on OECD, 2014

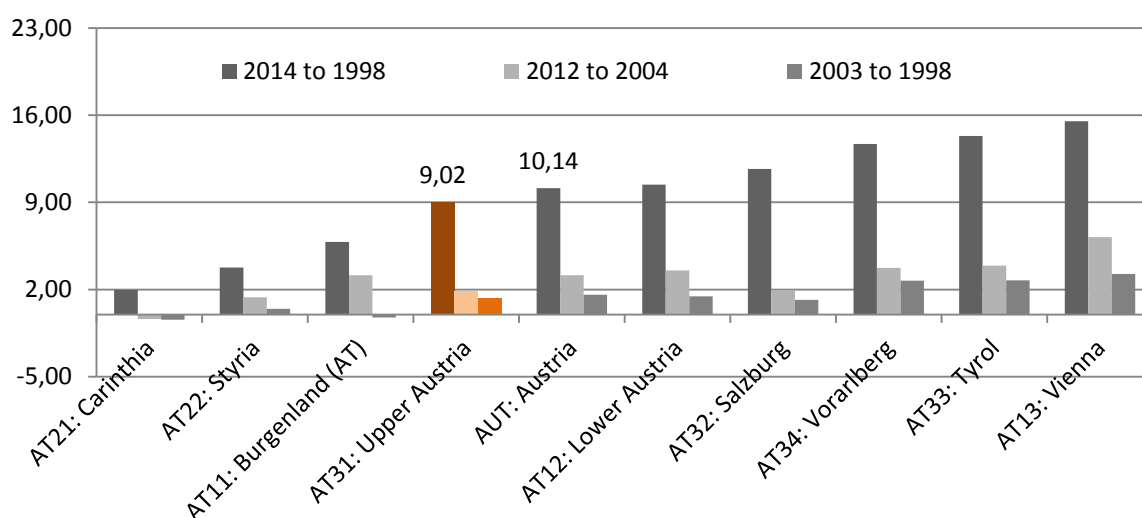
Taking into account that first of all, we don’t have long term data for the growth rates of GVA total and GVA in industry and secondly, these data fall into the period of stagnation and the financial crisis of 2008 we can’t make any significant conclusion related to the periods of cluster policy evolution and GVA growth. Nevertheless, we still want to highlight that since 2002 Upper Austria has experience high growth rates of GVA in industry, which were significantly higher than the total in the same period of time (Graph 59). Moreover, despite a sharper decline immediately after the crisis the post-crisis period is marked by higher rates than Austrian.

3.2.2 Human and labour capital

The population of Upper Austria is slightly above 1.4 million inhabitants (QI 2014) and makes about 16.8% of Austrian total (around 8.5 million). Although in the last years the population of Upper Austria has increased, its total share of Austria's population has decreased by about 1%.

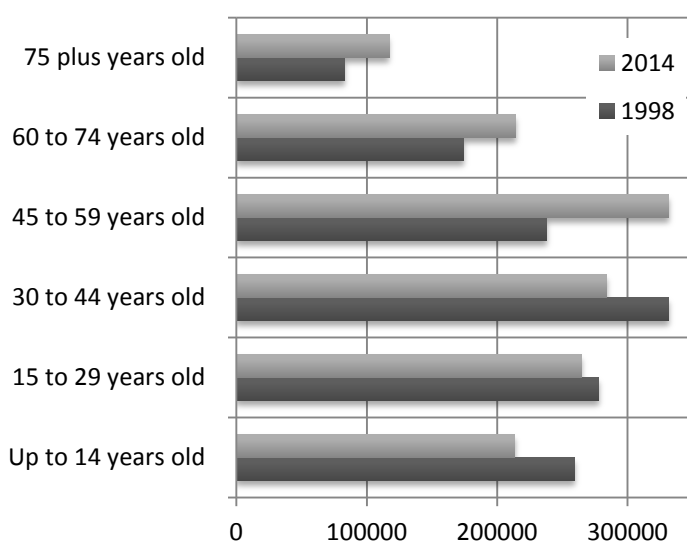
Overall Upper Austria had one of the lowest population growth rates, 9% from 1998 to 2014 (Graph 60). This is lower than the Austrian national (10.14%) and some of its neighboring regions, such as Lower Austria (10.43%) or Salzburg (11.69%). From the period based observation of population growth, we observed a slightly higher increase in the second period, from 2004 to 2012.

Graph 60 Period based increase of population, in percentage, Austria and Austrian federal provinces, 2014 to 1998, 2012 to 2004, 2003 to 1998



Source: Author's development based on (Statistic Office of the Republic of Austria 2014)

Graph 61 Population spread, Upper Austria, 1998, 2014



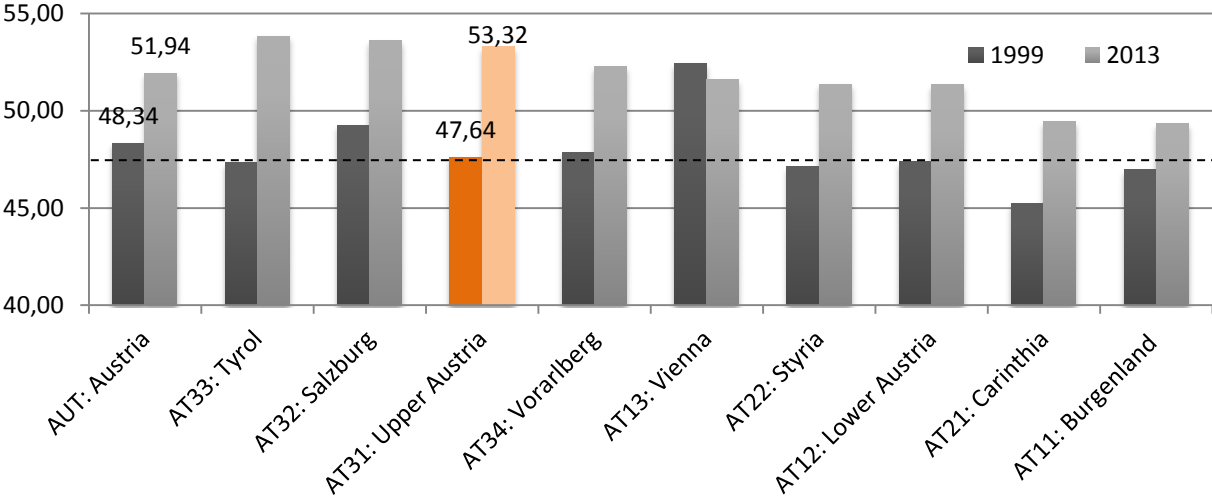
Source: Author's development based on Statistic Office of the Republic of Austria, 2014

The population pyramid in Upper Austria reflects the overall trend of demographic change and herewith disproportional balance between economically active and inactive population.

Overall in Upper Austria we note the very low growth of population as well as labour force (less than 0.5%), which is similar to other regions in Austria.

In 1993 along with Tyrol and Salzburg the share of labour force (increased in 6% since 1999) in Upper Austria in 2013 was one of the highest in comparison to other regions in Austria (Graph 62).

Graph 62 Labour force as a percentage of population, Austria and Austrian federal provinces, 1999 and 2013

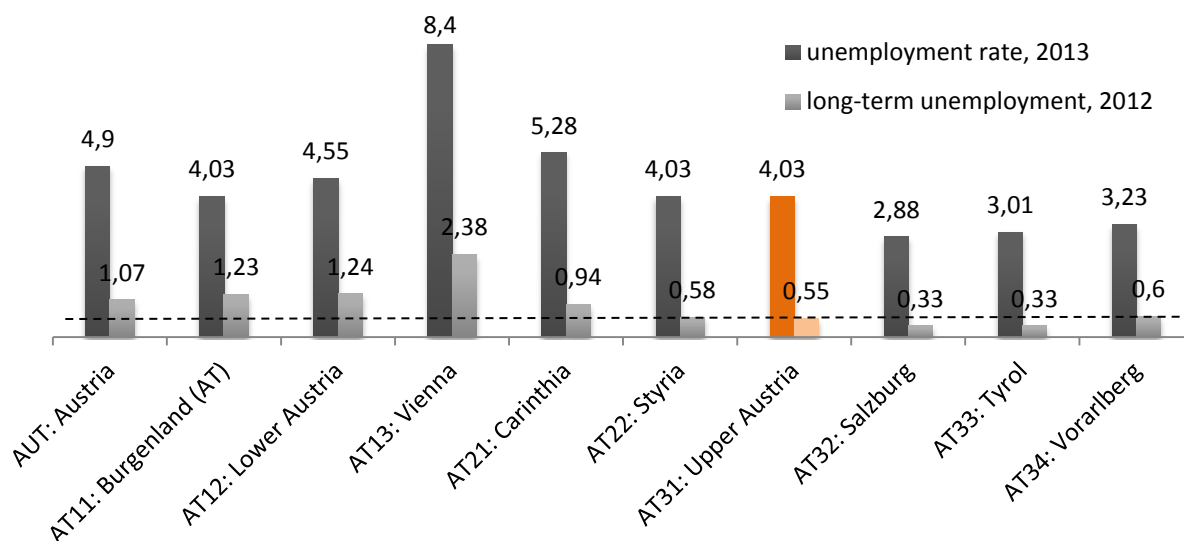


Source: Author’s development based on OECD, 2014

Upper Austria, as well as most of other federal provinces in Austria, has showed stable low unemployment rates (Graph 63). Even after the latest financial crisis the unemployment in Upper Austria was lower than the Austrian (4.03% in 2013) and other European countries, such as Germany (5.4%) and the Netherlands (6.2%). The region also has had low long-term unemployment. These constant low rates (around 4.5%) (Graph 64), indicate an active labour market and policy, which has been maintained over the last years. At the same time in reference to Interview 2D the positive labour market development is also due to the historically strong labour unions, especially in the industrial sector.

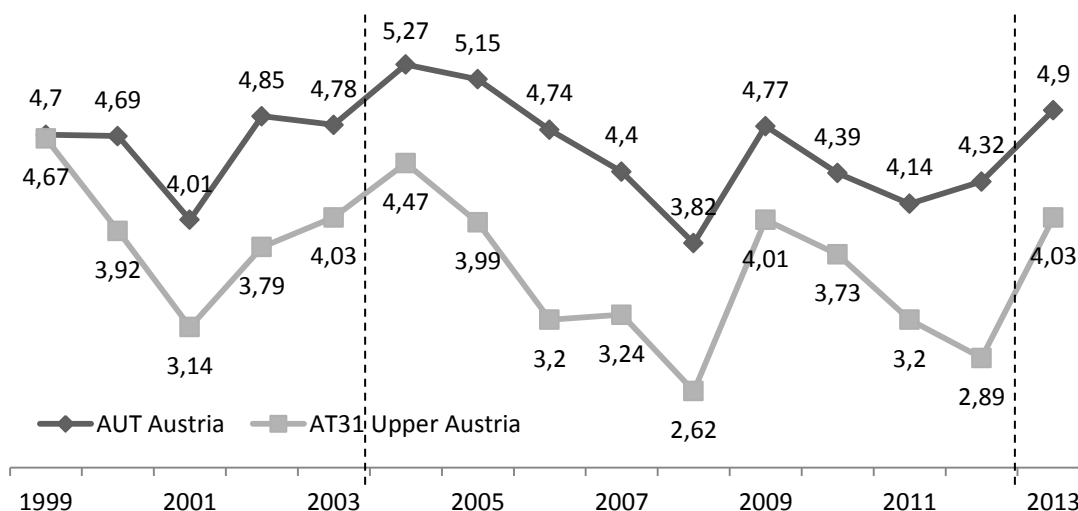
From the observation of the unemployment rate based on the periods of the cluster policy we can see that after a slight increase from 2001 to 2004, which was associated with the stagnation in most of the European countries, and until 2008 the unemployment rates were constantly going down (Graph 64). A similar reduction in unemployment rate was also noticed from 1998 to 2001. Finally since 1999 the unemployment rates in Upper Austria were always lower than the Austrian average.

Graph 63 Unemployment and long term unemployment rate (%), Austria and Austrian federal provinces, 2013



Source: Author's development based on OECD, 2014

Graph 64 Evolution of unemployment rates (%), Austria and Upper Austria, 1999 – 2013

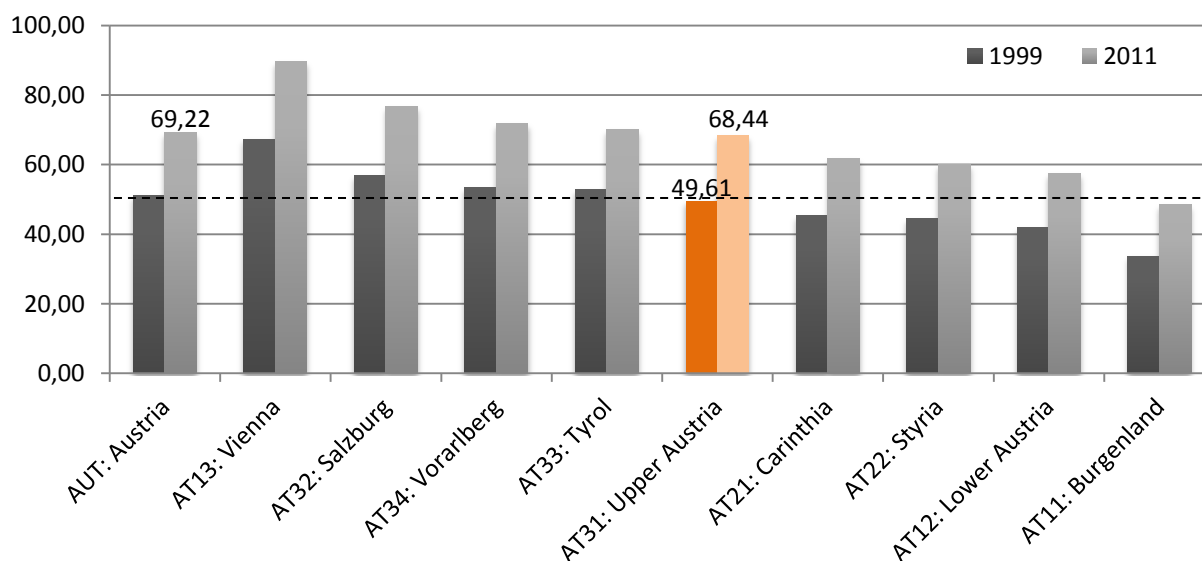


Source: Author's development based on OECD, 2014

The productivity level in Upper Austria is average in comparison to other Austrian regions (Graph 65). The total increase from 1999 to 2011 is around 35% (Graph 66), which is slightly higher than intotal for Austria.

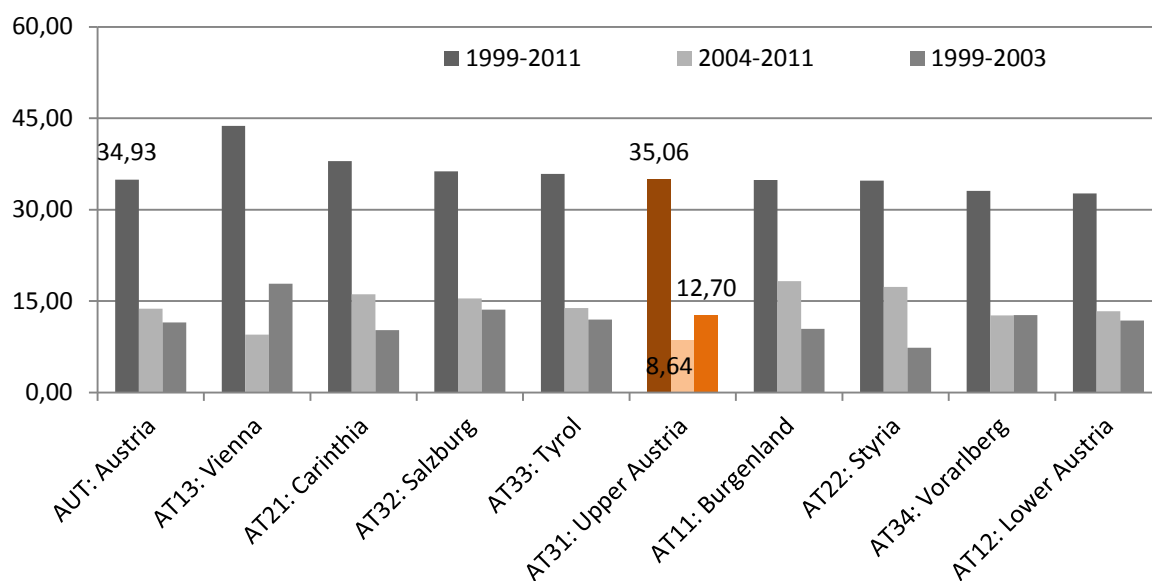
Based on the periods of the cluster policy evolution, it seems that the higher productivity growth was in the first period, from 1999 to 2003 (12.7%) rather than in the second (8.64%)(Graph 66).

Graph 65 Labour productivity (GDP/ labour, thsd. EUR current) Austria and Austrian federal provinces, 1999 and 2011



Source: Author's development based on OECD, 2014

Graph 66 Change in labour productivity in percentage, Austria and Austrian federal provinces, 1999-2011, 1999-2003, 2004 – 2011



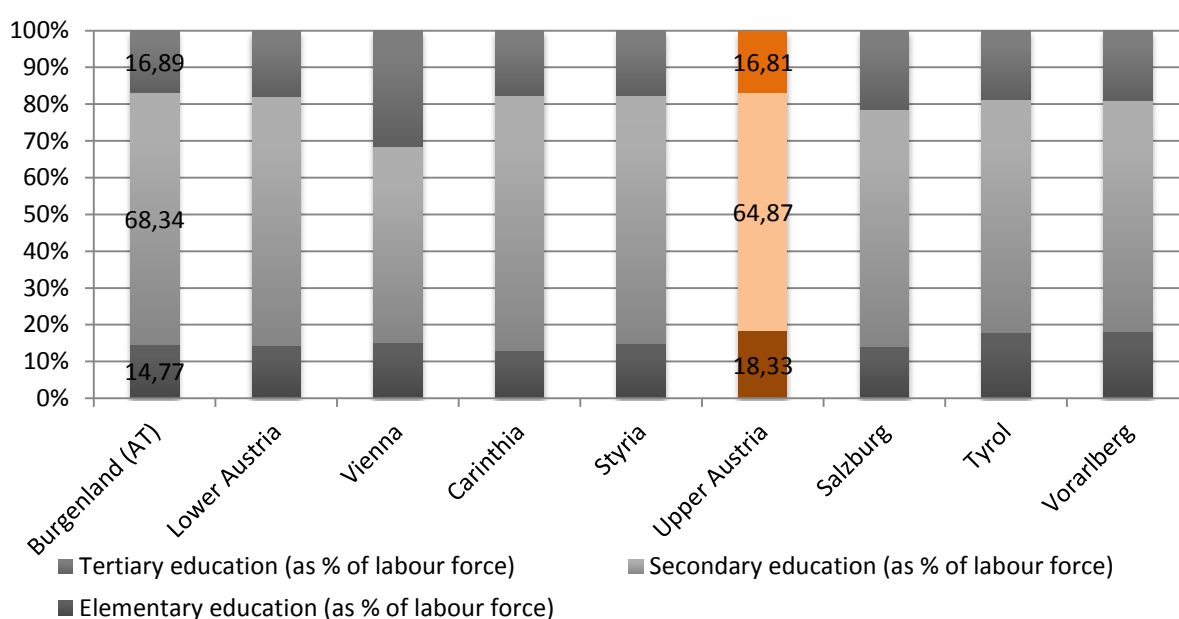
Source: Author's development based on OECD, 2014

In reference to the sub-indicator “Labour market efficiency” of the RCI Index 2013 (Annoni, Dijksra 2013) Upper Austria was 31st among 262 countries with 0.93 points, which places the region in the group of regions with the highest performance.

3.2.3 Education, technology and innovation

The education system in Austria is more oriented towards professional business and technical medium-level qualification (Interview 2N). This however, resulted in Upper Austria having the lowest level (16.81%) of labour with a tertiary degree and the highest (18.33%) with elementary education (Graph 67) in comparison to other Austrian regions in 2013. This low percentage of labour force with tertiary education is also lower than EU 28 average. This indicates a clear lack of employees with higher secondary education and may result in low positioning of Upper Austria in the sub-indicator “Higher Education & Lifelong learning” of the RCI Index 2013 (Annoni, Dijkstra 2013), where the region took only 127th place out of 258 with 0.03 points.

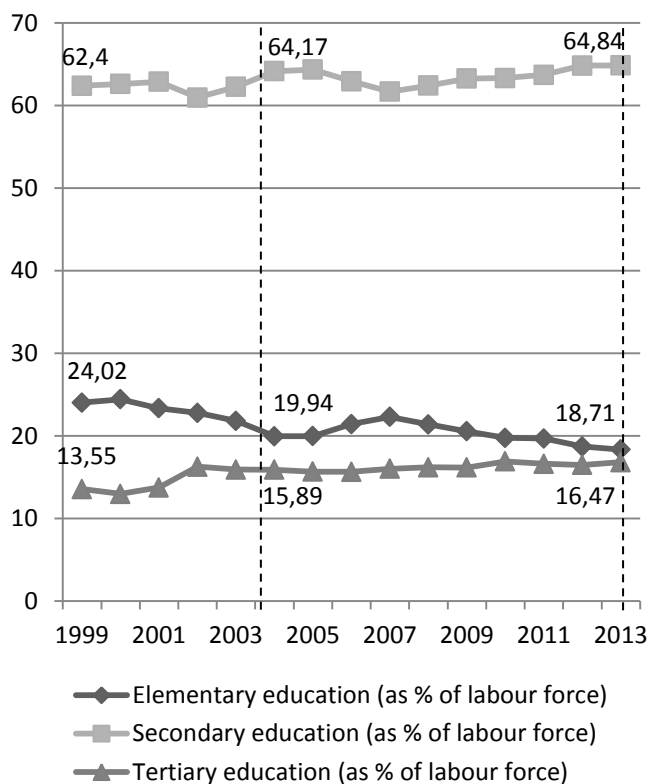
Graph 67 Education level as a share of labour force, Austria and Austrian federal provinces, 2013



Source: Author’s development based on OECD, 2014

At the same time although the low rates of unemployment in combination with a high rate of labour force with only secondary education underlines the results of a successful job-creating labour market policy, in the long term it may hamper the innovativeness of Upper Austria. This is also recognized as a weakness by several regional experts (Interview 2N, 2F). Certainly although high rates of employment with middle level skilled labour ensures lower production costs, an increase of employees with tertiary level (university and university of applied sciences) is needed in order to make the region a “Front-runner” in innovation and technological progress. This is particularly the objective of the latest strategic program 2020. The increase of employees with tertiary education with technical specialization will provide a basis for developing and producing products of-high value. Although the increase of labour force with tertiary and secondary degree has gradually increased since 1999 (Graph 68), we still see the need to further address this issue.

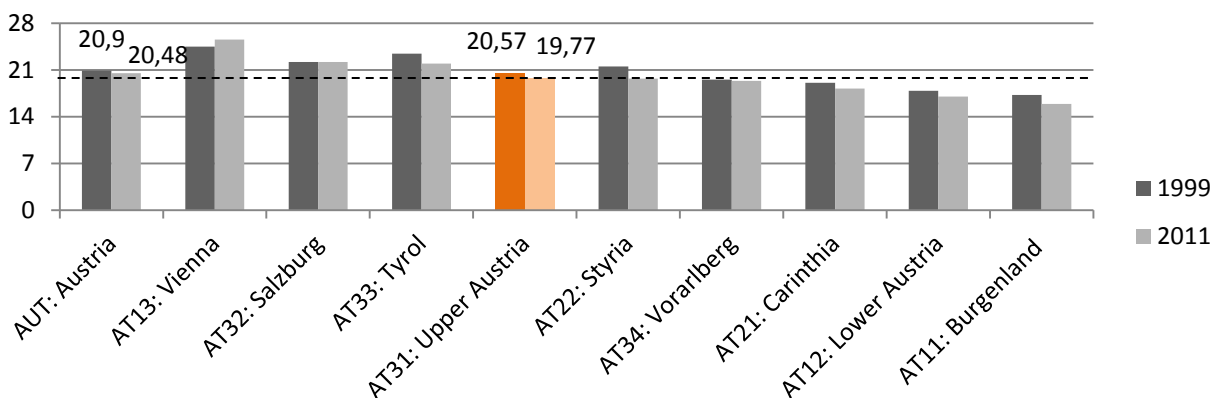
Graph 68 Evolution of education as a % of labour force, Upper Austria, 1999-2013



In terms of enrollment as a share of population Upper Austria has a similar trend to the Austrian average (Graph 69). The enrollment rates have stayed quite stable since 1999 (in 2011 it was around 1% less than to year 1999).

Source: Author's development based on OECD, 2014

Graph 69 Total enrollment as a % of population, Austria and Austrian federal provinces, 1999 and 2011

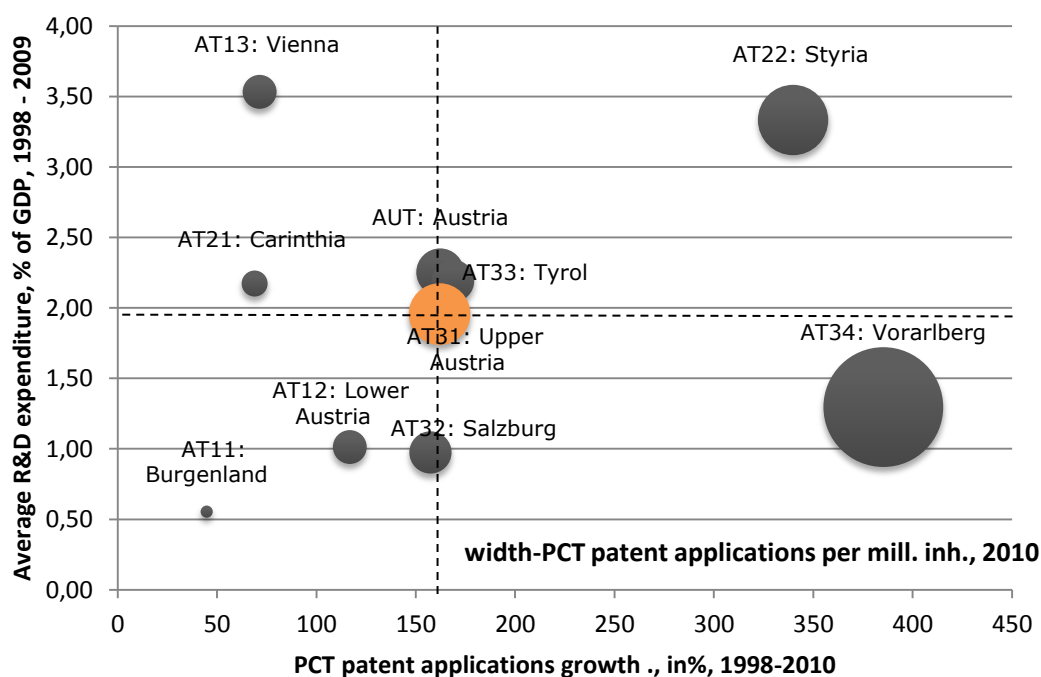


Source: Author's development based on OECD, 2014

Considering the evolution of patent applications in Upper Austria, which can serve as a measure of innovativeness and technological progress, we can observe that their growth was slightly higher than in most of the Austrian provinces (161.9%) (Graph 70). This indicator for Upper Austria is close to Austrian average and is surpassed only by Vorarlberg (385.2%) and Styria (339.8%). Based on the number of patent applications per million inhabitants (205.2) in 2010 Upper Austria was also among the same leading regions. Viewing the growth in number of patent applications based on the

periods of the cluster policy evolution, we have noticed a slightly higher increase in the first period, from 1998 to 2003 (68%) than in the second period, from 2004 to 2010 (51%) (own calculations based on OECD 2014). This is however a general trend for most of the regions in Austria. A drastic increase in number of patent application might also be related to the overall change in the patenting culture among the business sector, rather than with the direct innovation boost.

Graph 70 PTC patent application growth, %, 1998-2010 and average R&D expenditures (% of GDP), 1998-2009



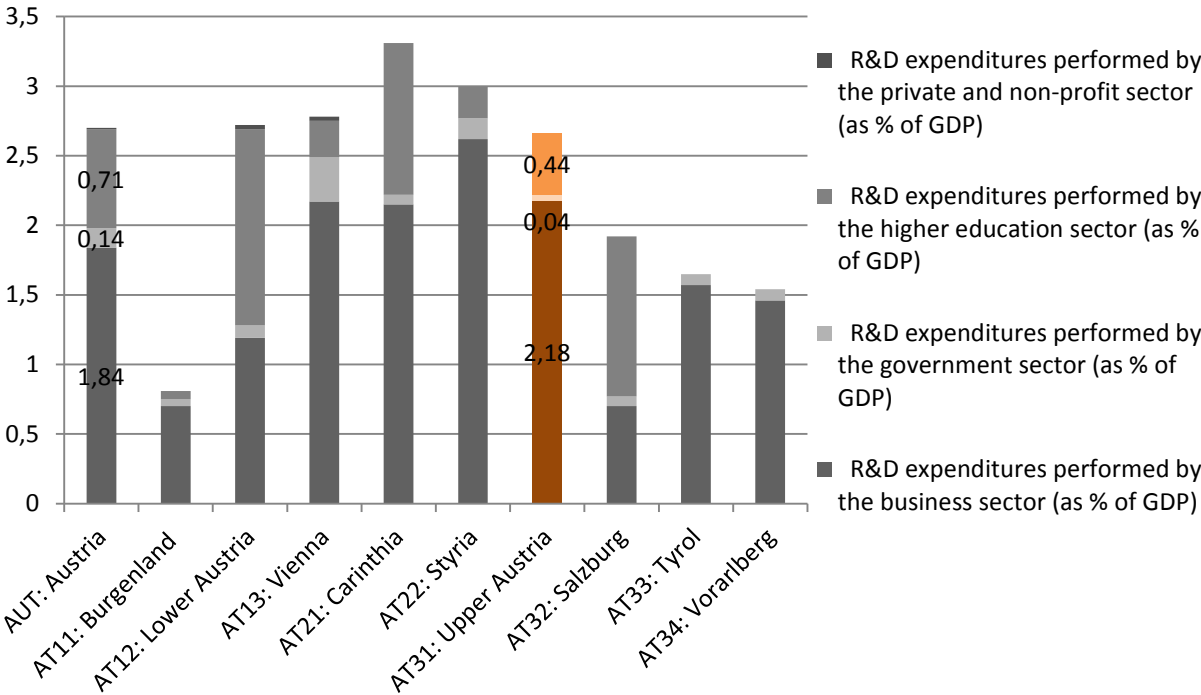
Source: Author's development based on OECD, 2014

Considering one of the highest increases in the number of patent application since 1998, the total R&D expenditures were on average one of the lowest in Upper Austria (1.96%)(Graph 70). In total, in 2009 Upper Austria with 2.45% of total R&D expenditures as a share of GDP was investing EUR 1134.14 million in research and development. Reviewing expenditures by each sector, in Upper Austria business sector (2.18%) had the highest share and had spent EUR 1008.6 million in 2009 and herewith was second highest after Carinthia. At the same time despite intensive public support of various collaborative and individual projects, which was indicated in the strategic projects, in Upper Austria the R&D expenditures by the government sector were one of the lowest in Austria, less than half percent of GDP (EUR 17.78 mill) in 2009. At the same time we assume that such low government expenditures are the result of a more market driven vision for economic development. A similar opinion is also expressed by Tödting and Kauffmann (2002), who think that Upper Austria has a more business-centered approach to research and innovation. This can be also seen from the cluster policy, which is very private/ business driven. Noticing these low rates, which have

maintained since 1998, we share the opinion of Stahlercker (2012) and think that this could be a potential area for policy actions in order to boost growth and innovation.

In contrast to stable low public expenditures, the business sector in Upper Austria has more than doubled its expenses since 1998. Herewith while in 1998 they were around 1.08% of GDP, in 2004 they were reaching already 1.62% and reached more than 2.18% in 2009. As such the first period of cluster policy is marked by a higher increase of R&D expenditures performed by business sector rather than the second period, from 2004 to 2009.

Graph 71 R&D expenditures by sector as % of GDP, Austria and Austrian federal provinces, 2009



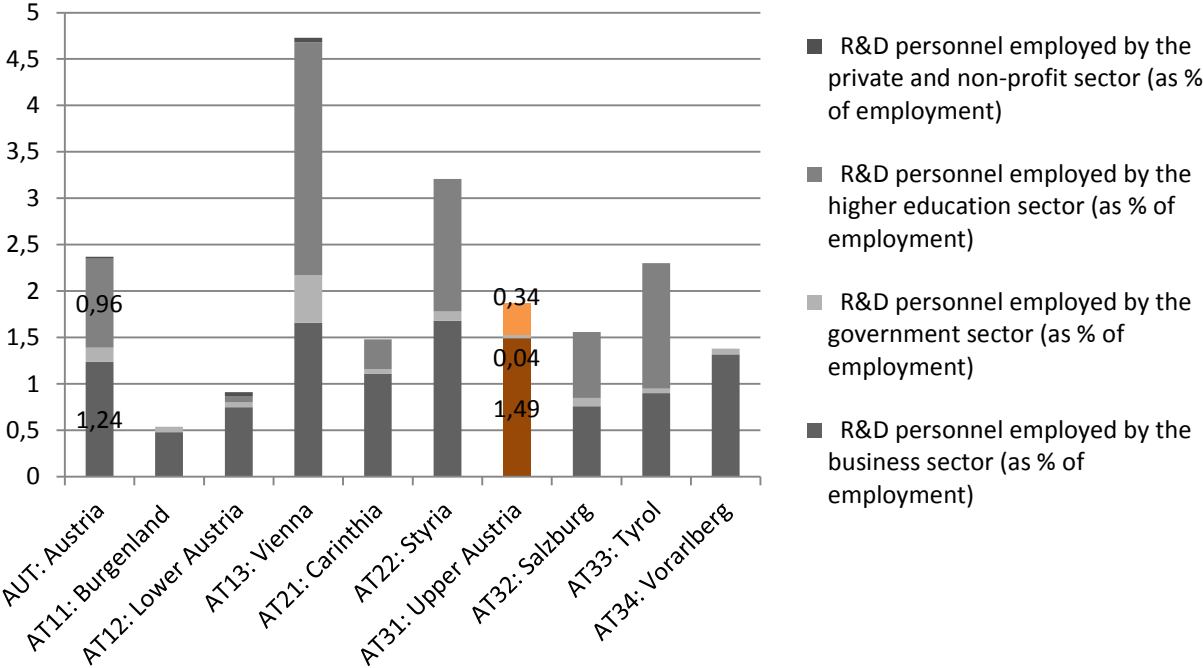
Note: R&D gov. expend. year 2004 in Burgenland, Carinthia, Tyrol, Vorarlberg

Source: Author’s development based on OECD, 2014

In 2009 around 13 231 employees (1.87% of labour force) were working in research and development in Upper Austria. Among Austrian regions it is slightly below the average rate. The share of R&D personnel has increased since 2002 by half a percent, which makes Upper Austria very similar to Lower Austria that has the highest increase among other Austrian regions. While Stahlercker (2012) claims that there should be a better labour division within the knowledge infrastructure, we also noticed low level of experts in research and development employed in the higher education sector (0.34%) and government (0.04%). Both indicators are way below the Austrian national. At the same time we note an above average employment of R&D personnel in the business sector (1.49%, 10 549)(Graph 72). Indeed only Vienna (1.66%) and Styria (1.68%) had a higher share of employees in research and development in 2009. Since 2002 an increase of

personnel in the business sector of almost half a percent is seen, whereas in higher education sector only in 10%.

Graph 72 R&D personnel as % of employment, Austria and Austrian federal provinces, 2009



Note: R&D government expenditures for Burgenland, Carinthia, Vorarlberg, Tyrol based on year 2004

Source: Author’s development based on OECD, 2014

The strong industrial history and the current status of Upper Austria supported by industrial and cluster oriented technological policies, has ensured the region’s top positioning in 2008 in term of share of high and medium high-technology manufacturing in manufacturing (37.11%) (Graph 89). The traditional “mature” sectors in reference to Stahlercker (2012) are very important as they push the development of new technologies in Upper Austria. At the same time Upper Austria was still similar to the national level with regards to the knowledge intensive services as of total services (42.9%), which is 3% lower than the Austrian average and 10% below the Vienna area. Indeed, Upper Austria as Stahlercker (2012) thinks gave less importance to knowledge-intensive sectors than other regions in Austria, which led to even decrease of service share from 1998 to 2008 in around 1%. On the contrary, high and high-medium manufacturing during the same period has increased its share in manufacturing in 3% (own calculations based on OECD 2014). However, it is important to note that there was no stable rise or declining trends in any of these indicators.

To conclude we also want to make reference to several sub-indicators of the RCI Index 2013 (Annoni, Dijksra 2013), which are related to technological development and innovation. Based on all sub-indices, “Technology” (125th out of 259), “Technological readiness regional households” (115th out of 262) or “Innovation” (132nd out of 162) Upper Austria is placed in the middle group of

regions. Because of this, we concur with Stahlercker (2012) and think that indeed although in terms of EU average Upper Austria can be seen as having performed better, in comparison to Austria it is still not the “top performer” in technology and innovation related indicators.

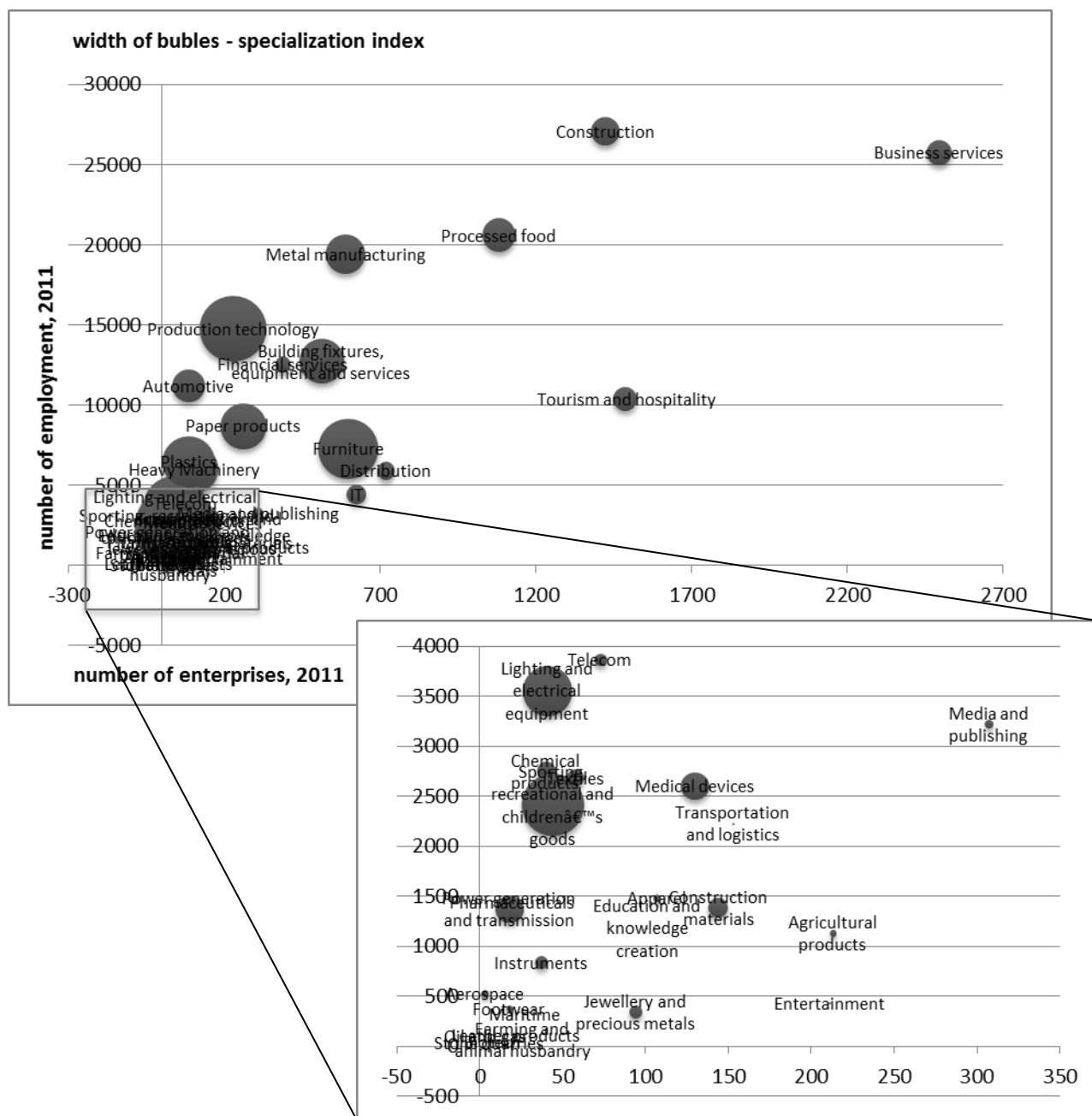
3.2.4 Clusters

Clusters, which have been established in Upper Austria, are the result of historical processes accompanied by interventions in the framework of the cluster policy. Faíña et al. (2010) also think that Upper Austria can be considered as a highly clustered region. Since 1998 9 cluster initiatives have been established to support clusters (Graph 79, Table 48). The maturity level of each cluster varies, that is why established cluster associations try to address the natural clusters in a very individual manner. The full list of the clusters can be found in Annex 8. Moreover, within the selected clusters government has assisted companies and technological research centers in funding their projects in collaboration. Herewith we assumed that if the cluster policy had been implemented effectively these established cluster associations should have led to the strengthening and further growth of these clusters. This is to be reviewed in this part.

There are different approaches to measure clusters. We will estimate the cluster progress mainly based on employment and establishment figures. Graph 73 shows the spread of clusters based on number of employees and the number of enterprises in the indicated sectors in 2011. The width of the bubble reflects the specialization (based on employment – for explanation see Note line under the Graph 73) of this cluster in European terms. As such the higher the specialization index is, the higher is the employment share of Upper Austria cluster in regard to the employment share of the same cluster on the EU level. The stronger the index is, the more important it might be for attracting other companies and influencing economic development in the region.

Based on our employment and enterprise data (Graph 73 as well as Table 39 and Table 40) we note the importance of the following clusters: **metal and manufacturing, processed food, production technology, building fixtures/ equipment & services, automotive, furniture, tourism and hospitality, IT, lighting & electrical equipment, plastic, media & publishing and agricultural products**. Almost all of these sectors are viewed as clusters by regional experts and cluster associations exist in these areas.

Graph 73 Clusters in Upper Austria based on number of employees and enterprises, 1997, 2011



Note: Specialization index: regional specialized in a specific cluster category; it compares the proportion of employment in a cluster category in a region over the total employment in the same region, to the proportion of total European employment (EU27) in that cluster category over total European employment

Source: Author's development based on European Cluster Observatory, 2014

Steel and metal sectors have composed a significant part of Upper Austria for many decades. As it was mentioned earlier around the 1980s the enterprises in this sector were mainly public and experienced crises, which led to their privatization. Since the 1990s, through diversification and opening new competitive strengths the regional government of Upper Austria has aimed to reduce regional dependence on this sector alone. At the same time the sector is still very important for regional competitiveness and has many connections with other sectors and clusters, such as

automotive or mechatronics. There is no public-private cluster association supporting this sector, as several leading companies representing this sector, e.g. Voestalpine - already fulfill similar tasks to the cluster initiative. Overall the cluster has shown constant positive growth over the last years.

Another important cluster is based on the **automotive** industry. This cluster is also very important for the regional as well as for the Austrian economy. The first cluster policy interventions took place towards the development of this sector, which resulted in the establishment of the first cluster initiative group launched in 1998. The focus of the cluster: vehicle manufacturers and automotive sub-suppliers, as well as relevant machine and plant constructors and service companies. Although the number of companies is not big (around 80 companies in 2011, Table 40), it offers employment to more than 11 thousand people. The leading companies of the cluster are Miba-Group, Banner Batteries, FACC, BMW Motor Production, Austria Metall AG, Voestalpine, BRP Rotax, Plasser und Theurer, and Engel Austria. Based on both the number of enterprises as well as number of employees, the cluster has experienced stable growth since 1998.

Clusters based on the **production technologies** sector employ around 15 thousand people. The cluster experienced constant growth since 1997. One of its sub-clusters – mechatronic has its own cluster association supervised by Clusterland Upper Austria and is focused on companies in the mechanical engineering and plant building sector, equipment and apparatus construction, special technology suppliers and services. Mechatronics plays a cross-sectional role for such disciplines like mechanics, electronics and informatics.

The IT cluster in Upper Austria is comprised of over 600 companies with a total of around 4.4 thousand employees. Since the 1990s the sector has experienced an immense growth especially due to the establishment of the Softwarepark Hagenberg (Part 2.2.10. Impulse centers in Chapter 7), which is in reference to Maier, Trippl (2011) is one of the largest high-tech parks in Austria. The evidence for this growth can be seen in a very high increase of cluster based employment (in 4.63 times from 1997 to 2011 and in 3.65 times from 1997 to 2005) and a similar increase in terms of the number of enterprises (in 5.24 times from 1997 to 2011 and in 4.18 times from 1997 to 2005). These are one of the highest growth rates among clusters in Upper Austria. Since 2013 within Clusterland Upper Austria a cluster initiative supporting ITC had been founded. The reason for the launch of the cluster association was the desire to further broader regional and inter-regional co-operation opportunities for the local sector representatives (Interview 2L, 2A).

In the **plastic** cluster since April 1999 the cluster associations has been established. It is now also under the co-ordination of Clusterland Upper Austria. It focuses on manufacturers and processors of plastics, machinery, modules and tools, as well as service suppliers. Since 2005 the geographical area of interest for cluster institutions also includes another Austrian administrative region, Lower

Austria. Based on the Table 39 and Table 40 the plastic cluster has constantly experienced an increase in the number of employees, while the number of enterprises has slightly reduced. Generally this cluster is similar to the automotive cluster and is predominantly represented by big companies rather than small ones.

Cluster association named as **Food Cluster** was established in September of 2002 and is targeted towards food production companies, their direct and indirect suppliers, R&D- and educational bodies. The coordination of the cluster is performed by the Upper Austrian Chamber of Commerce. The Cluster includes the following branches (Clement et al. 2009): Miller, Backer, Butcher, Confectioners, Food and beverage industry, Liquid production, Breweries, Trader, Feed producers and Dairies, Service providers in the food industry. Surprisingly, the two clusters which fall under the target of this cluster, processed food and agricultural products, have shown completely different results. The performance of the **agricultural** cluster has excellent results in comparison to other sectors in Upper Austria based on employment and enterprise data (employees: Table 39: 6.56 for 1997-2011, 8.36 for 2005-2011, and enterprises: Table 40: in 19.36 times 1997-2011 and 1 in 2.53 times 2005-2011). In contrast, the **processed food** sector has performed badly (employees: Table 39: in 0.96 times for 1997-2011, in 0.93 times for 1997-2005, and enterprises: Table 40: in 0.86 times 1997-2011 and in 0.92 times 2005-2011).

The Furniture industry based cluster is another important sector for the Upper Austrian economy. It has more than 7 thousand employees and almost 600 companies. The cluster association in this field was also established early, only 2 years after the launch of cluster policy. The cluster initiative targets manufacturers of furniture and wood construction, as well as their sub-suppliers and companies offering special services. Despite the established cluster association the sector has shown negative trends in almost all the observed periods (Table 39 and Table 40). At the same time the building fixture, equipment and services clusters has indicated improvement with a slightly positive trend during the observed periods.

Especially positive development trends have been observed in the **biotech** cluster – growth of 20 times (employees) and in 8 times (enterprises) from 1997 to 2011. We assume that this result is due to the combination of two factors – global growth of this sector and the support to the cluster provided in the framework of the Health Technologies cluster association. Furthermore, very positive trends can be associated in such sectors as **aerospace** with in 6.06 times employment and in 1.21 times enterprise increase and the oil and gas cluster – in 12.25 times (employees) from 1997 to 2011. Cluster in **education and knowledge creation** has also shown excellent growth results, both in terms of employment numbers as well as enterprises. This is a positive sign for pro-active actions related to the need to improve the academic and educational environment in Upper Austria.

Table 39 Number of employees per cluster, Upper Austria, 2011

Cluster/ Year	2011	2011/1997	2005/1997	2011/2005
Construction	27076	↑ 1,07	↓ 0,96	↑ 1,11
Business services	25762	★ 4,66	★ 3,80	↑ 1,22
Processed food	20588	↓ 0,96	↓ 0,93	↑ 1,03
Metal manufacturing	19432	↑ 1,06	↑ 1,11	↓ 0,96
Production technology	14752	↑ 1,53	↑ 1,34	↑ 1,15
Building fixtures, equipment and serv.	12703	↑ 1,03	↑ 1,03	↓ 1,00
Financial services	12532	↑ 1,63	↑ 1,50	↑ 1,08
Automotive	11193	↑ 1,20	↑ 1,24	↓ 0,97
Tourism and hospitality	10349	↑ 1,28	↑ 1,15	↑ 1,11
Paper products	8684	↑ 1,17	↑ 1,16	↑ 1,01
Furniture	7249	↓ 0,65	↓ 0,74	↓ 0,88
Plastics	6432	↑ 1,32	↑ 1,03	↑ 1,28
Heavy Machinery	5985	↑ 1,36	↑ 1,24	↑ 1,10
Distribution	5895	↓ 0,88	↑ 1,10	↓ 0,80
IT	4415	★ 4,63	★ 3,65	↑ 1,27
Telecom	3865	★ 2,86	★ 2,00	↑ 1,43
Lighting and electrical equipment	3553	★ 2,03	↑ 1,63	↑ 1,24
Media and publishing	3224	↑ 1,09	↑ 1,03	↑ 1,06
Chemical products	2752	↑ 1,22	↓ 0,87	↑ 1,39
Textiles	2688	↓ 0,53	↓ 0,82	↓ 0,64
Medical devices	2602	↑ 1,56	↑ 1,22	↑ 1,28
Sporting, recreational and children goods	2417	↓ 0,94	↑ 1,19	↓ 0,78
Transportation and logistics	2225	↑ 1,87	↑ 1,95	↓ 0,96
Apparel	1482	↓ 0,52	↓ 0,53	↓ 0,99
Pharmaceuticals	1440	↑ 1,77	↑ 1,62	↑ 1,10
Construction materials	1388	↑ 1,08	↓ 0,94	↑ 1,15
Power generation and transmission	1371	★ 2,12	↑ 1,60	↑ 1,33
Education and knowledge creation	1183	★ 25,72	★ 9,96	★ 2,58
Agricultural products	1129	★ 6,56	↓ 0,78	★ 8,36
Instruments	839	★ 2,01	↑ 1,95	↑ 1,03
Aerospace	527	★ 6,06	↓ 0,91	★ 6,67
Entertainment	431	★ 8,45	★ 2,02	★ 4,18
Footwear	372	↓ 0,26	↓ 0,32	↓ 0,80
Jewellery and precious metals	344	↓ 0,38	↓ 0,59	↓ 0,64
Maritime	325	↓ 0,36	↑ 1,19	↓ 0,31
Leather products	112	↓ 0,79	↓ 0,75	↑ 1,05
Oil and gas	98	★ 12,25	★ 13,88	↓ 0,88
Farming and animal husbandry	70	★ 11,67	★ 14,67	↓ 0,80
Biotech	40	★ 20,00	★ 38,00	↓ 0,53
Stone quarries	39	↓ 0,20	↓ 0,56	↓ 0,35
Tobacco	36	★ 3,00	★ 4,00	↓ 0,75

Note: star ≥ 2 , up green arrow <2 & ≥ 1 , down red arrow <1 , classification of cluster sectors is based on the methodology of European Cluster Observatory

Source: Authors' development based on European Cluster Observatory, 2014

Since 1997 until 2011 a negative trend was observed in **textile and textile related sectors** such as **footwear and leather products**. Overall most of the cluster-potential sectors in Upper Austria have experienced either slightly positive or stable growth trends.

Table 40 Number of enterprises per cluster, Upper Austria, 2011

Cluster/ Year	2011	2011/1997	2011-1997	2005/1997	2011/2005
Business services	2494	★ 3,92	1858	★ 3,79	↑ 1,04
Tourism and hospitality	1488	↓ 0,78	-414	↓ 0,80	↓ 0,97
Construction	1424	★ 2,13	756	↑ 1,62	↑ 1,32
Processed food	1081	↓ 0,86	-172	↓ 0,94	↓ 0,92
Distribution	719	↑ 1,53	250	↑ 1,51	↑ 1,02
IT	624	★ 5,24	505	★ 4,18	↑ 1,26
Furniture	597	↓ 0,91	-57	↑ 1,09	↓ 0,84
Metal manufacturing	588	↑ 1,43	178	↑ 1,56	↓ 0,92
Building fixtures, equipment & serv.	512	↑ 1,48	167	↑ 1,42	↑ 1,05
Financial services	389	↑ 1,49	128	↑ 1,18	↑ 1,26
Media and publishing	307	↑ 1,54	108	↑ 1,77	↓ 0,87
Paper products	260	↑ 1,09	21	↑ 1,21	↓ 0,90
Production technology	228	↑ 1,64	89	↑ 1,63	↑ 1,00
Agricultural products	213	★ 19,36	202	↑ 1,55	★ 12,53
Entertainment	211	↓ 0,84	-40	↓ 0,19	★ 4,40
Transportation and logistics	153	↓ 0,97	-4	↑ 1,10	↓ 0,89
Construction materials	144	↑ 1,33	36	↑ 1,31	↑ 1,01
Medical devices	130	↑ 1,57	47	↑ 1,52	↑ 1,03
Apparel	107	↓ 0,55	-88	↓ 0,69	↓ 0,80
Education and knowledge creation	101	★ 7,21	87	★ 4,71	↑ 1,53
Heavy Machinery	101	↓ 0,56	-79	↓ 0,96	↓ 0,58
Jewellery and precious metals	94	↑ 1,18	14	↑ 1,21	↓ 0,97
Automotive	85	↑ 1,21	15	↑ 1,19	↑ 1,02
Plastics	85	↓ 0,94	-5	↑ 1,06	↓ 0,89
Telecom	73	↑ 1,55	26	↑ 1,89	↓ 0,82
Textiles	58	↓ 0,70	-25	↓ 0,82	↓ 0,85
Sporting, recreational and child.goods	44	↑ 1,38	12	↑ 1,44	↓ 0,96
Lighting and electrical equipment	41	↑ 1,41	12	↑ 1,55	↓ 0,91
Chemical products	40	↑ 1,03	1	↑ 1,28	↓ 0,80
Instruments	37	↑ 1,16	5	↑ 1,44	↓ 0,80
Maritime	27	↓ 0,93	-2	↑ 1,07	↓ 0,87
Farming and animal husbandry	26	★ 13,00	24	★ 12,50	↑ 1,04
Leather products	22	↓ 0,71	-9	↓ 0,81	↓ 0,88
Pharmaceuticals	20	↓ 0,87	-3	↑ 1,04	↓ 0,83
Footwear	18	↓ 0,55	-15	↓ 0,64	↓ 0,86
Power generation and transmission	18	↑ 1,13	2	↑ 1,50	↓ 0,75
Biotech	8	★ 8,00	7	★ 7,00	↑ 1,14
Stone quarries	6	↓ 0,46	-7	↓ 0,85	↓ 0,55
Aerospace	3	↓ 0,75	-1	↑ 1,75	↓ 0,43
Oil and gas	3	↓ 0,75	-1	↓ 0,25	★ 3,00
Tobacco		↓ 0,00	-1	↑ 1,00	↓ 0,00

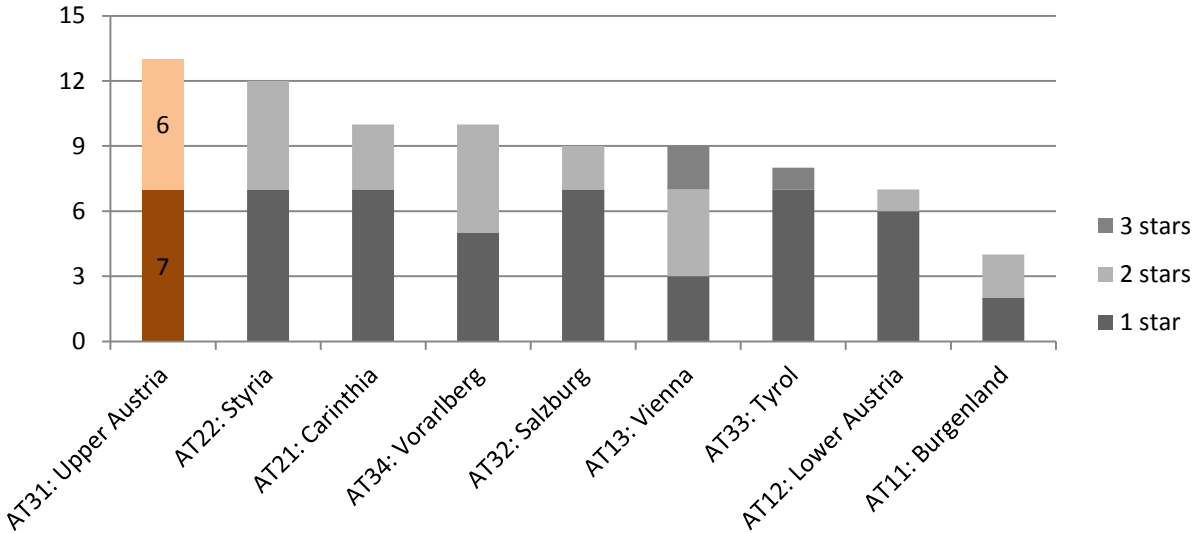
Note: star >= 2, up green arrow <2 & >=1, down red arrow <=1, classification of cluster sectors is based on the methodology of European Cluster Observatory

Source: Authors' development based on European Cluster Observatory, 2014

The review of the enterprise-based data for cluster development broadens our understanding of the character of the cluster. It is especially evident if the cluster has very high share of employment dispersed between only a few companies. In Upper Austria this is especially the case for automotive, heavy machinery or production technologies clusters. On the contrary, construction and tourism & hospitality clusters indicate high numbers of employment and enterprises.

The European Cluster Observatory has developed indicators which not only assist in mapping the clusters on regional level, but also in the estimation of their overall national as well as European relevance/ benchmarking. The initial typology system (for methodology Annex 6) evaluates existing regional clusters based on their size, specialization and focus. Based on this methodology Upper Austria has the biggest number of clusters (13), evaluated with at least 1 star (Graph 48 Graph 74). At the same time there is no cluster with 3star rating.

Graph 74 Number of star marked clusters, Austrian federal provinces, 2011



Source: Authors’ development based on European Cluster Observatory, 2014

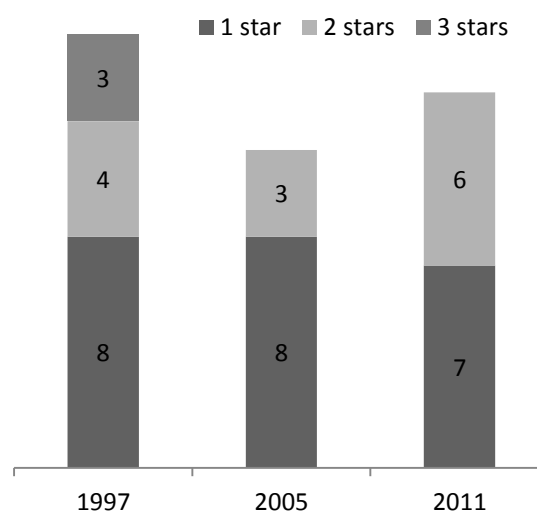
Table 41 indicates the clusters which have received stars. Based on this table we can say that most of the clusters which have been rated with a star are addressed by the Upper Austrian authorities within the cluster policy. At the same time there are no cluster associations, which directly or indirectly targeting such clusters as: Lighting & electrical equipment, Sporting, recreational & children’s goods, Business services, Financial services and Paper products. Moreover, such clusters as IT or automotive, which have been receiving support from the cluster policy, are not listed.

Surprisingly since 1997 the number of clusters with stars has even reduced. In reference to Graph 75, in 1997 in Upper Austria three clusters were marked with 3 stars and these were **Building fixtures, equipment & services, Furniture and Production technology**. All these three clusters have been downgraded to only 2 stars. As we don’t know exactly which star category is missing, based on the earlier tables (Table 39, Table 40) we can only assume that this is due to an overall decrease in the number of employees.

Table 41 List of star-marked clusters, Upper Austria, 2011

Cluster/ Stars
Metal manufacturing **
Production technology **
Building fixtures, equipment and services **
Furniture **
Lighting and electrical equipment **
Sporting, recreational and children's goods **
Business services *
Construction *
Financial services *
Heavy Machinery *
Paper products *
Plastics *
Processed food *

Graph 75 Evolution of number of star marked clusters, Upper Austria, 1997, 2005, 2011



Source: Authors' development based on European Cluster Observatory, 2014

Concluding, we should highlight that most of the clusters have shown **positive trends** in their development since 1997. These positive trends can be observed both in the traditional industries (**metal manufacturing, production technologies, heavy machinery, automotive**) as well as in the industries, which are new or developed on the inter-sector basis (**agricultural products, biotech, pharmaceuticals, lighting and electrical equipment**). Moreover in all of these clusters there exists a cluster association. The growth of alternatives to the traditional sectors is especially welcome as the reduced dependence from the steel and metallurgy sector was one of the main objectives of the cluster policy. At the same time, some of the sectors, which were receiving cluster-based support, such as **furniture and timber construction**, experienced a decline. This however, shouldn't jeopardize the performance of the whole cluster policy, but it may be the sign of ineffective interventions associated specifically within this sector. Finally, we have also observed **other sectors** (e.g. tourism & hospitality), which could be additionally addressed by cluster policy in Upper Austria. It doesn't mean that these clusters should be also institutionally supported, but addressing them would open additional diversification and specialization potentials for the regional economy.

3.3. Composite influence of factors on regional economic growth

Here we present the main outcomes, which can be extracted from the multi-linear regression model, which we used in order to observe the correlation between defined factors, which are reflected through selected variables, and economic growth, which is the response variable.

It is important to highlight that the presented results should be treated with caution as the number of observations is very low with respect to the number of the variables integrated into the model. At the same time we find the result useful and informative, especially for to complement the

descriptive analysis and to formulate conclusions in terms of regional economic performance. We also have tried grouping and observing different sets of variables and variable groups, thus all the tables which are presented below only include the most significant ones.

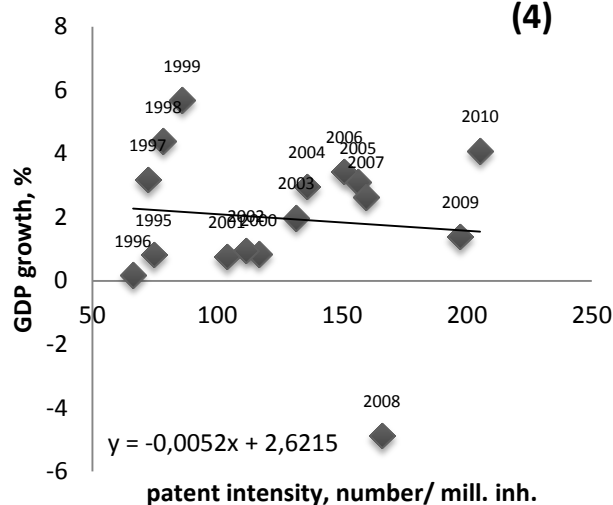
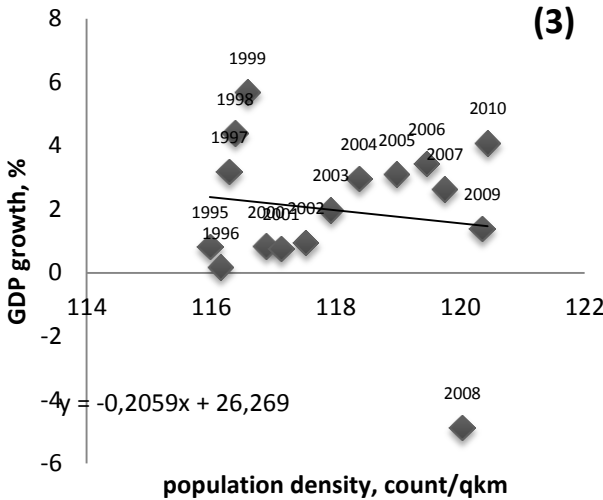
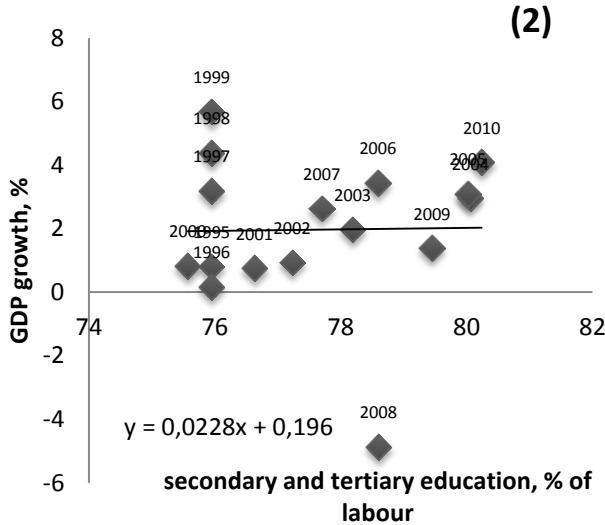
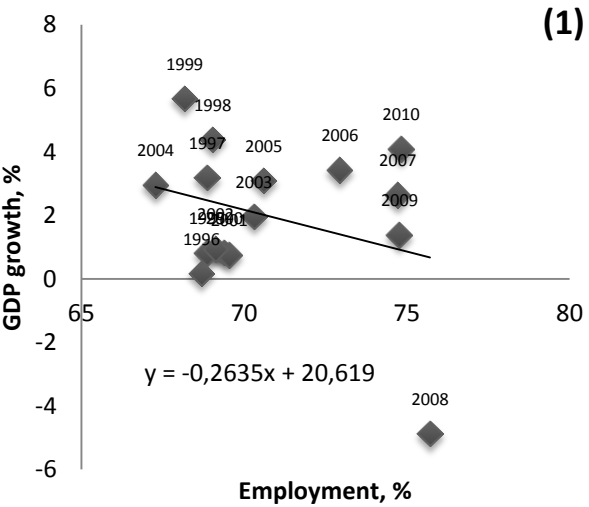
Before that we observed the relation between the GDP growth and each indicator separately in a visual form (Graph 76). Based on these tables we can already make some initial conditions. Although the relation between most of the indicators and economic growth is negative, we can still see some positive trends, especially with regards to variables which are strongly influenced by cluster policy.

First of all two positive relations were associated with cluster related indicators (10 & 11 in Graph 76). A positive trend appears in both variables reflecting our automotive cluster – based on number of entities and on employment number. This can indicate that the developments in the automotive cluster were positive and could have contributed to the economic development in Upper Austria. Considering that the automotive cluster was the first one to be supported within the cluster policy and was the first to establish one of the biggest cluster associations, we can make a link with the possible effect from the implementation of the cluster policy in the region. However, the successful development of the automotive sector could also be related not only to the cluster policy but in general with the strong path-dependency mechanisms, which can be associated with this sector, and opportunities for automotive to establish links with neighboring regions in Austria and Germany, which have also focused on the automotive sector. Nevertheless, the general selection of the automotive sector for the cluster policy instruments had an important impact on the development of the sector and herewith on the region as a whole.

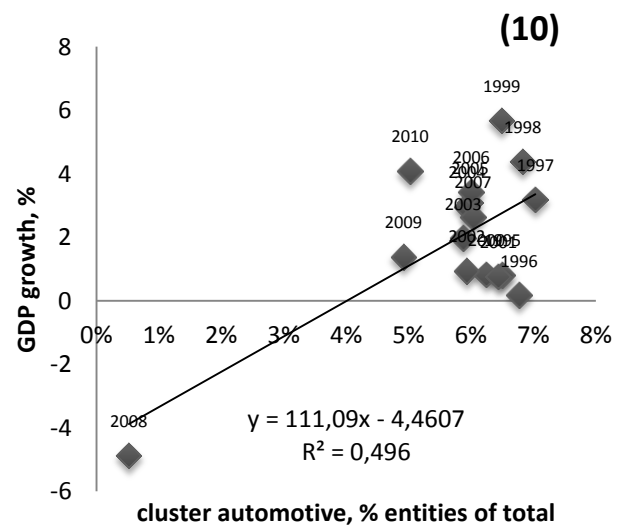
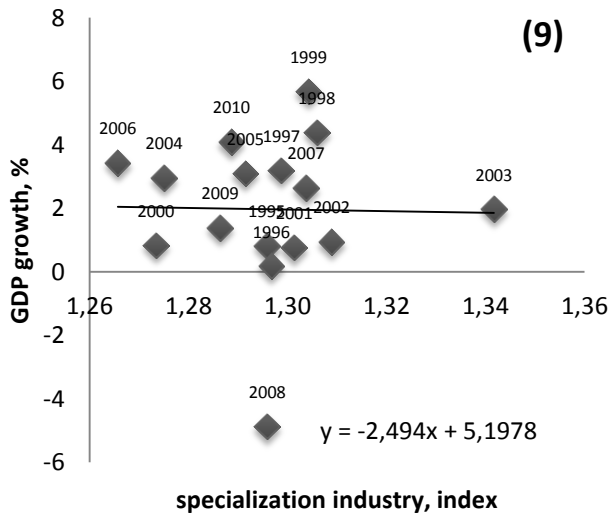
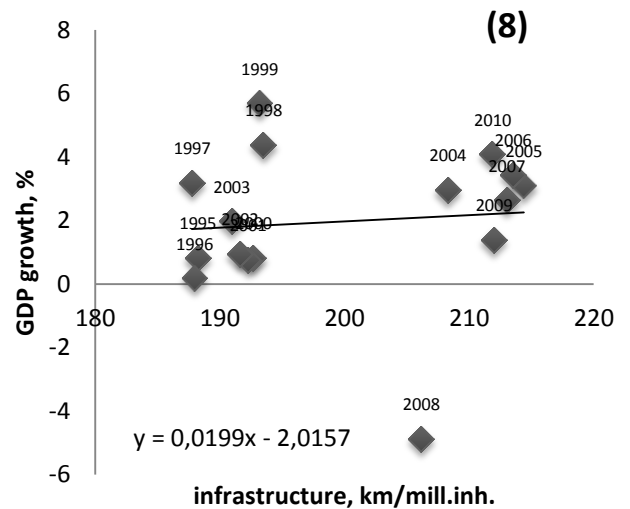
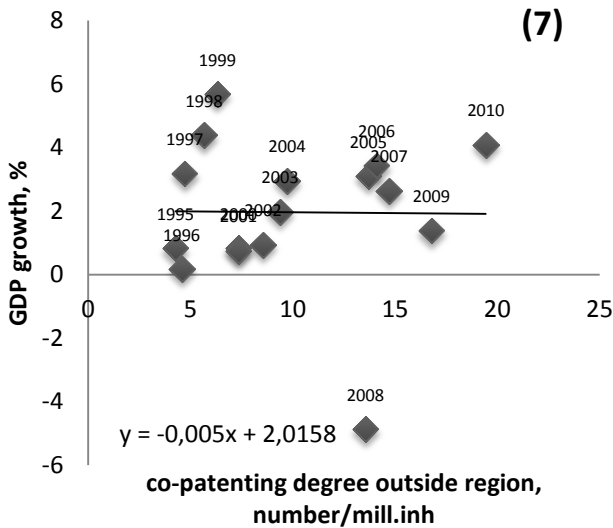
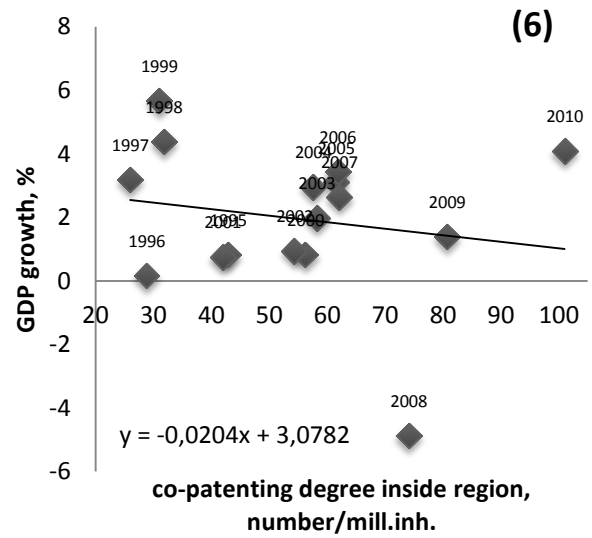
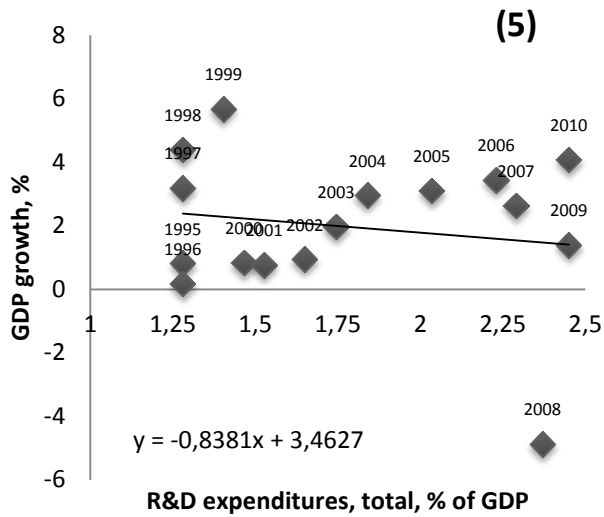
Second of all, we notice a slight positive relation between education and GDP growth (2 in Graph 76). This is associated with our earlier conclusion on the slight but insufficient improvement in the educational level of the labour force. Although the cluster policy was targeted towards closer alignment of academic and business need, we think that this issue should be further improved. That is why further attention to improve knowledge capacities in the region might result in a stronger economic boost of Upper Austria.

Finally a positive link was also observed between economic growth and infrastructure, which is based on number of motorways per population. Indeed infrastructure might have a close relationship with connectivity and international openness of the region, thus positively influencing regional development. Another conclusion which can be drawn from the graphs below is the deterioration of the results due to the financial crises, causing the bias observed since 2008.

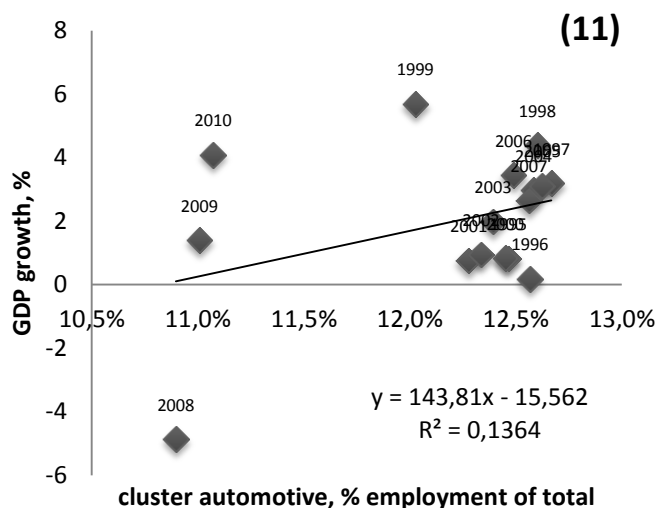
Graph 76 GDP growth versus variables selected for regression model: employment (1), secondary and tertiary education (2), population density (3), patent intensity (4), R&D expenditure (5), co-patenting degree inside the region (6), co-patenting degree outside the region (7), infrastructure (8), specialization industry (9), cluster automotive entities (10), cluster automotive employment (11), Upper Austria, 1995-2010



Graph 76 (Continuation)



Graph 76 (Continuation)



Now we will study the results for Upper Austria from the regressions composing of variables highlighted above and broadly argued in the theoretical section (Table 42, Table 43, Table 44). First of all, we notice a **convergence of regional economy**, which seems to take place in all the studied sub-models. Meanwhile the **employment** rate seems to have a negative connection with economic growth. However, the results are not very significant due to a low level of R-squared. Finally, one of the most interesting indicators is **co-patenting with foreign** regions. In case of the Upper Austria it showed positive relation with economic growth appearing together with education and other innovation relevant indicators. None of the other variables which we have associated with the clustering effects, such as e.g. infrastructure or share of establishment or employment in the automotive sector, showed significantly good fit in order to make a concrete conclusion. The same is also true with respect to patents or industry specialization.

At the same time more interesting results appear from the regression with the time lags. The outcomes of these models are shown Table 43 and Table 44. In Table 43 we continue to observe the convergence of the region with increase of **GDP per capita**. Furthermore, we also continue to see a positive relation with the **co-patenting with foreign regions** in a 5 years lag. However, the reverse trend by the above indicator is also present. In particular, with a 3 year time lag the connection with economic growth appears to be negative. In contrast to Table 42 opposite observations are to be tracked for the **co-patenting inside** of the region in the case of a 5 year lag. Neither the result on the **infrastructure**, nor **patenting** shows statistically significant outcomes in order to provide substantial arguments.

Table 42 Regression results, Upper Austria, 1995-2011

Models	1	2	3	4	5
Intercept/ Constant	-35,424	-31,625	33,852	-22,757	-0,923
Y	-2,145	-1,833	0,946	-0,424	-0,020
EmplRate	-0,499	-0,627	-0,504	-0,666	-0,662
	-2,122	-2,245*	-2,643*	-2,203*	-2,639*
	-1,974	-1,944	-	-1,451	-1,202
	-2,284*	-2,222*	-	-1,210	-1,197
Edu	-2,217	-2,452	0,130	-2,469	-1,870
	-1,610	-1,729	0,207	-1,328	-1,186
Pop	9,154	8,601	-6,153	5,877	1,531
	2,175	2,000	-0,803	0,498	0,152
Pat	-	0,064	0,057	0,143	0,020
	-	0,873	0,493	1,012	0,148
R&Dexp	-	-	7,368	-3,197	1,087
	-	-	0,371	-0,117	0,048
Co-Pat1in	-	-	-0,069	-0,027	-0,019
	-	-	-1,466	-0,363	-0,307
Co-pat2out	-	-	0,205	-	0,156
	-	-	2,941*	-	1,807
Infr	-	-	-	0,594	0,352
	-	-	-	1,247	0,843
Spec.	-	-	-	0,632	0,368
	-	-	-	1,182	0,789
Clust2Est	-	-	-	-	-
Clust1Emp	-	-	-	0,103	-0,075
	-	-	-	0,061	-0,054
R Square	0,411	0,453	0,743	0,712	0,842
Adjusted R Square	0,197	0,179	0,518	0,136	0,406
F	1,919	1,654	3,298	1,237	1,931
N	16	16		16	16

Note: Below the estimated coefficient is given the value of t statistics, this sign * indicates significance at 95%; ** - significant at 99%

Source: Input data is based on OECD 2014 & Eurostat 2014

Table 43 Regression results time lag, Upper Austria, 1995-2011

Model	1	2	3	4	5	6
Intercept	-17,160	3,066	-37,639	-8,502	-4,145	-2,340
	-3,528**	3,545**	-2,615*	-1,138	-0,455	-0,311
Y	-1,004	-0,302	-0,923	-0,114	0,060	-0,153
	-4,180**	-3,397**	-5,750**	-0,580	0,494	-0,843
Pop	6,920	-	9,950	-	-2,575	-
	3,162**		3,186**		-1,329	
PopT3	-5,928	-	-3,487	-	2,901	-
	-2,723**		-1,876		2,728*	
PopT5	4,769	-	3,472	-	0,000	-
	3,829**		2,592*		65.535,00	0
Pat	-	-	-	0,125	0,171	0,113
				2,993**	5,457**	2,795*
Pat T3	-	-	-	-0,117	-0,095	0,017
				-1,164	-1,768	0,147
Pat T5	-	-	-	2,037	0,382	0,522
				1,613	0,335	0,378
Co-Patlin	-	-0,004	-	-0,026	-0,035	-0,058
		-0,303		-0,922	-1,897	-1,784
Co-patlin T3	-	0,003	-	0,068	0,063	0,002
		0,249		1,217	2,129	0,030
Co-patlin T5	-	-0,057	-	-0,081	-0,095	-0,065
		-4,549**		-4,013**	-8,435**	-3,187**
Co-Patlout	-	0,192	0,016	0,131	0,148	0,140
		8,973**	0,300	4,166**	4,942**	4,387**
Co-patlout T3	-	-0,140	-0,185	-0,156	-0,194	-0,179
		-7,365**	-4,015**	-8,698**	-12,992**	-7,855**
Co-patlout T5	-	0,058	0,034	0,045	0,052	0,047
		5,939**	2,508*	3,570**	7,924**	3,356**
R Square	0,650	0,951	0,911	0,985	0,998	0,995
Adjusted R Square	0,523	0,908	0,834	0,955	0,656	0,963
F	5,108	22,225	11,730	32,655	114,446	30,871
N	16	16	16	16	16	16

Table 44 Regression results time lag, Upper Austria, 2005 -2011

Models	1	2	3	4
Intercept	0,104	0,119	0,262	1,292
	0,057	0,039	0,052	0,417
Y	0,044	0,003	-0,020	-0,058
	0,332	0,011	-0,041	-0,214
Spec.	0,205	-	0,016	-
	0,475		0,034	
Spec.T3	0,369	-	0,150	-
	0,898		0,337	
Spec.T5	-0,988	-	-0,073	-
	-2,409*		-0,144	
Clust2Est	-	1,529	1,436	1,852
		4,752**	2,838*	4,758*
Clust2Est T3	-	-2,363	-2,293	0,000
				65535,0
		-1,102	-0,602	00
Clust2Est T5	-	-1,081	-1,484	-0,139
		-0,469	-0,291	-0,059
Clust1Emp	-	-	-	-1,662
				-1,477
Clust1Emp T3	-	-	-	-3,077
				-1,424
Clust1Emp T5	-	-	-	-3,055
				-1,156
R Square	0,534	0,871	0,884	0,917
Adjusted R Square	0,224	0,784	0,613	0,542
F	1,722	10,100	3,264	7,343
N	11	11	11	11

Note: Below the estimated coefficient is given the value of t statistics, this sign * indicates significance at 95%; ** - significant at 99%

Source: Input data is based on OECD 2014 & Eurostat 2014

Although we are very interested in clusters, based on the data for Upper Austria very little can be said in this regard apart from stressing again the shortcoming of the data. The only significant result can be traced to the number of establishments in the automotive cluster. Based on the regression the positive connection with growth appears to take place without any time delay. Apart from this, the specialization in industry in the 5 year time lag might have negative ties to GDP growth. Thus insufficiency of the results especially in regard to the low adjusted R-square strongly increases the

discrepancy of these conclusions and indicates a need for a deeper investigation, which should be based on a larger set of yearly observed data

Stressing the difficulties of the regression model and its results, we still will attempt to formulate some overall conclusions. As such, we would stress only on the effects of population and co-patenting with foreign regions on the economic growth. With respect to clusters the share of establishments in the automotive sector without time lag is worth highlighting in Upper Austria as well.

3.4. Summary of the economic development part

In this part of the case study we have performed a static and dynamic review of the regional economic development through the prism of the main factors, such as capital, human and labour force, education and technological progress and cluster development, influencing economic growth in the last 15 to 20 years. After that, based on the regression model we extended our analysis by reviewing a composed review the key factors on economic growth.

The main outcomes of our case study show that Upper Austria is the most industrialized region in Austria with an average level of economic performance and above average in comparison to EU 28. At the same time especially the first years after the implementation of the cluster policy (1998-2000) were characterized by the highest growth rates over the observed period. Moreover, Upper Austria has experienced the highest GDP per capita growth and almost the highest GDP increase from 1997 to 2012 (Graph 53) in comparison to other regions in Austria. This along with being the region with the highest export share has led to stable but average economic development of Upper Austria over the last 15 years. The reason for the average performance in recent years could be rationalized by following: 1) in reference to Maier and Trippel (2011) the region's specialization in more traditional sectors and claiming strong path-dependent influence on economic evolution of the region, 2) application of low-risk market-driven cluster policy in Upper Austria and 3) due to overall harmonized regional policy performed by state government in terms of all its federal provinces.

The improvement in several key factors within Upper Austria was very evident and could be associated with the cluster policy, in particular in regard to the labour market (with the lowest national and European unemployment rates, Graph 63) and business driven technological innovation (reflected through high rates of patent applications, Graph 71, and R&D personnel employed per in business sector, Graph 72). Despite some progress we share the opinion of Maier and Trippel (2011) and stress that the regions has weakness in such aspects as low public R&D expenditures (Graph 71), unbalanced educational system leading to a lack of highly qualified knowledge (Graph 67) and an uneven per sector distribution of personnel in research and

development (Graph 72). The performance of selected factors during the period (for cluster policy periods Part Evolution of cluster policy in Chapter 7) /dynamic perspective, shows high rates of change in most cases particularly during the first period of cluster policy evolution. After several years of stagnation (2001-2004) the growth renewed but it has never returned to the same pre-2000 rates. The short period of cluster policy observation and its further hampering by several global crises hinders us from reaching definitive conclusions in terms of period based implications of the cluster policy in Upper Austria.

Upper Austria is a very clustered region with at least 9 sectors of regional and national importance. Most of the clusters are developed based on the traditional sectors. Special positive developments can be attributed to clusters such as **automotive, IT, agriculture products, heavy manufacturing, production technologies, biotech and pharmaceuticals** (Table 39 and Table 40). A positive relation was especially noted between the performance of the automotive cluster (measured by the number of enterprises taken with time lag) and economic growth (based on the results from the regression model - Table 44 and on the individual base - Graph 76). However some of the traditionally strong clusters reduced in their European and national strength (Graph 75) assumingly through redistribution of its employment to other growing sectors, especially **construction, tourism & hospitality, entertainment or media & publishing**. Considering only 9 functioning cluster initiatives, we stress the need in support of the alternative to traditional clusters as well. Surprisingly, a negative correlation has been identified between the economic growth and co-operation measured through co-patenting within and outside of the region in time lag perspective (Table 43). As such, we assume that economic development might not only be driven by the enhancement of cooperation through projects but also from **enhanced knowledge and professional skills** available in the region (reflected by the relation between the level of education of the labour force and economic growth, Graph 76).

To conclude, we want to remark that in general terms cluster policy was especially effective in strengthening the competitive potential of selected, traditional based clusters in Upper Austria. This has ensured the region's stable economic development since the middle of the 1990s. At the same time although the cluster policy is well market driven, we think that stronger public support and more service and alternatives to traditional cluster support should also be considered.

4. Main findings and conclusions

The cluster policy in Upper Austria was officially launched along with the first strategic regional program in 1998. At the same time the first studies and cluster mapping of clusters in the regions were conducted within the framework of the Austrian innovation research programme ("TIP" – "Technology, Information, Policy Consulting") since the beginning of 1990s. The main rationale

for the application of the cluster policy in Upper Austria was the effective implementation of cluster related actions in the neighboring region and the dominant role of the market in the implementation of the cluster policy. The goal of the cluster policy in Upper Austria was to strengthen regional competitiveness by boosting **innovation through co-operation** between companies and other regional institutions from the same sector. On the regional level mainly two instruments were selected to support the naturally existing and potential clusters: 1) increase and support the number of projects developed in the cooperation between companies and other actors from the cluster, 2) establishment and promotion of cluster associations. The first cluster initiatives were built in a top-down fashion by the regional business agency, Technology and Marketing Company (TMG), and later were transferred to a more bottom-up approach within the public-private company “Clusterland Upper Austria”. Up to 2014 9 cluster associations and 3 networks were in operation in the region. The activities offered by cluster associations range from overall information services on the development of the clusters and sectors over the administrative and networking support for the development of project in co-operation to the assistance in internationalization and marketing activities.

Based on the interviews and reviewed literature we have identified **3 periods of cluster policy evolution** in Upper Austria. These periods are: I) 1992 – 2003: Ground building, II) 2004-2012: Restructuring management and going international, III) since 2013: Cross vertical-horizontal specialization boost (Table 36). As such, we can see that the cluster policy in Upper Austria has developed based on the response of the market evolution and its needs. Furthermore, we have also noticed the influence of European policy making (e.g. establishment of cross-branch Networks was supported by European Commission in terms of the 6. R&D Framework programme). Generally the policy was kept at low cost with high reliance on the market co-ordination.

Furthermore, we did an in-depth analysis of each of the **7 stages of cluster process in each of the 3 periods** of cluster policy evolution. The main findings reflected in the Annex 10. Generally we can conclude that each period has passed through almost all stages of the cluster policy process. Although with each subsequent period the number of key factors in each stage of the cluster policy increased, we couldn't identify a direct link between these factors and the improvement of economic development.

In the first period of the cluster policy we see the highest rates of economic growth, but we **don't think that they are directly linked to the implementation of the cluster policy**. At the same time until 2003 different cluster enhancing activities were planned, however most of them were arranged and implemented on an intuitive basis. While only in the second period of the cluster policy did the development of clusters start to be more organized and structured. Especially the clear one-stop contact point in the region speeded up the internationalization and attraction of external knowledge

to the region. Here the stable economic growth is further to experience. Furthermore, we propose that the established cluster initiatives have been selected based on the natural but traditional industries (automotive, heavy manufacturing, mechatronics, biotech & pharmaceutical, IT) that are still dominant, which in reference to Maier and Trippl (2011) points to a high degree of path dependent mechanisms, especially in traditional sectors. Moreover most of these clusters are now building the pipelines of regional RIS specialization and strategic focus for 2020: Industrial production, Health, Energy, Food and Mobility.

At the same time we think that in the latest strategic regional program clusters are starting to lose their high regional focus and turning into more self-market driven mechanism. In this regard we see some danger, which might result in low degree of public support and a reduction in trust between governance and business officials. We think that the economy & cluster analysis policy stage should be stronger addressed. Herewith, we also mean the engagement of an external evaluation. Although the cluster associations as well as government administration are constantly undergoing cluster and policy reviews, academic based recommendations and studies, especially with regard to economic and natural cluster development are lacking. This would provide regional agents with a stronger conceptual/ methodological vision for regional and cluster development.

Based on the policy review we derive several main changes and permanent aspects of the cluster policy. Among the **permanent** aspects the following issues should be highlighted:

- The motivation for the application of the cluster policy seen as a tool to increase regional innovation through cooperation and herewith strengthening the competitiveness of Upper Austria
- The market driven approach to the development of natural clusters
- Selected clusters represent natural traditionally strong industries in the region
- Two key instruments applied for the promotion of clusters: co-operative projects and activities organized by cluster initiatives
- The Government of Upper Austria has provided constant support but without exerting too much influence on the activities of the cluster associations

The mains **changes** within the cluster policy in Upper Austria are highlighted in the Table 31 below. We think that passing from being a technology based to specialization driven cluster policy, introducing new regional organizations and change in financial support can stand for the main cluster policy changes in the region.

Table 45 Main changes introduced in the cluster policy in the Upper Austria since 1998

Area	Description
Regional level	
Clusters role in strategic program	The first program saw clusters as a central component for technological and innovation development in the region. The second and the third one have placed clusters and cross-branch networks in the heart of the economic development and regional internationalization strategy. The third one sees clusters as already integrated and established part of the regional economic model.
Communication between regional level and cluster associations	The launch of the first cluster initiatives was driven by the regional development organization, TMG (establish by Government support), thus since 2005 most of the cluster associations are being incorporated into one company “Clusterland Upper Austria” and partially coordinated by other leading associations in the cluster’s core branch
Participation of regional institutions	The participation of regional institutions has increased over time. In the first co-operative projects mostly companies and the leading research / impulse centers were participating. With time stronger attraction of universities and other sector-related institutions took place
Cluster associations	
Activities	The number and spectrum of the cluster activities offered to its members is very broad and has been developed based on the member’s needs and interests
Maturity level	The cluster associations are identifying their targeting companies and institutions, learn to communicate and engage them. By the end of 2014 they passed to being very independent and mature institutions and guiding the government in types of priorities to be set for regional development
Project grants	The character of applications for the project grants has changed from being too generalized to being more specialized and structured and specifying the types of companies and character of collaboration to be supported

Source: Authors’ development

The main outcomes of our case study show that Upper Austria is the most industrialized region with an average level of economic performance in Austria and above average in comparison to the European Union 28. Although Upper Austria was in a similar position in the middle of the 1990s, the increase of GDP per capita from 1998 to 2011 was the highest in the country. In addition to this Upper Austria has also experienced higher growth rates than national.

The study of key economic factors in Upper Austria showed similar trends to the economic growth. Whilst levels of productivity, disposable household income and number of personnel involved in R&D reflect the region’s stable average position within Austria, the labour market (with the lowest national and European unemployment rates, Graph 63) and innovation related indicators (reflected through high rates of patent applications, Graph 71, and R&D personnel employed per in business sector, Graph 72) put the region in the higher ranks. However, one of the lowest public expenditures on R&D (Graph 71), an unbalanced education system (Graph 67) and per sector unbalance distribution of personnel in research and development personnel (Graph 72) may have hampered the economic boost during the last 10-15 years.

At the same time, especially in the first years after the implementation of the cluster policy (1998-2000) the highest growth rates over the observed period were achieved. Moreover, Upper Austria has experienced the highest GDP per capita growth and almost the highest GDP increase from 1997

to 2012 (Graph 53). This along with being the region with the highest export share within Austria represents the stable but average economic development of Upper Austria over the last 20 years. The performance of selected factors over the period (for cluster policy periods see Evolution of cluster policy) /dynamic perspective shows in most of the cases high rates for the first period of cluster policy evolutions. After several years of stagnation (2001-2004) growth was renewed but has still not returned to the same growth rates as before the latest financial crisis in 2008.

Most of the clusters in Upper Austria are developed based on traditional sectors. Special positive development can be attributed to clusters such as automotive, IT, agriculture products, heavy manufacturing, production technologies, biotech and pharmaceuticals (Table 39 and Table 40). An especially positive relation between the automotive cluster (measured by the number of enterprises with time lag) and economic growth based on the results from the regression model (Table 44) and on an individual basis was observed (Graph 76). However, some of the traditionally strong clusters have reduced their European and national strengths (Graph 75) by redistributing its employment to other growing sectors, especially construction, tourism & hospitality, entertainment or media & publishing. Considering that there are only 9 functioning cluster initiatives and sectors of regional focus, we stress the need to address the alternatives to traditional clusters as well. Surprisingly, a negative connection has been identified between the economic growth and co-operation measured through co-patenting with and outside of the region in time lag perspective (Table 43). As such, we assume that the economic development might not only be driven by the enhancement of cooperation through projects but also from enhanced knowledge and professional skills available in the regions (reflected in relation between education level of the labour force and economic growth, Graph 76).

Generally the drawing of stronger conclusions regarding the impact of cluster policy on regional economic and cluster development is hampered by data validity and limitations. In particular the following limitations emerge: 1) lack of sustainable data for the observed indicators after 2012/2013, 2) the disturbance of the economic development trend due to the financial crisis of 2008 as well as by the oil, Russian and Asian crises of 1997 – 1998 and stagnation in the European Union at the beginning of 2000s, 3) the absence of long term indicators related to cluster policy implementation.

All in all we observed **modest positive implications** of the cluster policy on the economic development and its indicators. The reason for this is that overall moderate economic performance has been maintained since 1995 as well as an average performance of Upper Austria in relation to other regions in Austria. At the same time we think that the cluster policy can be seen **successful** in the following terms:

- Increasing the accessibility of innovation and technological designs to a broader spectrum of regional and international institutions, especially SMEs
- Turning the cluster-based vision of economy into an integrated part of the competitiveness cluster-based specialization strategy for Upper Austria
- Inception of the policy objective: Cluster initiatives are directly associated with natural clusters and competitive regional strengths
- Cluster policy has passed from being something external to internal for the regional actors;
- Creating a platform for the communication between different public and private agents, where the real needs, interests and visions can be discussed, highlighted and listened to;
- Clusters are seen as a consolidated part of the whole regional industrial, technological and innovation oriented system

From our point of view following **factors have contributed** to the **effective implementation** of the cluster policy in Upper Austria:

- Selection of the supporting clusters took place based on the existing regional strengths and combining them with the regional public and business interests
- Building of innovation and science related infrastructure (integration of all key regional players into one transparent and systematized innovation holding/ network) and largely protecting them from the industrial decline and path-dependency problems
- Establishment of cross-branch networks, which were addressing vertical issues relevant for all clusters herewith stimulating non-industrial innovation and spillovers between clusters
- The existence of long term strategic regional planning, which ensured a more generalized and harmonized approach towards reforming
- The performance of cluster associations is reviewed on a regular basis, which is seen as a measurement and a stimulus for their self-improvement
- Close geographical location of key actors from key related regional institutions provides possible information spill-overs enhancing cluster development and inter-institutional collaboration
- Existence of financial resources (in form of regional fund (des Zukunftsfonds) and European Recovery Fund (ERF)) for implementation of reforms and introduction of cluster policy
- Pro-active support and high expertise provided by TMG since the first years of the cluster policy
- Trust and mutual agreement between the institutions

- Establishment of an independent exclusively cluster focused organization, which was also a one stop contact for outside actors and one stop decision maker for inside (Clusterland Upper Austria)

At the same time, despite the positive outputs achieved from the implementation of the cluster policy, we think that its results could had stronger impact on the economic development. We consider following **aspects hampering** the effectiveness of cluster policy:

- Limited number of sectors for cluster support as well as their very traditional character
- Low attention and engagement of universities in the cluster development
- Redundant planning of activities within the strategic policy programs
- Low risk public intervention planned in the policy planning leading to extensive market driven cluster policy and traditionally based cluster specialization in the region
- Scarce R&D expenditures from the government sector
- Absence of regular academic inputs on the economic and cluster performance in the region leading to insufficient policy modification
- Cluster policy is more driven to support members of the cluster associations rather than addressing all the whole actors of natural cluster

In this regard the cluster policy related **recommendations** for the Upper Austria are to be proposed after a comparative review of both case studies in the Final Conclusion.

CHAPTER 8: MAIN FINDINGS FROM THE CASE STUDIES

In the previous two chapters an in-depth case study analysis of the two regional cluster policies in the Basque Country and Upper Austria has been made. Here we are underlining the main similarities and differences between these two policies with the aim of making overall conclusions regarding our research on the evolution of the cluster policy since its launch, its implications on the economic development of the regions and the components contributing to the effective policy making. This Chapter 8 is structured similarly to the case study chapters: first we review the policy and then economic development. The main findings are presented at the end of this chapter.

1. Cluster policy review

In this part we focus our attention on the main findings driven from the review of the cluster policies that have taken place in the Basque Country and Upper Austria. The structure of this part will first reflect the overall evolution of cluster policy in both regions. Following this we study the cluster related institutions and we will close by reviewing each stage of the cluster policy process.

1.1. General overview of the cluster policy evolution

The cluster policy in the Basque Country was launched in 1991 and was the result of the declining economic situation in the region. The new, at the time, approach towards strengthening regional competitiveness was convincing enough for its implementation after the consultations between leading Basque politicians with economic experts, in particular Mr. Michael Porter himself. The import of the cluster policy to Upper Austria took place under similar declining economic conditions in the region. After numerous explorations on cluster concept and other economic tools within national Technological Policy the cluster policy was launched in 1998, and by the end of the 1990s both regions had already developed a platform of instruments facilitating cluster development.

After more than 15 years the initiated cluster policies are still being implemented. The tangible result of these policies is the establishment of 11 priority and 11 pre-cluster associations in the Basque Country, and 9 cluster and 3 network associations in Upper Austria (Graph 79). Additional results of the cluster policy implementation can be also attributed to the change in perceptions of doing business, re-identification of regional industrial strengths and exceptional economic development in both regions. The last aspect is discussed more broadly in the economic part of this Chapter 8. At this point we want to highlight the main similarities and differences between both cases, which were noted in the study of the cluster policy evolution periods.

Despite the fact that the cluster policy in the Basque Country started several years earlier than in Upper Austria, we can still claim that in both regions cluster policies **have evolved along similar**

evolution stages (Table 20 and Table 36), which, in our opinion, also closely correspond to the development of regions' clusters, cluster associations and herewith reflect the regional and international market needs (Graph 77).

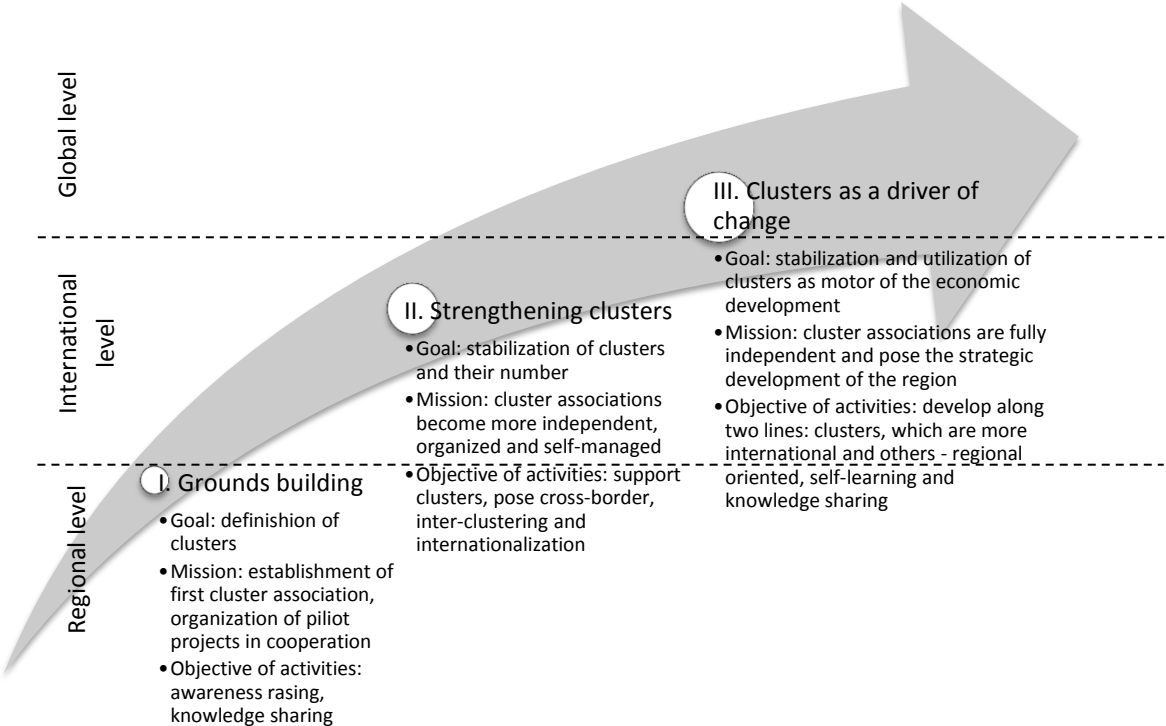
Both regions start their cluster policy with extensive study of the clusters in the regions and the identification of regional weaknesses and opportunities. In numerous discussions the priority or leading sectors/ cluster are being selected for policy pilot interventions. When the first positive results appear, other sectors or groups of interest also start to express their interest in participation. Essentially the whole first period of the cluster policies is associated with the identification of existing clusters, with raising awareness of regional actors on the cluster concept and the organization of first projects or activities, which help dominant companies to realize their inclusion in a certain cluster and to try out the development of projects in collaboration. By the end of the first period in almost all sectors, which have been either motivated by the government or have shown their own interest, the cluster associations were established. However the organizational structure of these organizations still tended to be frail. Moreover, in both cases we have noted the strong financial and political support of the government at this period.

The next period of the cluster policy evolution is already associated with the maturity of cluster members. Here the companies start to show a more pro-active role in the organization and administration of cluster policies and cluster initiatives. In Upper Austria, this maturity led to the establishment of the clusters own company/association, Clusterland Upper Austria Ltd. A similar trend, although a little later on, happened in the Basque Country, when the regulation of the cluster associations was transferred to SPRI. The activities, which were being suggested and supported by the policy framework also changed. They turned to be more oriented towards the growth, stabilization and internationalization of clusters. For this policy agents tried to intensify the involvement of other regional institutions, such as technological centers, universities, and to point out the benefits of inter-cluster, cross-border and cluster-network cooperation. As companies express the will to cover their own costs for the participation in cluster associations, the cost of the policy can be reduced or redistributed to cover more project-related expenses.

Finally, we can see that in the latest period of the cluster policy, the regional cluster policy intend does not only intend to offer support for clusters, but rather already uses these clusters as driving components of their regional unique specialization strategy. Of course, this strategic thinking based on the specialization is affected by EU RIS3 policies, nevertheless, it is still clearly evident from the interviews conducted in the regions, that clusters, due to an ideological shift from being something foreign, have turned out to be to a fully integrated component of the regional economy. Moreover, cluster members start to be less dependent on the decisions posed by the government and take the development of the regional economy into their own hands. Besides this, some of the clusters were

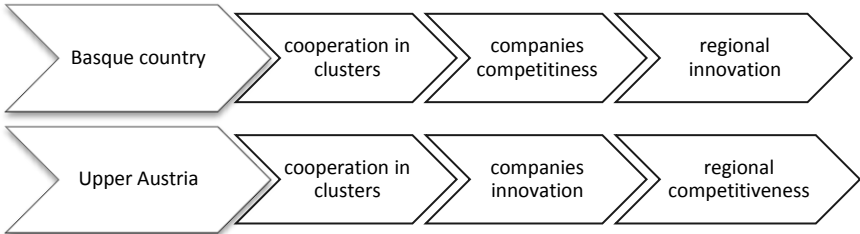
found to be very internationally connected and link the region to the participation in global value chains.

Graph 77 Evolution of cluster policies



Source: Author’s development

Graph 78 Strategic approach of the cluster policy in the Basque Country and Upper Austria



Source: Author’s development

To conclude, we want to highlight that in both regions the cluster policy had very similar goals: cooperation and innovation (Graph 78). At the same time we think that if in Upper Austria competitiveness was the ultimate goal, which had to be achieved by a boost in innovation through cooperation, the Basque Country by contrast held innovation as the ultimate goal, which had to be achieved by enhanced competitiveness through cooperation.

In addition to this we pose that in both cases the cluster policy has passed from being **regional technology-driven cluster policy to regional smart specialization cluster-based innovation strategy**. Strategies and programs of the European Union shaped the evolution of the regional and

cluster policies (example establishment of Networks in Upper Austria and alignment of policies to the EU funding). Finally, despite region specific character of the cluster policy in both regions the support and strengthening of SMEs was always at the heart of all cluster policy actions.

1.2. Regional institutions involved in the cluster policy making

Based on the conducted case studies we have identified several similarities and differences in terms of institutions, which were playing an important role in the cluster policy. Underlining the results achieved for both regions we want to stress the following common traits:

- **Strong similarity of institutions participating in the cluster policy on the regional and cluster association level**

The Graph 15 and Graph 49 presented in the earlier cases indicate the involvement of institutions from the same three main areas: government (public), private and research, which represent the triple helix model (Graph 5). This is the case for both regional and cluster associations level. At the same time it wasn't always the case, as at the launch of the cluster policy certain actors have dominated in the policy making process. Nevertheless with time, the intent to establish a more balanced involvement of different institutional types was realized. As such, by 2014 in both regions very similar institutional categories were participating in cluster policy. These institutions are Governments & Government Administrations, Regional Development Agencies (SPRI & TMG), Chambers of Commerce, Cluster Associations & Firms, Universities and Research Centers.

- **Presence of a strong regional authority and personality within this institution or region, initiating and coordinating the launch of the policy**

We have identified that in the case of the both policies the import and promotion of cluster concept was driven by people, who were the representatives of the institutions with strong decision-making roles within their region. In such, while in the early 1990s, the Basque Government was having a strong influence not only on the policy making but also on the behavior of many economic agents on the market, in Upper Austria it was the case for the Upper Austrian Chamber of Commerce. That is why several personalities, who were numerously mentioned in the interviews and were holding charismatic debates on the benefits of the cluster policy, were representatives of the above organizations, Mr. Jon Azua – the Basque Country and Mr. Christoph Leidl – Upper Austria. Although each of the above mentioned institutions were at first coordinating the cluster policy implementation, their influence has been significantly reduced over time.

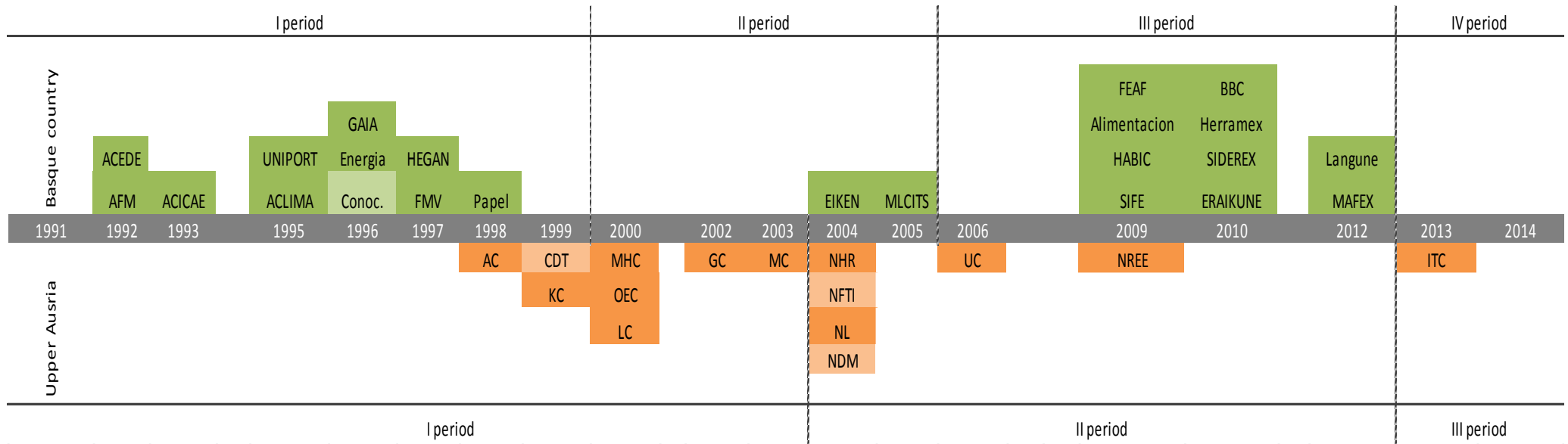
- **Establishment of cluster associations as a tool for cluster enhancement**

In both regions as the result of the cluster policy the establishment of a new type of institutions, cluster association/ initiative took place. Although there is a difference in the number of cluster associations - in the Basque Country there are **11 priority and 11 pre-cluster associations**, whilst in Upper Austria there are only **9 cluster association and 3 networks** - the internal organizational structure and the activities are very similar (Graph 79). Moreover there are several cluster associations, which have been established in similar cluster sectors, e.g. automobile, IT, energy, and environmental technologies. In addition to this, by 2014 in both regions we have observed clusters of 3 types of cluster associations: **local, regional and supra regional**. Under the last category we refer to the ones which include members from other nations or even from regions in foreign countries. Moreover in both of the regions several types of established cluster initiatives have been later **closed or merged**. Whereas in the Basque Country it was the service-oriented cluster “Knowledge in Management,” in Upper Austria it was an industry based cluster association “Motors/ Driving Technologies”.

In addition to the above it is also important to stress the two great **differences** in the **cluster associations** between the regions. First of all in Upper Austria the network associations were also built. A similar attempt was made in the Basque Country with the “Knowledge in Management” cluster however this was closed after several years. Secondly the coordination and communication mechanism between macro/ regional and micro/ cluster association levels differs. It seems that both regions have a centralized coordination of clusters, but in the Basque Country this coordination until 2013 was on the level of the government, while in Upper Austria on the level of cluster associations themselves.

Regarding overall differences in the cluster policy related institutional system, that were identified by us from the cases, we think that the coordination mechanism between the institutions involved in the policy making is more structured and organized in case of Upper Austria. The facilitation of this process could be the allocation of almost all key institutions or their headquarters in one city. This closer geographical location enhanced formal and informal networking facilitating the knowledge exchange and decision making. In conclusion, we think that overall a very similar institutional framework for cluster policy has been observed.

Graph 79 Cluster associations, evolution of establishment, the Basque Country and Upper Austria



Note: Associations marked are
 closed in the Basque Country (light green)
 closed in Upper Austria (light orange)
 Source: Author's development

1.3. Reviewing stages of cluster policy process

The in-depth analysis of the 7 stages of the cluster policy process has provided us with extensive information on the way the policy was made and has evolved in the two studied regions. In this part we drive main conclusions on the key components, which were the most relevant for the two cases. The detail table on the 7 stages of the cluster policy during each period of the policy evolution can be found in the Annex 10. In this part we first drive overall policy stage related conclusions and then the key elements in each stage of the cluster policy are summarized for each region.

Overall we think that from the launch of the cluster policy until the latest years many components in each stage of the cluster policy in the both regions have appeared and/ or improved. In particularly for both cases we see the progress in terms of:

- Incorporating the multi-dimensional and multi-institutional side of the cluster policy analysis, development, implementation and evaluation
- The strong integration of the business sector in the cluster policy review, development and implementation stages
- Clear vision and goal of the cluster policy
- Development and application of evaluation and monitoring elements of the policy realization

Nevertheless considering all improvements, we still think that the both regions have similar weaknesses mainly in the following stages: **economy and cluster analysis, policy implementation, evaluation & monitoring**. Along with this we also mark several region based weaknesses, which can be seen in the Table 46 and Table 47.

In case of **the Basque Country**, we see the weaknesses in relation to the lack of:

- Unified indicators and systematic procedures required for the effective monitoring and evaluation of development of cluster initiatives
- Active incorporation of the private sector in the review and the development stages of the cluster policy
- Effective transmission of regional cluster vision and clear funding timeframe for cluster policy
- A unified platform for the communication between different actors of the cluster policy making process

In terms of **Upper Austria we observed the main gaps** in such areas as:

- Realization of full scale and in systematic manner regular economic and cluster analysis addressing the needs, weaknesses and strengths of natural clusters and the region as a whole
- Realization of activities targeted towards enhancement of the whole cluster, not only the cluster associations
- Stronger incorporation of other departments and policies for supporting the development of cluster
- Clear long term funding strategy addressing cluster development

Table 46 and Table 47 clearly indicate key components within the stages of the cluster policy process, which may require specific attention of the policy makers and could be the focus of further policy attention. These components are either thick marked or indicated with an orange circle. The identification of these elements was done based on the in-depth cluster policy study in the previous Chapters 6 and 7 and in brief reflected and indicated in the Annex 10.

Table 46 Matrix of key components for the success of the cluster policy, the Basque Country¹³⁵

Key success components/ Stages	1. discussion initiation	2. economy & cluster analysis	3. policy review	4. policy development	5. policy implementation	6. evaluation/ monitoring	7. policy improvement
A. Components, which are unique for each policy stage							
	Existence of previously adapted trendy policy	Existence of an organized group for managing analysis; Clusters are chosen from existing or promising ones; Chosen clusters overlap, have good market connections & consensus from private & public side ; Political fairness and publicity by choosing clusters;		Cluster policy considers each cluster evolution stage; Ultimate goal of policy is strengthening competitiveness; Cluster policy is directed toward more than one cluster; Cluster policy fits within existing powers of the policy making authorities;	Existence of leader or leading organization; Timeframe of the funding is formulated; Clusters are primarily supported by public money with constant reduction over time; institutionalized; early action; peculiarities of each cluster(s) are taken in the consideration	Monitoring & Evaluation are integrated in the policy making; Evaluation has a clear idea about results to be achieved; The results increase the awareness of the cluster situation and policy approach; existence of control indicators	Lessons driven from the evaluation are considered and integrated
B. Components, which are common for several policy stages							
Awareness on the cluster issue and its advantages/ disadvantages for the region							
Choice of cluster(s)/ policy is based on unique regional characteristics							
Engagement of an external organization/ experts							
Application of variety of research methods						●	
Clear understanding for chosen policy approach							
Strong participation of private sector			●				
Leading & developing personal is highly competent in region & cluster issues							
Multilevel cooperation & coordination				●	●		
Strategy & vision is clearly defined				●		●	
Good mix of existing policies & programmes is developed				●	●		
Measuring indicators are well defined and long-term integrated in the policy					●	●	
C. Components, which are common for the whole process							
	long term commitment & motivation; establishment of network for communication; trust between actors; participation of all actors from triple helix; political stability & support; strong regional government						

Source: Authors' interpretation

¹³⁵ The Table 46 indicate key components within the stages of the cluster policy process, which may require specific attention of the policy makers and could be the focus of further policy consideration. These components are either thick/red marked or indicated with an orange circle. The identification of these elements was done based on the in-depth cluster policy study

Table 47 Matrix of key components for the success of the cluster policy, Upper Austria¹³⁶

Key success components/ Stages	1. discussion initiation	2. economy & cluster analysis	3. policy review	4. policy development	5. policy implementation	6. evaluation/ monitoring	7. policy improvement
A. Components, which are unique for each policy stage							
	Existence of previously adapted trendy policy	Existence of an organized group for managing analysis; Clusters are chosen from existing or promising ones; Chosen clusters overlap, have good market connections & consensus from private & public side ; Political fairness and publicity by choosing clusters;		Cluster policy considers each cluster evolution stage; Ultimate goal of policy is strengthening competitiveness; Cluster policy is directed toward more than one cluster; Cluster policy fits within existing powers of the policy making authorities;	Existence of leader or leading organization; Timeframe of the funding is formulated; Clusters are primarily supported by public money with constant reduction over time; institutionalized; early action; peculiarities of each cluster(s) are taken in the consideration	Monitoring & Evaluation are integrated in the policy making; Evaluation has a clear idea about results to be achieved; The results increase the awareness of the cluster situation and policy approach; existence of control indicators	Lessons driven from the evaluation are considered and integrated
B. Components, which are common for several policy stages							
Awareness on the cluster issue and its advantages/ disadvantages for the region	●						
Choice of cluster(s)/ policy is based on unique regional characteristics							
Engagement of an external organization/ experts							
Application of variety of research methods	●					●	
Clear understanding for chosen policy approach							
Strong participation of private sector							
Leading & developing personal is highly competent in region & cluster issues							
Multilevel cooperation & coordination					●		
Strategy & vision is clearly defined						●	
Good mix of existing policies & programmes is developed				●	●		
Measuring indicators are well defined and long-term integrated in the policy					●	●	
C. Components, which are common for the whole process							
	long term commitment & motivation; establishment of network for communication; trust between actors; participation of all actors from triple helix; political stability & support; strong regional government						

Source: Authors' interpretation

¹³⁶ The Table 47 indicate key components within the stages of the cluster policy process, which may require specific attention of the policy makers and could be the focus of further policy consideration. These components are either thick/red marked or indicated with an orange circle. The identification of these elements was done based on the in-depth cluster policy study

1.3.1. Discussion initiation stage

The initiation of the discussion stage is especially important when the policy is being implemented for the first time. However, we think that the maintaining of the discussion stage in the later periods is also of a great use, as it makes it possible to preserve communication and dialog between all actors in the region.

The review of the two cases provided us with the following input on the similarities between the cases. First of all the **knowledge-import of the cluster concept** to the region took place under a very **similar pattern and almost simultaneously**. The economies of both regions were in the declining phase and needed a full revision of their strategic approach toward the development of their economies. In the search for it the leading officials from the Basque Country and Upper Austria came across studies and policy tools, which were proposed and promoted by Michael Porter (1998a, 1991). Moreover, in reference to the interviews the officials have even met the economist in person and discussed the advantages of the policies' application. Secondly the **rationale for the application cluster** policy also coincides. In the wave of the forthcoming intensification of internationalization and globalization, the strategic development of the regions had to be completely revised and redefined. The application of cluster identification tools at the beginning of the policy was promising to find existing and potential clusters and sectors, which would lead to a strengthening of regional competitiveness. Moreover, the policy was also seen as a low cost one, as it didn't require extensive financial public support. Here we see a clear connection with the NEG and agglomeration theories (Table 10 and Table 6). Finally, in the first period **none of the regions had a prior experience with the implementation of cluster policy or of another "trendy" policy**, which for the government administrations and related authorities posed a challenge in the development of cluster policy. In every other period the modification of the cluster policy was already based on their own experience and on the experience of other regions, which also initiated the implementation of the cluster policy.

Meanwhile, we have also noticed some key distinctions in the policies discussion stage among the regions. In the first place the discussion on the cluster policy in the Basque Country took place dominantly on the level of the regions, whereas in Upper Austria the state level was also very actively involved in the study of the cluster approach to policy making. Moreover, we claim that although the **awareness of the cluster issue and its potential advantages/disadvantages for the region between main regional participants** took place in regions, still the organization form and the grade of informing was very different. While in the Basque Country the information was primarily spread by Porter and his experts, in Upper Austria local and national experts due to strong Austrian school of economic thought were trying to conduct analysis and understand the issues related to companies industrial agglomerations. Moreover, in the later periods of the cluster policy

in Upper Austria this raising of awareness is done more systematically and on a platform based approach. Indeed, we think that in Upper Austria since the first period of the cluster policy a kind of **forum/ network for communication between all affected actors** was established. The basis for this communication was either the TMG, development agency, or the Upper Austrian Chamber of Commerce. Around these two institutions most of the discussions took place. While in the Basque Country, the cluster concept was brought up by the Basque Government, and included only the discussions on their level.

Finally, we suppose that is exactly these several initial differences in the first period of the cluster policy might have led to the time difference in the start and in style of the cluster policy.

1.3.2. Economy and cluster analysis stage

Viewing the economy and cluster analysis of two regional cluster policies we have noticed several following similarities.

First of all in both regions an **in-depth economy and cluster analysis for understanding the input situation and strengths of the regions** was made. These studies were applying various methods of analysis and identifying the existing and potential clusters for the further regional selection and focus. In both cases the policy experts were **aware of the main principals and advantages** of the cluster based policy and cluster tool. Nevertheless, the conduction of the studies was done in a different way. If in case of the Basque Country the international experts with good knowledge on the methodology and concept developed by Michael Porter (Monitor Group) were directly contracted to conduct these analyses. In Upper Austria under the framework national program (Austrian TIP Program) and by national economists (by Austrian Institute of Economic Research) more diverse studies were performed. In such, although in both cases the organized **group for conducting researchers was established** (the Basque Country – Government and Monitor experts, Upper Austria – WIFO, Government on the national and level of federal province, TMG, Upper Austria Chamber of Commerce), it seems that in the Basque Country it was done in a more concrete, short and precise way. Furthermore, in the evolution of the cluster policy we think that only in the Basque Country at a later stage, several big scale in-depth analyses on the policy and cluster situation were made (since 2009 Basque competitiveness reports and studies made by Orkestra-Basque Institute of Competitiveness), while in Upper Austria we can draw our attention mostly to the recent ex-ante analysis by Mayerhof, P. and WIFO in 2013.

Secondly, we think that the identified and selected clusters for policy targeting were in both regions indeed **based on unique regional characteristics**, which were evident from the conduction of the region specific studies. The studies were also clearly pointing out all **existing and potential clusters** (e.g. automotive, plastic, wood – Upper Austria, and machinery tools, automotive port of

Bilbao – the Basque Country). Moreover all the selected clusters **fitted with the existing policy priorities**, but did not necessary had overlaps.

At the same time we observed that if in Upper Austria the chosen clusters for later policy targeting seem to show stronger similarity with the identified natural clusters, in the Basque Country in reference to Torres and Lagendijk (2000) we observed lower coherence between the proposed by Monitor's study clusters and the ones that were finally chosen for policy support (e.g. in the Porter's study the following sectors were suggested for the policy support: travel and leisure, Rioja wine or Fishery, but in none of them, even in 2014 has the cluster association or strong policy focus. We think that this specific selection of clusters in the Basque Country is related with more **government driven** policy making, even despite the fact that the final decision on sectors, in which cluster initiatives had to be established, was developed on the public/private platform base. At the same time, although the establishment of cluster initiatives in Upper Austria was driven more from the top down, there we see more **consensus between the public and private actors** than in the Basque Country in the first period of cluster policy. The **choice of clusters is also made in consultation with internal and/or external expert analysis, actors within clusters and then combined with instincts of policy makers**. Overall in the later periods of the cluster policy all new cluster initiatives were established in the close communication with the private sector. This is especially relevant for pre-clusters in the Basque Country, which were defined in around 2009 based on the leading export oriented sectors.

1.3.3. Policy review stage

Observing the policy review stage we have noticed the following similarities between the regions.

First of all, in both of the cases the **review of the cluster policies is done**, but often there is no strong attention given to the benefits, which can be extracted by the conduction of in-depth review of cluster policy. The exception in both regions can be given to the policy review stage in the first and the latest cluster policy period, when the review of the previous policies was done very extensively, was very causative for setting clear steps for further policy intervention. We assume this deep policy review was associated with the need of the policy makers to justify, clearly understand and argue their decision to continue application of cluster policy. From our point of view this latest review was already connected with the long-term period of the cluster policy implementation and its integration into the multilevel system of existing European and national policies, e.g. RIS3 Strategies.

Secondly, we also observe that with time, the review of the previous policies or cluster policy is done more strategically. Moreover the **private sector is also stronger engaged** in the review. At the same time we have also observed that for the review of the cluster policies regional authorities

often contract **external institutions**, e.g. Joanneum Research, Technologies Group (Upper Austria) or Monitor Group, Deloitte Consulting (the Basque Country).

Finally, in both cases, **the policy experts were well informed** with rationales, benefits and possible risks, which were coming from the application of cluster policy.

1.3.4. Policy development stage

The study of the cluster policies in the selected regions of the European Union, the Basque Country and Upper Austria has also produced several essential similarities and differences in the development stage of their policies. Overall it is necessary to note that most of the aspects (either similar or different) have been modified and upgraded since the first period of the cluster policy, but there are also issues which remain permanent.

Under this we refer to the key components, which were building the **overall goal of the cluster policy**. In such, in both cases the application of the cluster policy was centered on such aspects as **cooperation between companies and other institutions, SMEs promotion, innovation and competitiveness**. At the same time we think that if in the Basque Country the ultimate goal of the regional cluster policy was strengthening regional innovativeness, by means of enhanced competitiveness of the companies resulted from an increase in the cooperation between companies, research institutions and academia, in Upper Austria by contrast strengthening regional competitiveness was the ultimate goal, which was to be achieved through enhanced innovativeness of the companies driven by cooperation (Graph 78).

Moreover the **strategy and vision of the cluster policy** in both cases has similarly changed. If in the first years of the cluster policy the vision for the cluster policy was to work alongside the innovation and technology policy as a mean to strengthening innovativeness of the companies and/or regions, in the later periods of the cluster policy it was already working as a basis for regional smart specialization, diversification and self-positioning of the whole regions. Finally, the cluster policy in the latest years (since around 2010) was confidently seen as a driving force of the regional policy in the Basque Country and Upper Austria. That is why cluster policy was never acting on its own, but rather was seen as an integrated part of the overall strategic development of the regions, developing alongside the regional needs and working with other existing policies, e.g. industrial, innovation & technology policies (Table 34 and Graph 14). This allows us to state that there was a **good mix of other existing policies**, which were also addressing clustering and stimulating the development of business environment in the regions.

Another similarity which has been maintained within the developed cluster policy in both regions is that the policy is targeted towards **more than just one cluster**. In both cases from the beginning the

need to address and support at least three clusters was mentioned in the first policy programs. In the Basque Country the attention in the policy program was given to almost 7 cluster sectors from the start. By 2014 the cluster policy in Upper Austria focused on around 9 clusters and 3 networks, while in the Basque Country there are 22 clusters incorporated in the policy priorities.

Furthermore, we think that the developed cluster policy was aiming to assist cluster not only through supporting cluster-based projects and established clusters associations, but also through other regional activities, which could additionally **facilitate spill-overs, networking and increase agglomerations**. In both regions to these measures we can address the support through promotion of e.g.

- inter-clustering
- cross-border cooperation
- establishment of networks addressing vertical thematic issues

Nevertheless, we are **doubtful** in terms of the ability of **cluster policy to consider the peculiarities of the cluster's character and evolution**. Indeed on the level of the cluster association it was the case, thus, on the macro/ regional level all clusters were very similarly treated. At the same time, since 2009 the Basque Country and since 2006 Upper Austria, we see the first signs associated with an intent to boost clusters differently. In the Basque Country since 2009 the differentiation between priority and pre-clusters was introduced, resulting in different financial support of cluster associations in each group. Moreover since 2014 clusters will receive even more differentiated financial support, which is based on the activities plans. In Upper Austria this was the case already since the establishment of independent cluster managing authority Clusterland Upper Austria Ltd.

Finally, we think that in the Basque Country as well as in Upper Austria the development of the cluster policy **fits/ fitted within the responsibilities and powers of the regional policy making authorities**, as all of the authorities (e.g. TMG – Upper Austria or Basque Government –the Basque Country) had the facilities and resources to develop policy programs. Moreover since 2000s the development of cluster policy in both regions was conducted in communication with different regional actors. In particularly in Upper Austria it was clearly realized. As mentioned in the second strategic program “Innovative Upper Austria 2010” the involvement of more than 250 different regional experts was engaged in drafting the program. While in the Basque Country this process was/ is not very transparent. Although we were informed that the communication during the drafting of the program takes place and will be further improved. Nevertheless, it seems that in Upper Austria the understanding of the cluster concept among representatives of different regional groups is more synchronized and is conceptually clearer than in the Basque Country.

1.3.5. Policy implementation stage

On the regional level, in the Basque Country and in Upper Austria the implementation of the cluster policy was realized mainly through the application of two measures:

- a) establishment of **cluster supporting organization** (cluster initiative/ association)
- b) promotion and support of **projects in co-operation**

Moreover, in both regions for the realization of the cluster policy **already existing mechanisms or programs** were **tried to be used**. In particular, in the Basque Country many cluster associations were established on the basis of earlier existing sectorial business associations. In addition to this, the Basque Government also tried to use technology policy instruments, such as funding of projects realized by research centers, aligned with cluster priorities and needs. In Upper Austria the personnel capacities of the preexisting business association, TMG, were used as cluster initiatives in the first period of the cluster policy. At the same time we think that more effective application of other programs and activities for the enhancement of clustering in both regions was achieved in the latest periods of the cluster policy, when the awareness and access to companies' related programs on the regional, national and European level has more integrated and facilitated. This is also the case when the benefits of the multi-level cooperation and funding started to be better realized.

With the exception of the above, in general we think that the implementation of the cluster policy in both regions has been realized in a largely distinct way.

First of all the **coordination and communication** between cluster associations and regional authorities was more **decentralized in the Basque Country than in Upper Austria**. Although since the start of the cluster policy until 2014 the Basque Government has established within its Administration the matrix of cluster experts (they were first advising and later only being a bridge institution between regional authorities and clusters), still all cluster initiatives were fully independent and acting on their own within the framework set by the policy program. Moreover, only since 2014 the business association SPRI started to serve as a first stop point to enquire about the cluster associations. Herewith, we still assume that the development of cluster association was done very decentralized/ independent. On the contrary, in Upper Austria in the first stages of the cluster policy mainly one organization, Technology and Marketing Company, was responsible for the realization of policy related activities. Even after the separation of the cluster-related departments from the TMG, most of the cluster initiatives were united under the new independent institutions, Clusterland Upper Austria Ltd. This company's management board serves as a communication link between the clusters and regional authorities. Although there are still some cluster initiatives, which act independently from Clusterland, e.g. Food cluster, Eco-energy cluster, we still think that the cluster coordination in Upper Austria is more centralized than in The Basque

Country, although it is even market driven. In addition to this, we see an improved visibility in relation to the cluster association in Upper Austria. Besides having a very structured, clear and organized bi-lingual online presence, the international participation of clusters is also assured by Clusterland Ltd.

This is also closely related to the **difference in the financial support of the cluster policy**. Although in both cases public money is being provided, its sum and the way in which it is organized differs. While in Upper Austria in the beginning the cluster policy was realized with the full financial support of the public resources, in the Basque Country the members of the cluster association had to pay a certain fee from the beginning. At the same time, in the Basque Country this organizational approach to cluster policy funding along with the quantity of public support has been largely maintained over the years, while in Upper Austria it has changed to be more business driven. Herewith since 2005 membership fees were also introduced leading to a constant reduction of public grants. Nevertheless, neither in the Basque Country nor in Upper Austria is the **timeframe of funding** clearly formulated and is strategically aligned.

Meanwhile we marked certain similarities between the regions in terms of the organizational functioning of the **cluster associations**.

In both regions since around 2000s cluster organizations tried to develop and **propose clear and sizable visions** for their members. On average, **cluster managers tend to be highly qualified** personnel with multiple competencies and strong motivation. In addition to this the organization structure is very similar. The **organigram is very horizontal**: there is a main cluster manager, who has several employees responsible for certain activities and assisting the main manager in different activities. The group of members of the cluster association forms an Advisory Board, who is responsible for the strategic development of the cluster. This Board tends to be dominantly led by the **representatives from industry**, as well as other institutions. In both cases within cluster initiatives there are several similar vertical and horizontal thematic areas for action, namely internationalization, technology promotion and education.

1.3.6. Monitoring and evaluation stage

The analysis of the two regional cluster policies has shown overall that starting from the first period of the cluster policy the actions, which were developed and applied as a part of the monitoring and evaluation stage, have been significantly upgraded and improved. Moreover these changes took place on both, macro- (regional) and micro (cluster) levels. That is why the character of the key components within the monitoring & evaluation stage significantly differs between the first and the latest period of the cluster policy.

For example, in the first years of the cluster policy in both regions **evaluation and monitoring were not seen as an integral part of the cluster policy**. Later on from around 2000 in the Basque Country and around 2004 in Upper Austria, it starts to be more evident that the regional policy makers and cluster managers are more focused on gathering and accumulating specific data on cluster policy evolution. At the same time, we think that in Upper Austria the gathering of data takes place in a more structured and systemized manner. In particular on the level of cluster associations we refer to the biennial survey, cluster association self-benchmarking instrument and overall around 30 other different indicators, which are also accessible online. This also shows a more **balanced range of methodological approaches**, which are being used in the cluster policy evaluation. The changes on the macro level are very evident with the appearance of control indicators in the strategic policy plans both in Upper Austria and the Basque Country. As such, while Basque Internationalization Plan 2014-2016 mentions the milestones and targets to be achieved, the Strategic program “Innovative Upper Austria 2020” already incorporates the ex-ante policy and indicated the forthcoming mid-term evaluation.

At the same time we think that there are several key components of the evaluation & monitoring stage, which are still not strongly considered. First of all not all **members of the natural clusters are being involved in the evaluation process**. Even considering the regular biennial survey, which is conducted in Austrian region, is targeted only on the members of the cluster association rather than on the members of the natural one. Secondly, in **none** of the regions **evaluation is conducted with a long term perspective**. Finally, in addition to the above we think that especially in Upper Austria the evaluation of the cluster policy is lacking two significant elements: 1) one platform where the data can be gathered and analyzed and 2) region-built research institutions, which are able to perform analysis in a regular and systematic manner. Although Clusterland Upper Austria Ltd. gathers and produces different reports on the development of clusters, we think that their abilities are limited to perform a full scale economic and cluster analysis, as their prime role is to be cluster managers, rather than researchers. In the Basque Country Orkestra-Basque Institute of Competitiveness can potentially serve as a one stop point for cluster and economy analysis.

Thus overall we assume that in both regions the policy makers on all levels of the cluster policy are aware of the reasons on the need and the results they want to achieve by conducting the evaluation. In particularly in Upper Austria it was numerously mentioned that the companies are the heart of the clusters and their satisfaction with the policy instruments is their high priority. Although we still think that the results from **monitoring and evaluation increase the awareness of the cluster situation and policy approach**, we think that the integration of missing key components, would significantly improve the performance and effectiveness of the cluster policy in both of the regions.

1.3.7. Policy improvement stage

The most important finding from the two cases of the regional cluster policy in relation to the improvement stage is their continuous modernization and adaptation of the cluster policy instruments based on the **lessons driven from the evaluation**. But these changes are different in each of the regions; this has to do with different policy background, institutional structure, financial resources and cluster needs. In the both cases constant improvement takes place and the changes are often driven from evaluations, or recommendations, which were provided by external or internal experts. Moreover the changes take place on both levels of cluster policy: regional and cluster. Furthermore, modifications are also not blindly copied from recommendation, but adapted or aligned with political and business needs. Besides the need towards constant policy adaptation is taken with the positive attitude. Indeed modification of the cluster policy is considered as long lasting learning and upgrading processes. Thus in order for the changes to be successful the **new assessments have to be explained and be understandable**, and correlated with participants needs. That is why in the latest periods of the cluster policy making the private sector is strongly involved.

1.3.8. Key components important during the whole policy process of cluster policy

Driving the conclusions from the review of the key components (e.g. political support, presence of strong regional government/authority, collaboration & dialog, etc.), which had to be present during the whole policy stages and periods we want to claim that from our point of view all of these components were well present in cluster policy in the Basque Country as well as in Upper Austria.

At the same time in some aspects we have observed slight differences, which however do not affect the components itself. First of all this is related to the **presence of strong regional government/authority in the regions**. Indeed although in both regions this institution is present, its type is a bit different. If in the Basque Country the Government and the Provincial Councils can be considered as strong regional institutions, in Upper Austria it is mostly Chambers of Commerce and industrial, labour, etc. associations. This has to do with the historical established political system in the countries of regions' allocation.

Secondly, **the political stability** of the regions was more assured in case of Upper Austria rather than the Basque Country. The reason for this was the conflict between the Basque separatist group ETA with regional and national Spanish authorities. Furthermore, this political instability was also driven by higher vulnerability and diversity level in Spain rather than in Austria.

Finally, we also think that the **collaboration & dialog** is more achieved in Upper Austria rather than in the Basque Country. Our assumption is based on the smaller number of population and higher grade of centralization of many political, cultural and economic events in Upper Austria rather than in the Basque Country.

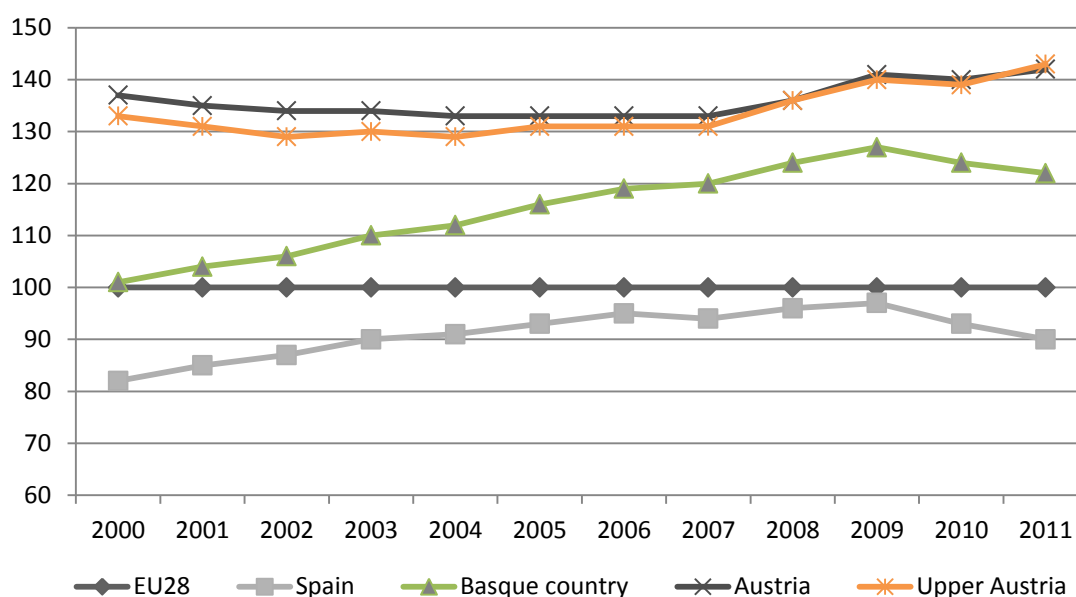
2. Influence of cluster policy in regional economic development

In this part of the main findings we draw the main conclusions on the implications of cluster policy on the regions' economic development through the prism of the defined factors (capital, human and labour resources, innovation and technological development and clusters) and economic growth.

2.1. Economic development and growth

Both regions are seen as one of the leading industrial regions not only within the borders of their countries, but also at the European level (Graph 80). Moreover, the positive difference to EU 28 has been steadily maintained since 2000.

Graph 80 GDP per capita in percentage of the EU (base EU28=100%), EUR, EU, Spain, the Basque Country, Austria, Upper Austria, 2000-2011

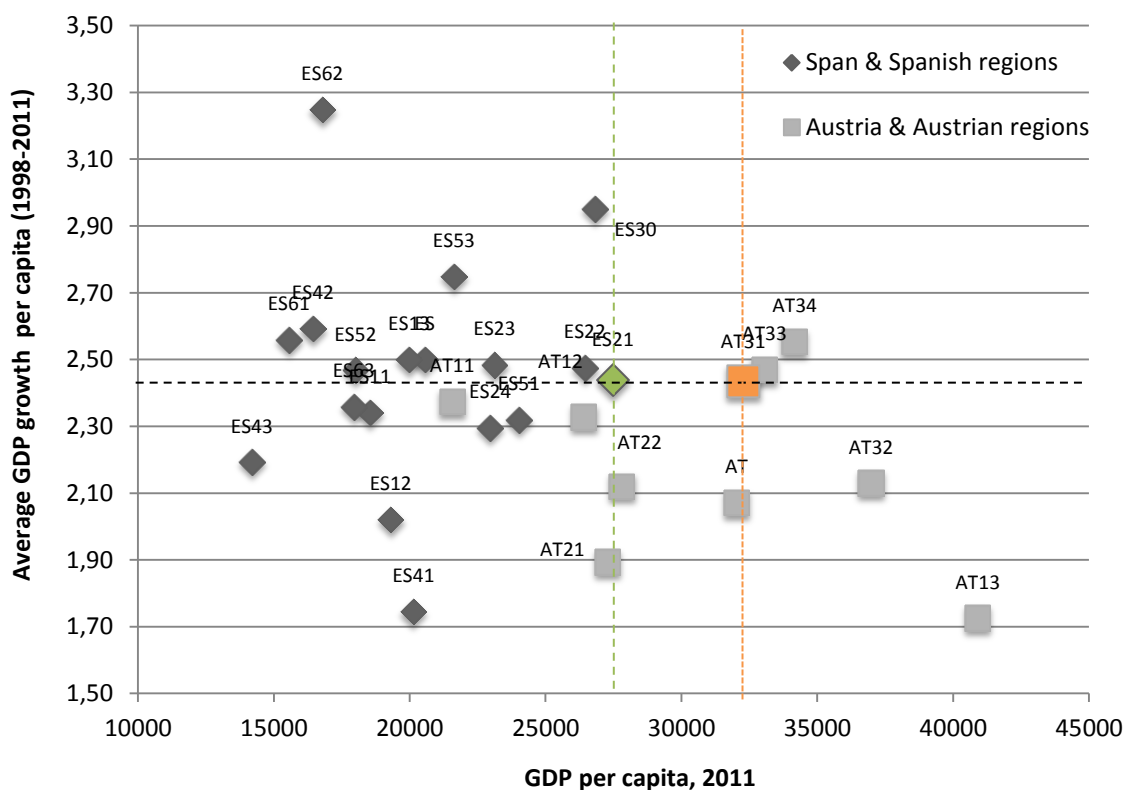


Source: Authors' development based on Eurostat, 2014

The economic standing of the countries in which the regions' are located is quite different. These differences are important to stress when drawing the conclusions on patterns of the regions' economic development. As such although the Basque Country was the leading region in terms of GDP per capita within Spain in 2011, Upper Austria was only on the 5th among its neighbor regions, however its GDP per capita (EUR 35 874, current prices, EUR 32 273 constant) in 2011 was clearly higher than of the Basque Country (EUR 30 302 current prices, EUR 27 475 constant) (OECD 2014).

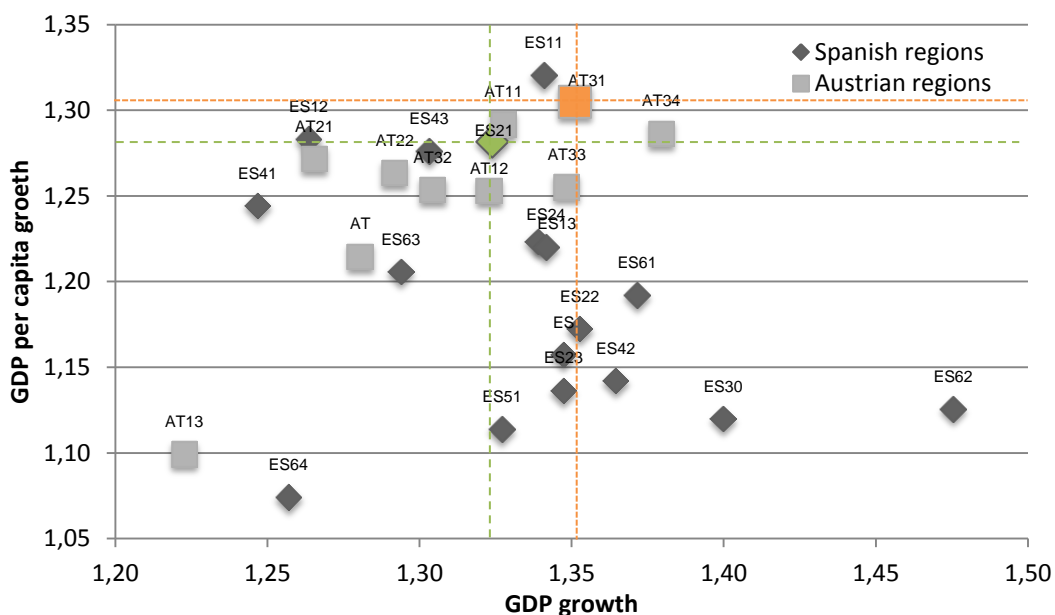
At the same time the average GDP per capital growth (based on constant prices) for the period from 1998 (when cluster policy has been launched in Upper Austria) to 2011 was the same in both regions – 2.44% (Graph 81). Meanwhile, while for Upper Austria the GDP growth of 2.44% is clearly above the average, among Spanish regions the same growth is below the national trend.

Graph 81 Average annual GDP growth per capita (EUR constant (real) prices (year 2005)) from 1998 to 2011 and GDP per capita (EUR constant (real) prices (year 2005)) in 2011, Spanish and Austrian regions



Source: Authors' development based on OECD, 2014

Graph 82 GDP and GDP per capita growth (EUR constant (year 2005), Spanish and Austrian regions, 1998 to 2011)

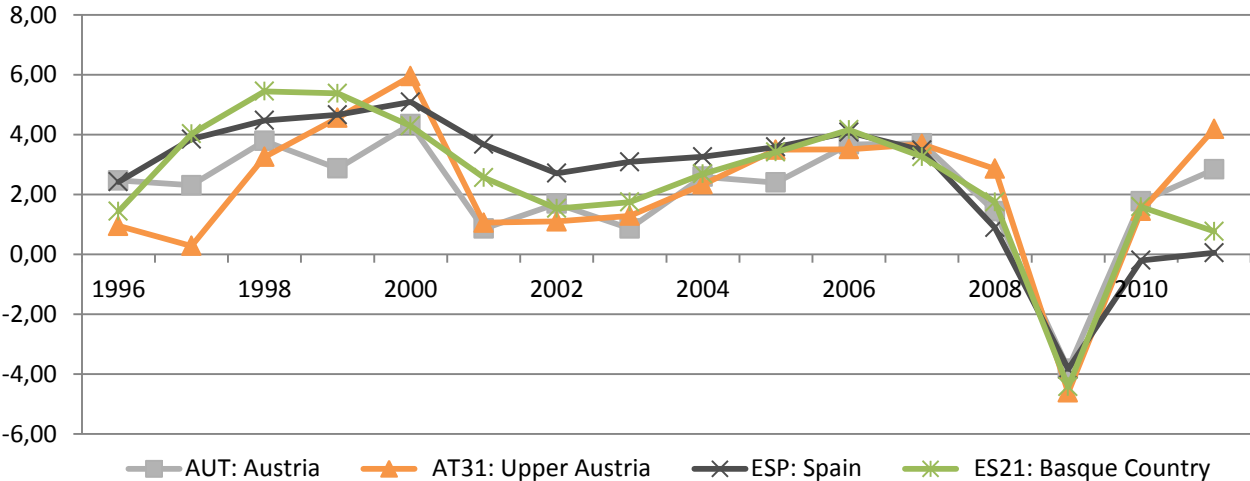


Source: Authors' development based on OECD, 2014

A similar trend in relation to regions position within their country is also to be observed when analyzing the overall increase of GDP per capita and GDP (both based on the constant (real) prices to 2005) (Graph 82). There we can see not only the higher increase of GDP per capita (30%) and GDP (35%) in Upper Austria in relation to the Basque Country (28% and 32% respectively), but also the stronger positioning of Upper Austria in comparison to growth in other Austrian regions. Indeed from 1998 to 2011 the GDP per capita increase was the highest and GDP rise - second highest in Upper Austria in relation to Austrian federal provinces.

At the same time we should take into consideration the differences in the stage of cluster policy implementation in the regions, since year when we do the comparison of the GDP per capita and GDP increase in the Basque Country cluster policy has been in implementation for 6 years, while in Upper Austria - still in its infancy. In order to achieve a more objective comparative overview we observe the GDP growth rates in the first 5 and 10 years since the year of the cluster policy launch in both regions (Graph 21 and Graph 83). From there we note that both regions in the first years (the Basque Country, since 1993 up to 1998 and Upper Austria since 1997 up to 2000) had constantly very high growth rates. Since 2003 their GDP growth rates have aligned. This can hint that in both regions, especially in the Basque Country, the growth could be the result of the re-positioning and re-defining the regional competitiveness due to the applied cluster, innovation and technology policies. Meanwhile we also tend to think that the GDP per capita growth in the first years of the cluster policy was determined not only by the application of cluster policy, but also by the overall economic boom that took place during this period.

Graph 83 Evolution of GDP growth rate (EUR constant (real) prices (year 2005)), Spain, the Basque Country, Austria and Upper Austria, 1996-2011



Source: Authors' development based on OECD, 2014

In terms of the observed **Overall Competitiveness Index** (Annoni, Dijksra 2013), we can see that both regions are of a similar standing. Apart from being in the same group they also ranked similarly, one after the other, namely Upper Austria with 0.159 (Rank: 104 out of 262) and the Basque Country with 0.175 (Rank: 103 out of 262).

Thus our picture would be more complete by observing some selected sub-indicators of an overall RCI competitiveness index. Herewith in terms of the **basic sub-index**, which includes such core aspects as basic education, health, infrastructure, macro stability and institutions **Upper Austria** (0.085, Rank: 118)) is better placed than the Basque Country (-0.057, Rank: 135), being almost 17 points higher in the rankings. **Austrian region** (-0.031, Rank: 126/ the Basque Country -0.143, Rank: 140) is similarly better positioned in the **innovations sub-index**, which includes aspects such as innovation, business sophistication and technological readiness. Nevertheless, the **Spanish region** (0.459, Rank: 63/ Upper Austria 0.303, Rank: 89) is significantly **ahead** in the **efficiency sub-index**, which is based on the market size, labour market efficiency and high education training indicators.

In terms of a review within national and EU borders, we can say that both of the regions are almost always located in the same group, which positions them either on the average or slightly above the average level. Summing up, it can be seen that in general terms both of the regions have similar economic and social development. However, Upper Austria, in contrast to the Basque Country, seems to be more homogenous with other regions of its country. Furthermore, although the overall competitiveness score of the Basque Country is slightly higher, it is behind Upper Austria in some basic and innovation related indicators. The cause of this might be the slightly different social and educational systems, as well patenting patterns, which will be studied in more detail later. Significant differences could be caused by the more developed SMEs support system in Upper Austria and a better general macroeconomic situation. In European terms, both of the regions still have potential for further growth and improvement if they are to catch up with the leading regions, such as e.g. Baden-Wuerttemberg in Germany or Sydsverige in Sweden or Utrecht in the Netherlands. At the same time we have to keep in mind that all indices are cumulative indicators, where introduction or exclusion of one of them can dramatically influence the score of the index. Herewith their application must be performed with caution.

To conclude, we think that the economic performance in Upper Austria was superior to the Basque Country especially as from 1998 to 2011 the growth of GDP and GDP per capita for Upper Austria was higher than for the Basque Country, still it doesn't allow us to draw a fully firm conclusion in favor of the Austrian region (Graph 82). Thus, based on the selected indicators we note higher economic performance in Upper Austria as compared to the Basque Country **we suggest more solid implications of cluster policy in Upper Austria compared to the Spanish region**. There is some

ambiguity in linking cluster policy with growth, especially considering the following two issues. First of all, based on the Overall Competitiveness Index (Annoni, Dijkstra 2013) both regions are similarly placed and, secondly, that due to the data availability we can compare only a shorter period (policy in the Basque Country started in 1992 while the period we mostly compare is from 1998 to 2011) of cluster policy in the Basque Country to a full period (since 1998) of the cluster policy in Upper Austria. We tend to claim that the economic development of both regions has benefited from the application of the cluster policy. It is especially evident in the long-term, where both regions have shown very similar growth rates since 2003. Furthermore despite some lower growth related indicators in the Basque Country, we still mark the excellent and above average performance of this region within Spain, which makes us think that the cluster policy certainly had a positive impact on the economic improvement of this autonomous community.

2.2. Factors of influence

2.2.1. Factor capital

Both regions showed the lowest **Gross Fixed Capital Formation** as a share of GDP in 2007 within their country (25% - the Basque Country and 18% - Upper Austria) (Graph 23 and Graph 56). At the same time, while in Upper Austria the GFCF as a share of GVA until 2004 was on average similar to the Basque Country, around 23.4%, after 2004 we noticed a more significant fall in the Austrian region compared to the Basque Country (22.5% the Basque Country, 21.84% Upper Austria, 2007). However as we didn't have any more data, we couldn't study the further development for the Basque Country. In the case of Upper Austria it reached 21.23% in 2011.

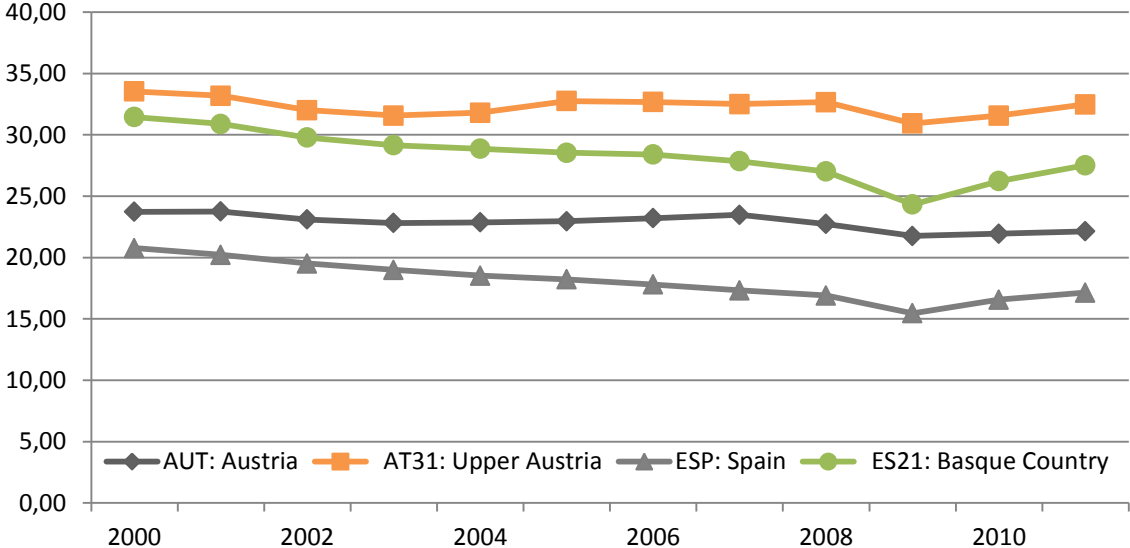
Besides the above, based on our selected indicators in the capital related factors we have noticed a further set of **distinctions**.

First of all, based on **disposable household income** per head (Graph 22 and Graph 55) Upper Austria in 2011 was positioned along the Austrian (18 397 – similar as for national), while the Basque Country was the highest in Spain (16 420 – the Basque Country, 12 267 - Spain). Moreover among other regions in Spain the Basque Country showed the highest disposable household income increase almost since the start of the cluster policy (39% from 1995 to 2011), while in Upper Austria it was only 3% higher than the Austrian (16% from 1998 to 2011 and also around 16% from 1995 to 2011). In case of the period based comparison, we also couldn't see any similarity, as the higher increase for the Basque Country tended to be in the first years of the policy, while for Upper Austria it came in the later years.

Finally both regions are seen as **industrially strong** ones even not only within their countries. Nevertheless, we have observed a very **distinct development trend in terms of the industrial and manufacturing share** with respect to the regional GDP in the Basque Country and Upper Austria

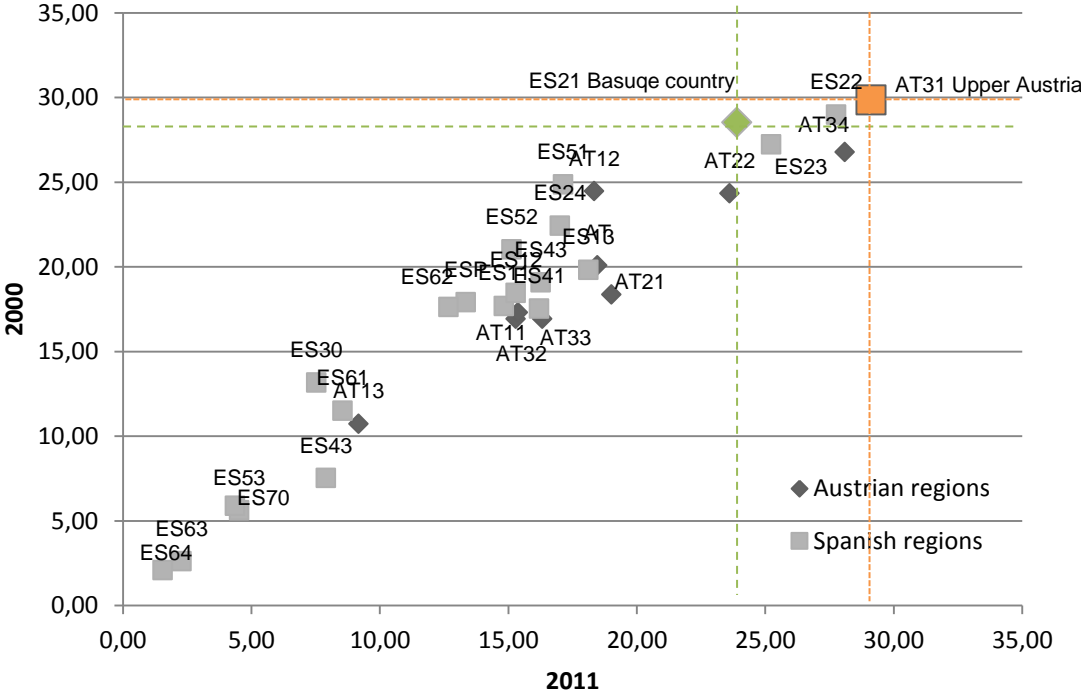
since 2000 (Graph 84 and Graph 85). While in the Basque Country GVA in manufacturing was deliberately reduced almost in 5%, from 28.54% in 2000 to 23.89% in 2011, in Upper Austria it remained stable and was constantly above 29%.

Graph 84 Evolution of GVA in industry as a percentage of total GVA, 2000-2011



Source: Authors' development based on OECD, 2014

Graph 85 GVA in manufacturing, constant prices, EUR, % in industry 2000 to 2011



Source: Authors' development based on OECD, 2014

2.2.2. *Human and labour capital*

In terms of the human capital we have seen numerous similarities between the two regions, while differences are mostly evident in labour market development.

The share of the **population** in each of the observed regions of the cluster policy has **similarly** been reduced with respect to the total share of the national population. Furthermore, the average population growth rates in the Basque Country and Upper Austria were also the lowest within their respective nations. At the same time we note that the population change in the Basque Country (2.3% from 1990 to 2014) was lower than in Upper Austria (9% from 1998 to 2014). Herewith both regions may also face problems related to the change in demography. By comparing cluster policy periods it seems that in both regions the increase of the population was the highest around the same time (in the Basque Country 2.6% from 2006 to 2012 – third period, Upper Austria 1.87% from 2004 to 2012 – second period)

Both regions have one of the highest levels of **labour force** with respect to the total regional population (50% in the the Basque Country and 53.32% in Upper Austria in 2013).

The **unemployment rates** in both the Basque Country and in Upper Austria were one of the lowest within their countries (2013: the Basque Country 15.84% to Spanish of 26.36%, Upper Austria 4.03% to Austrian of 4.09%). However it is clear that in the Basque Country these rates were significantly higher than for the Austrian region, as well as for the EU average. At the same time, in the Basque Country there was a significant fall in unemployment of more than 10% from 1993 until 2000. Moreover similar declining trends in unemployment in both regions can be observed from 2004 until the beginning of the financial crisis.

Although the **productivity** in Upper Austria (EUR 68.44 thsd. 2011) is average compared to Austria as a whole, it is still higher than that of the Basque Country (EUR 57.87 thsd. 2011), which in turn is the highest in Spain. This is the biggest **distinction** among the regions. Moreover, the increase in labour productivity from 1995 to 2010 was higher in the Basque Country than in Upper Austria, 70% compared to 38% respectively (similato for period 2000 - 2010 Basque region 48% compared to Upper Austria 26%). In comparison to other Spanish regions the Basque Country had the highest rate, while for Upper Austria this increase was average with respect to the country's other regions.

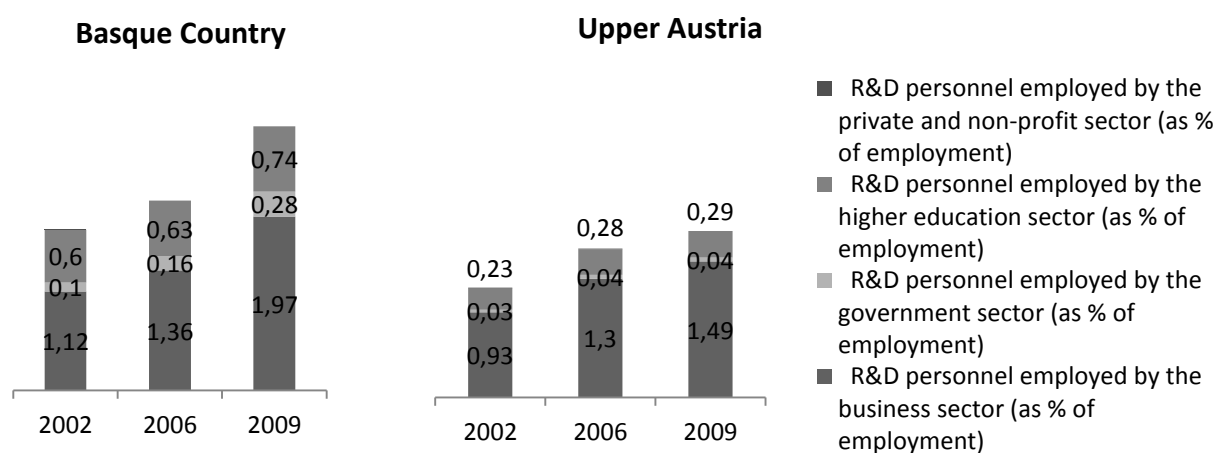
Finally, there is also a significant distinction between the Basque Country and Upper Austria based on the sub-indicator “Labour market efficiency” of the overall Competitiveness Index (Annoni, Dijksra 2013). Out of 262 regions Upper Austria was placed 31st with 0.93 points, while the Basque Country with -0.02 points only on the 146.

2.2.3. Education, technology and innovation

First of all the **educational system** and herewith the educational level of labour force varies strongly between the studied regions. While in Upper Austria the education system is more oriented towards assuring the accessibility of basic secondary education and then more technical and industry oriented experts, in the Basque Country the system facilitates and supports the attendance of tertiary education institutions, especially universities. Moreover, this has to do not only with the educational, but also with the labour market policies. Indeed, the labour policy in Upper Austria is much focused on job creation and assuring full employment.

That is why while having one of the lowest unemployment rates Upper Austria in 2013 had at the same time the lowest rate of labour force with tertiary education (16.8%) within Austria (20.7%) and in comparison to the Basque Country (52.8%) and even Spain (35.8%). In both case study regions the proportion of labour force with tertiary education has increased since 2000, from 30% to around 50% in The Basque Country, but by only around 3% in Upper Austria. Meanwhile the labour force with secondary education is 64.9% in Upper Austria compared to 21.8% in The Basque Country. That is one of the reasons why (based on sub-index “Higher Education & Lifelong learning” of the overall Competitiveness Index (Annoni, Dijksra 2013) Upper Austria took only 127 place with 0.03 points, while the the Basque Country reached 13 place with 1.22 points among the 258 regions compared.

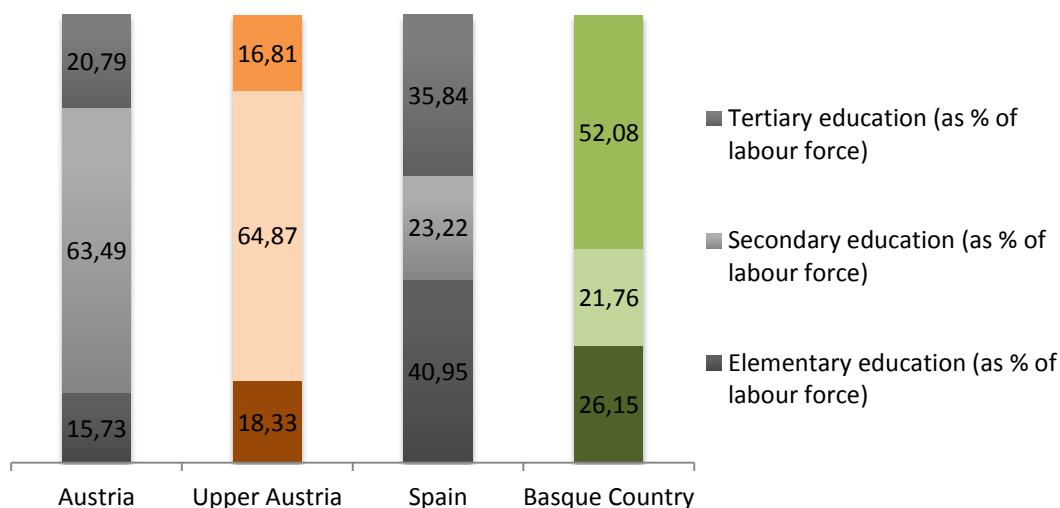
Graph 86 R&D personnel as a share of employment, the Basque Country and Upper Austria, 2002, 2005, 2009



Source: Authors' development based on OECD, 2014

In addition to the above, in 2011 the total enrollment rate in both regions was average in comparison to their respective countries and was almost similar between regions as well, the Basque Country – 21.3% and Upper Austria – 19.8%. Although in the case of the Spanish region it has slightly increased since 1999, while in Upper Austria on contrary it has decreased.

Graph 87 Education level as a share of labour force, Austria, Upper Austria, Spain, the Basque Country, 2013

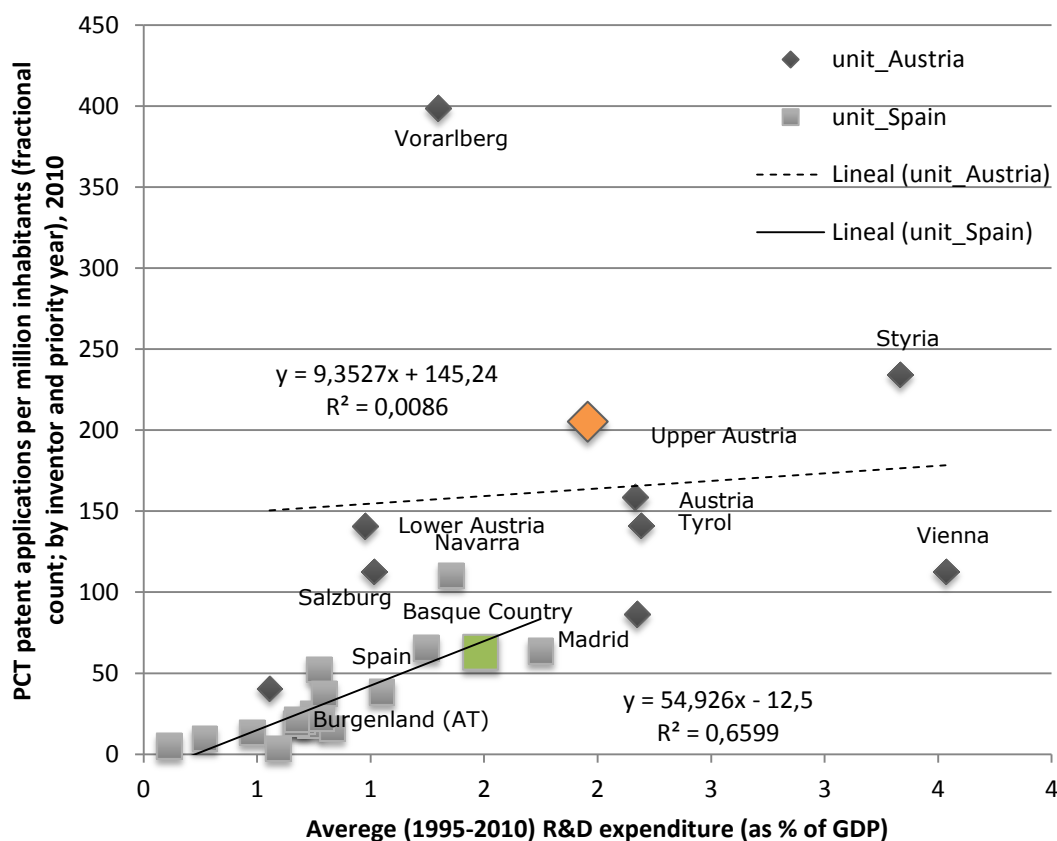


Source: Authors' development based on OECD, 2014

Secondly, another significant difference is seen in terms of the **innovation related indicators**. First of all we see a big difference between the number of patent applications in the Basque Country (64.04 per million inhabitants) and in Upper Austria (205.29 per million inhabitants). At the same time both regions experienced the highest growth in patent applications since 1991 in comparison to other regions within their countries (from 1990 to 2010 23.29 for Upper Austria, second highest 12.6 – Salzburg, and 49.25 for the Basque Country, which is the second highest after Aragon) (Graph 88). Moreover based on the number of PTC patent applications per million inhabitants both regions are among the top regions within their countries (in 2010 the Basque Country was the second after the Madrid area, while Upper Austria was third after Voralberg and Styria). Note, in case of the Basque Country the advancement in number of patenting was the results of intentionally changed business culture partially due to cluster policy.

The third difference between the studied regions is seen through the system of the **R&D expenditures**. Although the average total R&D expenditures for the period between 1995 and 2010 is higher in Upper Austria (1.96 % of GDP) than in the Basque Country (1.48% as a percentage of GDP), in comparison within other regions of their countries the Basque Country is leading, while Upper Austria is around average. This is considering that the R&D expenditures arising from the government sector are extremely low in Upper Austria compared to the Basque Country, 0.04% of GDP as to 0.12% of GDP in 2009 respectfully.

Graph 88 Average R&D expenditures to number of PCT patent applications per million inhabitant (by inventor and priority year) in 2010, Spain and Spanish regions, Austria and Austrian regions



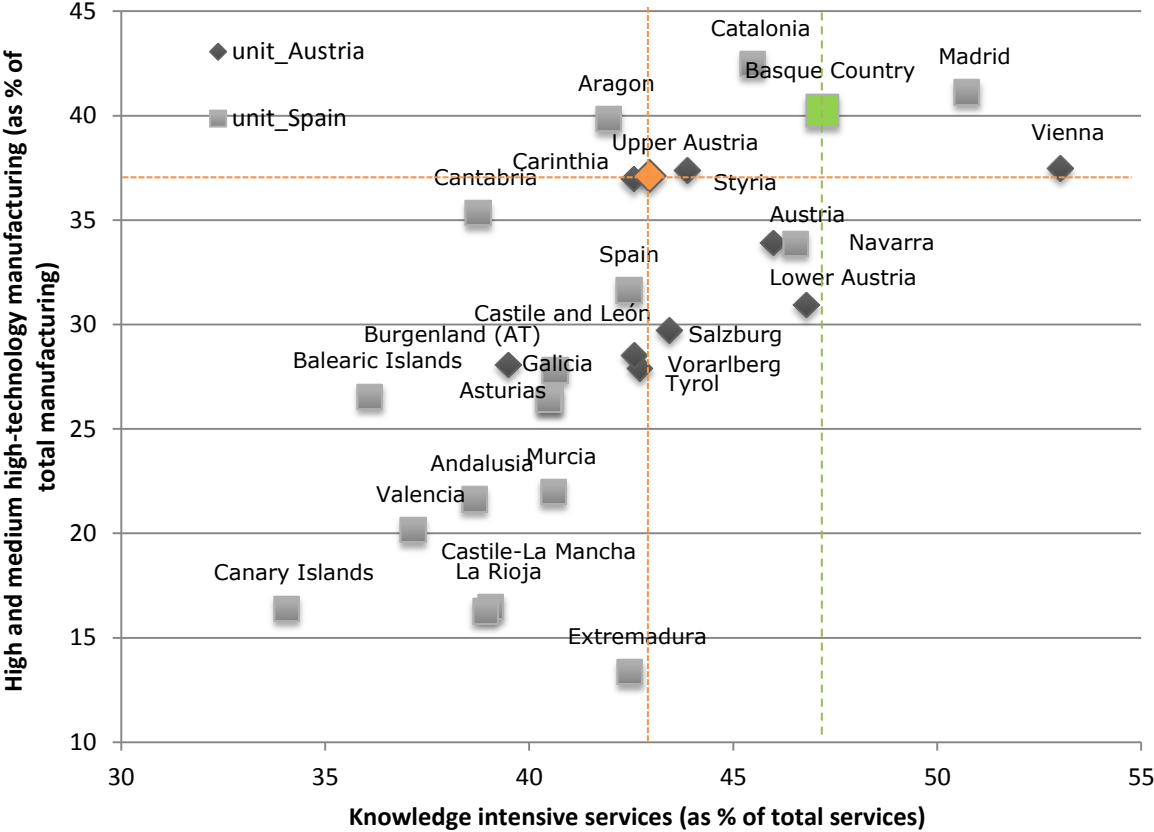
Source: Authors' development based on OECD, 2014

Furthermore there is also a big difference in terms of **total R&D personnel** employed in both regions. While in 2009 27,909 people were working in R&D in the Basque Country, which composed almost 3% of employment, in Upper Austria it was only 1.87% (13,231 people). Although in both regions the increase was higher than average compared to their respective countries (from 2002 to 2009 by 1.7 times for the Basque Country compares to 1.4 times in Spain, Upper Austria experienced a 1.6 times increase compared to the Austrian average of 1.3 times). In national terms the Basque Country has the third highest R&D personnel as percentage of employment, while Upper Austria is below the Austrian national. In addition to this, the Basque region also has one of the highest percentages of R&D personnel employed in the higher education sector.

Finally, the Basque Country is also better positioned not only within Spanish regions in terms of the rates related to **high and medium high manufacturing as a share of manufacturing** (2008: 40.24% in the Basque Country compared to 37.1% in Upper Austria, 33.9% in Austria and 31.6% in Spain) and **knowledge intensive services as a share of total services** (2008: 47.2% in the Basque Country compared to 43.9% in Austria, 42.9% in Upper Austria and 42.4 in Spain). This

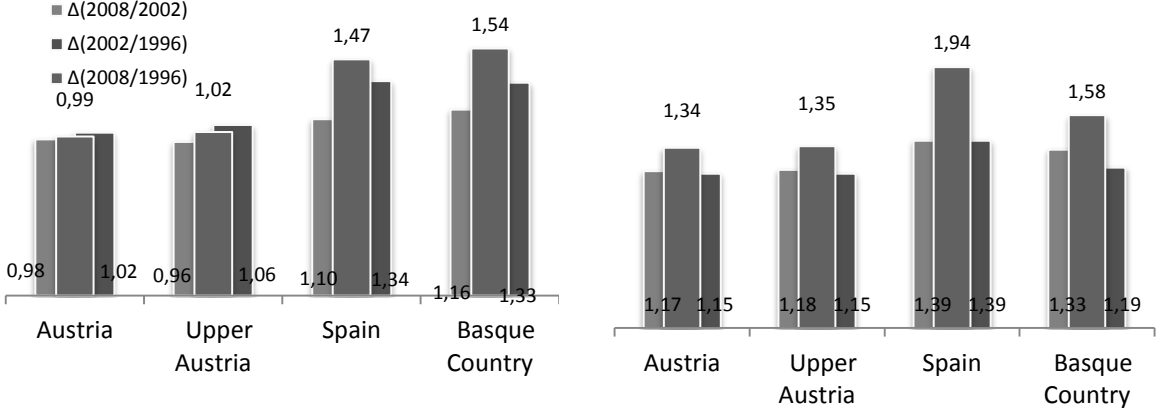
positioning is also supported by the higher than Spanish and Upper Austrian increase in high and medium high manufacturing (Graph 89, Graph 90)

Graph 89 Distribution of Spanish and Austrian regions based on High and medium high-technology manufacturing (as % of total manufacturing) and Knowledge intensive services (as % of total services), 2008



Source: Authors' development based on OECD, 2014

Graph 90 Period based change (*times) in high and medium high technology manufacturing and in knowledge intensive services, Austria, Upper Austria, Spain, the Basque Country, 1996 to 2008, 1996 to 2002, 2002 to 2008



Source: Authors' development based on OECD, 2014

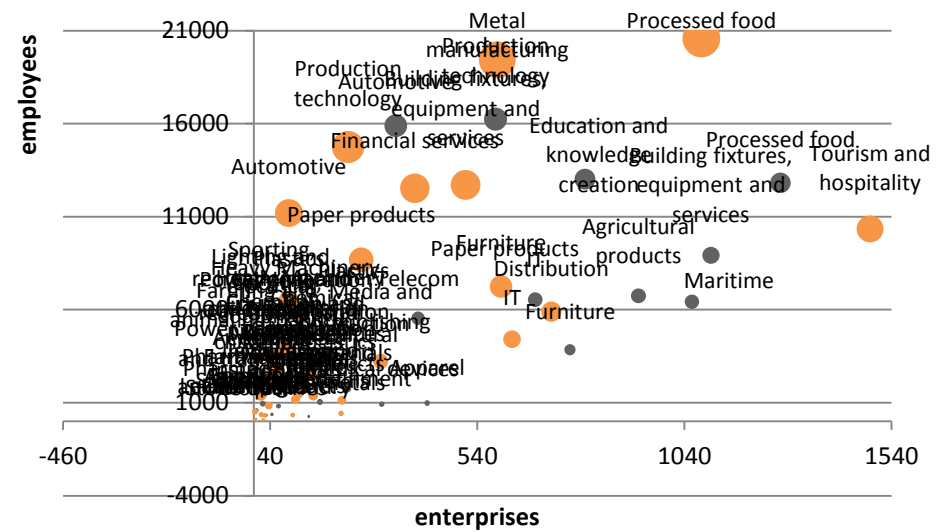
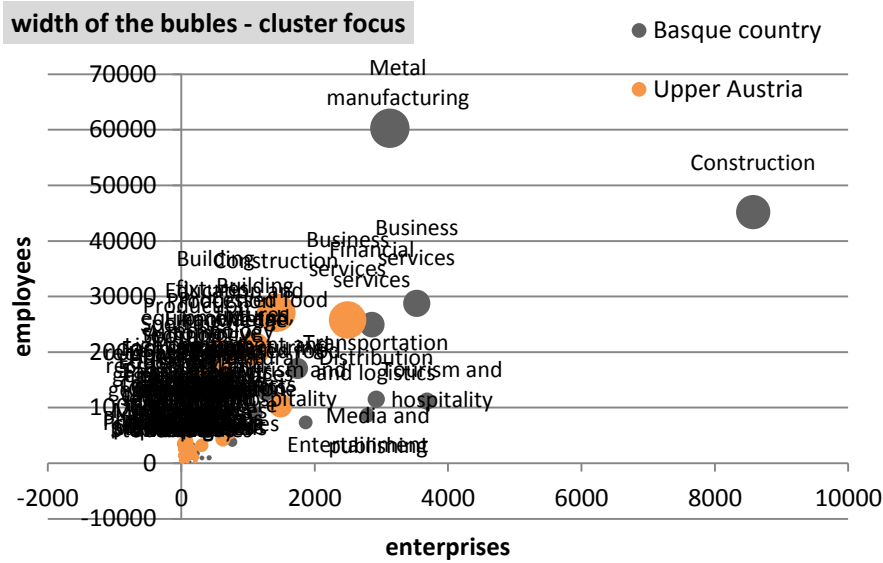
There are certain strong **similarities** between the regions in terms of the **period based growth of the number of patent applications**. As such in both regions the higher increase can be observed before 2000/ 2005. We think that this increase in both cases has to do on one side with the increase of the innovativeness of the companies, but on the other side more with the overall change in the patenting culture within the business sector.

Considering the small number of similarities between the observed regions as well as differences, which were highlighted above, the distinction in the positioning of the Basque Country and Upper Austria based on several sub-indicators of the overall Competitiveness Index (Annoni, Dijkstra 2013) is clear. As such while we see higher positioning of Upper Austria in regard to technology related indicators (125 out of 259, while the Basque Country took only 153 place), in relation to innovation indicators the situation is other way round (the Basque Country 93rd place out of 262, while Upper Austria only 132nd).

2.2.4. Clusters

The two regions have shown certain similarities and differences in terms of clusters and cluster development. Although we have tried to select regions with clusters in similar sectors or areas (particularly in automotive, metal manufacturing, construction, product manufacturing, etc., Graph 91 and Graph 92), there are a number of important differences, which need to be addressed in order to draw accurate conclusions on cluster development in the regions. First of all, the clusters in the Basque Country in the middle sized group (both based on the number of enterprises and employees) seem to be composed of a higher number of companies with fewer employees, while in Upper Austria it is the other way round (Graph 91). Secondly these middle and large-sized clusters seem to have stronger regional focus in Upper Austria than in the Basque Country. This means that Upper Austria is strongly clustered in a certain number of sectors, which role is very evident and important for the region. In reference to the stars methodology developed by European Cluster Observatory (Annex 6), due to the small scale of the Basque economy, Basque clusters fail to compete in national and European terms. This is one of the reasons why the number of clusters with stars in Upper Austria is higher than of the Basque Country, 13 to 6 respectively (Graph 92). Nevertheless, the number of clusters with stars is higher in Upper Austria, only the Basque Country has a cluster with highest, three stars, rank (metal manufacturing) meaning its top 10 positioning in all categories (size, specialization and focus) of the European Cluster Observatory methodology. In addition it is also interesting to note that both regions while using similar indicators for cluster mapping and development (number of members, employees, enterprises and turnover) show some distinctions in the analytical focus of cluster analysis. In Upper Austria is based more on data on the number of projects developed, events organized and participant pro event, whereas in the Basque Country - more on export volumes and prices.

Graph 91 Spread of clusters in the Basque Country & Upper Austria based on the employment, enterprises and focus, 2011



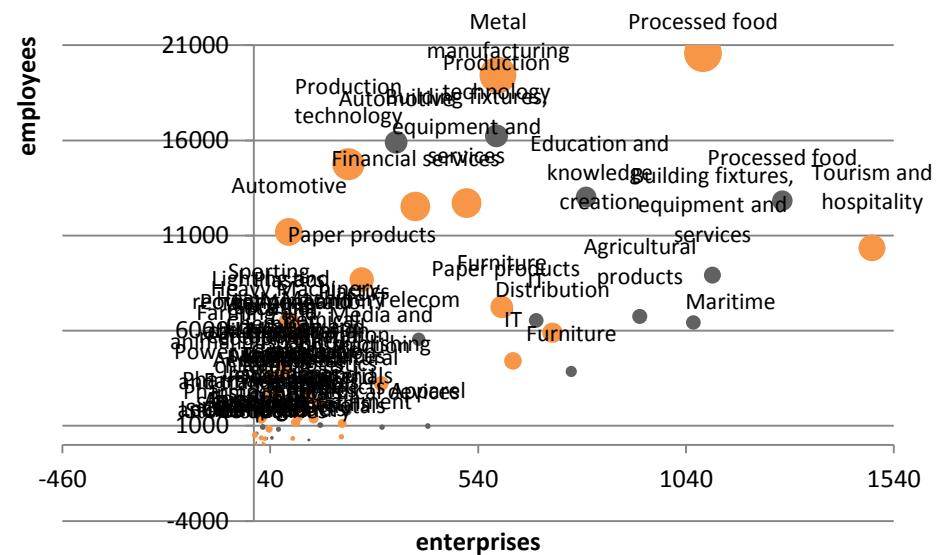
Legend to Graph:

- Upper left – original scale of the graph
- Upper right – zoomed in version of the “upper right” graph
- Bottom right – zoomed in version of the “upper left” graph

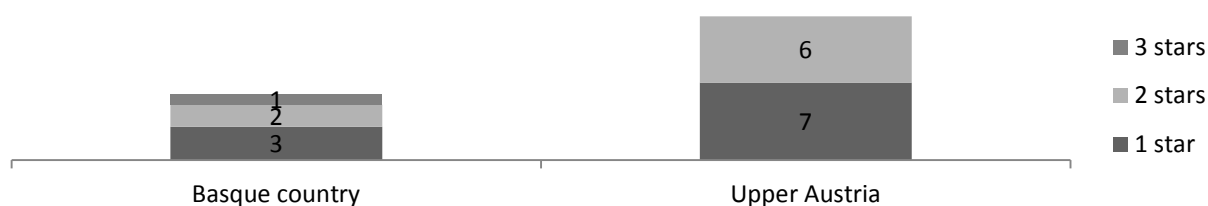
Note:

Focus - if a cluster accounts for a larger share of a region's overall employment, it is more likely that spill-over effects and linkages will actually occur instead of being drowned in the economic interaction of other parts of the regional economy. The 'focus' measure shows the extent to which the regional economy is focused upon the industries comprising the cluster category. This measure relates employment in the cluster to total employment in the region.

Source: Authors' development based on European Cluster Observatory, 2014



Graph 92 Number and character of star marked clusters, the Basque Country and Upper Austria, 2011



Sector (*number of stars)	
The Basque Country, total	Upper Austria, total
Business services *	Business services *
Construction *	Construction *
Metal manufacturing ***	Metal manufacturing **
Production technology *	Production technology **
Maritime **	Building fixtures, equipment and services **
Power generation and transmission **	Financial services *
	Furniture **
	Heavy Machinery *
	Lighting and electrical equipment **
	Paper products *
	Plastics *
	Processed food *
	Sporting, recreational and children´s goods **

Source: Author´s development based on European Cluster Observatory 2014

Now we will mention important **similarities** that have been observed from both cases studies in terms of the cluster development from the application of cluster policy. The most important is that the clusters, which have been supported within the cluster policy in the Basque Country and in Upper Austria, were natural ones (Table 48). At the same time, in Upper Austria we find more clusters with cluster associations, which have also been marked with stars by the European Cluster Observatory. This can be a sign of a more correct and low-risk identification and prioritization of clusters. Another similarity is that since 2005 to 2011 in both regions there is a higher number of clusters in which the number of enterprises has decreased, than increased (total number of sectors based on decrease of enterprises out of 40 is 26 in the Basque Country and 24 in Upper Austria) (Table 48). Moreover, Upper Austria has more clusters with an above average (change from 2005 to 2011 was equal or more than 2 times) increase in number of enterprises compared to the Basque Country.

Table 48 Change in number of enterprises 2011/2005, number of employees 2011 in sectors and corresponding cluster initiatives, the Basque Country, Upper Austria

Sector (natural cluster)	Basque country		Upper Austria		Cluster initiative Approximately covers natural cluster/ ES21 & AT31
	2011/2005 (enterprises)	2011 (employment)	2011/2005 (enterprises)	2011 (employment)	
Aerospace	↑ 1,26	2515	↓ 0,43	527	HEGAN (1997, ES21)
Agricultural products	↑ 1,15	6751	★ 12,53	1129	Alimentacion (2009, ES21) & SIDEREX (2010, ES21)/ Food (2000, AT31)
Apparel	↓ 0,90	987	↓ 0,80	1482	-
Automotive	↓ 0,91	15895	↑ 1,02	11193	ACICAE (1993, ES21)/ Automotive (1998, AT31)
Biotech	↑ 1,63	370	↑ 1,14	40	Biosciences (2010, ES21)
Building fixtures, equip. and serv.	↓ 0,89	8921	↑ 1,05	12703	ERAIKUNE (2010, ES21)
Business services	↑ 1,15	28742	↑ 1,04	25762	ACLIMA (1995, ES21)/ Environmental Technology (2006, AT31) & Network HR (2004, AT31)
Chemical products	↓ 0,96	3052	↓ 0,80	2752	-
Construction	↓ 0,89	45196	↑ 1,32	27076	ERAIKUNE (2010, ES21)
Construction materials	↓ 1,00	1749	↑ 1,01	1388	ERAIKUNE (2010, ES21)
Distribution	↓ 0,99	11508	↑ 1,02	5895	-
Education and knowledge creation	↓ 0,95	13020	↑ 1,53	1183	Conocimiento (1996, ES21, closed) & Langune (2012, ES21)/ NTFI (2004, AT31)
Entertainment	↑ 1,46	7359	★ 4,40	431	EIKEN (2004, ES21)
Farming and animal husbandry	↓ 0,62	3432	↑ 1,04	70	-
Financial services	↑ 1,11	24944	↑ 1,26	12532	-
Footwear	↓ 0,54	595	↓ 0,86	372	-
Furniture	↓ 0,86	3854	↓ 0,84	7249	HABIC (2009, ES21)/ Furniture (2000, AT31)
Heavy Machinery	↓ 0,62	5601	↓ 0,58	5985	AFM (1992, ES21)/ Mechatronics (2003, AT31)
Instruments	↓ 0,79	1817	↓ 0,80	839	-
IT	↓ 0,99	6545	↑ 1,26	4415	GAIA (1996, ES21)/ ITC (2013, AT31)
Jewellery and precious metals	↓ 0,96	261	↓ 0,97	344	-
Leather products	↑ 1,28	34	↓ 0,88	112	-
Lighting and electrical equipment	↓ 0,74	2543	↓ 0,91	3553	Eco-energy (2000, AT31)
Maritime	↓ 0,92	6429	↓ 0,87	325	UNIPORT (1995, ES21) & FMV (1997, ES21)
Media and publishing	↑ 1,07	8679	↓ 0,87	3224	EIKEN (2004, ES21) & Design & media (2004, AT31, closed)
Medical devices	↓ 0,97	927	↑ 1,03	2602	Health Technologies (2002, AT31)
Metal manufacturing	↓ 0,86	60301	↓ 0,92	19432	ACEDE (1992, ES21) & SIFE (2009, ES21) & FEA (2009, ES21)
Oil and gas	★ 2,00	137	★ 3,00	98	Energia (1996, ES21) & UNIPORT (1995, ES21)
Paper products	↓ 0,82	7142	↓ 0,90	8684	Papel (1998, ES21)
Pharmaceuticals	↓ 0,92	946	↓ 0,83	1440	-
Plastics	↓ 0,84	5997	↓ 0,89	6432	Plastics (2000, AT31)
Power generation and transmission	↓ 0,73	3987	↓ 0,75	1371	-
Processed food	↑ 1,02	12825	↓ 0,92	20588	Alimentacion (2009, ES21) & SIDEREX (2010, ES21)/ Food (2000, AT31)
Production technology	↓ 0,69	16236	↑ 1,00	14752	AFM (1992, ES21)/ Herramex (2010, ES21)/ Mechatronics (2003, AT31)
Sporting, recreat. and childrn. goods	↑ 1,07	822	↓ 0,96	2417	-
Stone quarries	↓ 0,78	332	↓ 0,55	39	-
Telecom	↑ 1,81	5549	↓ 0,82	3865	EIKEN (2004, ES21) & GAIA (1996, ES21)
Textiles	↓ 0,94	1045	↓ 0,85	2688	-
Tobacco	n.a	431	n.a.	36	-
Tourism and hospitality	↑ 1,05	11172	↓ 0,97	10349	-
Transportation and logistics	↑ 1,07	17048	↓ 0,89	2225	ClusterTIL (2005, ES21) & MAFEX (2012, ES21)/ NL (2004, AT31)

Note to the table: star >= 2, up green >=1, down red <1

Source: Authors' development based on European Cluster Observatory, 2014

Finally, by observing the change/ performance of the clusters (based on enterprises, Table 48) with established cluster initiatives in both regions, they have shown distinct positive and negative trends. For example, in both regions a cluster association has been established in the automotive sector, but in reference to Table 48 the Basque Country has shown a negative trend (in 0.91 times), while Upper Austria – positive (in 1.02 times) trend, meanwhile in transport and logistics it was other way round, the Basque Country – in 1.07 times and Upper Austria in 0.89 times. At the same time although a cluster association was built up in furniture – both regions showed negative trends (the Basque Country – 0.86, Upper Austria – 0.84). Overall, depending on the cluster we see both positive and negative trends in terms of cluster development as a result of cluster policy. It is of note that the sectors which we have marked with excellent enterprise growth belong to the areas of direct/ intensive cluster policy support. Herewith, in the oil and gas cluster in the Basque Country (2 times) there is an Energy cluster association, while in Upper Austria we find growth in agricultural products (12.53) from the food cluster association. Surprisingly, although there was extreme growth in the entertainment cluster (in 4.40 times) in Upper Austria, apart from the side influence of ITC cluster, we don't see any other closely sector-related association, which was established to promote entertainment. Summarizing and in combination with the complexity of the cluster data based on the enterprises we can draw **slight but mixed positive results in favor of the cluster policy for both regions with stronger inclination to Upper Austria**. In order to achieve stronger results, we think that deeper analyses are needed.

To conclude we think that considering the smaller number of cluster initiatives and public R&D investment in Upper Austria but with very similar overall trends in terms of cluster development since the launch of the cluster policy, we tend to see **better development of clusters in Upper Austria** than in the Basque Country. It should be noted that considering the imperfection of the data, this statement is subject to some uncertainty.

2.3. Composite influence of factors on regional economic growth

In order to observe the relation of the changes that have taken place over time, the application of multi-lineal regression analysis has been done. In each separate case we have looked at the correlation between the defined and response variables and produced some first results.

These results have shown a clear similarity among the cases in the positive relation between the change of the enterprises and/ or employment in the automotive cluster and economic/ GDP growth. These similarities, besides showing the importance of this automotive sector on the economic development of the region, can also serve as an indicator of the positive relation between cluster policy, clusters and economic development in both regions.

In order to strengthen the above results and enhance the regression model, we use data from both regions in a pooled regression model and observe in this case the relation between the defined variables and the GDP growth.

Table 49 Regression results, panel, 1995-2011

<i>Models</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
<i>Intercept/</i>						
<i>Constant</i>	0,633	19,098	4,809	6,619	8,030	8,919
	0,737	2,068*	0,516	0,716	0,855	0,908
<i>Y</i>	-0,083	-0,016	-0,058	-0,063	-0,054	-0,067
	-0,912	-0,120	-0,473	-0,474	-0,408	-0,482
<i>EmplRate</i>		-	-	0,024	0,048	0,010
				0,107	0,208	0,039
<i>Edu</i>		-	-	0,323	0,405	0,344
				1,325	1,560	1,138
<i>Pop</i>		-3,986	-1,071	-1,447	-1,798	-1,922
		-2,061*	-0,533	-0,728	-0,887	-0,919
<i>Pat</i>	0,078	-0,031	0,093	0,078	0,083	0,067
	2,724**	-1,005	2,830**	2,324*	2,434*	1,347
<i>R&Dexp</i>		9,523	1,854	4,004	4,254	4,517
		1,566	0,310	0,663	0,702	0,725
<i>Co-PatIn</i>	-0,043	-	-0,052	-0,062	-0,064	-0,058
	-3,168**		-2,856**	-3,145**	-3,208**	-2,440*
<i>Co-pat2out</i>		0,048	-	-	-	0,014
		1,754				0,424
<i>Infr</i>		0,015	0,045	0,029	0,031	0,028
		0,418	1,363	0,838	0,898	0,769
<i>Spec.</i>		-0,121	0,268	0,210	0,241	0,198
		-0,635	1,459	1,169	1,319	0,929
<i>Clust2Est</i>	0,554	0,819	0,773	0,941	0,832	0,811
	2,900**	3,113**	2,740**	3,649**	2,940**	2,762**
<i>Clust1Emp</i>		-	0,087	-	0,244	0,228
			0,355		0,943	0,851
<i>Dummy</i>	0,035	3,700	0,973	1,340	1,671	1,789
	1,776	2,089*	0,528	0,734	0,897	0,930
<i>R Square</i>	0,484	0,487	0,583	0,617	0,635	0,638
<i>Adjusted R</i>						
<i>Square</i>	0,384	0,277	0,384	0,407	0,404	0,377
<i>F</i>	4,869	2,320	2,935	2,935	2,750	2,442
<i>N</i>	32	32	32	32	32	32

Note: Below the estimated coefficient is given the value of t statistics, this sign * indicates significance at 95%; ** - significant at 99%

Source: Input data is based on OECD 2014 & Eurostat 2014.

Results for the panel regression model, which is based on accumulated data from both regions, are presented in Table 49, Table 50 and Table 51. Summing up the main results from the case comparison we should state that in both cases the principle of **convergence** can take place, especially in the absence of innovation related variables. Another **similarity** with previous results was noticed in regard to the negative connection with **employment** increase; that from the economic point of view may seem strange. However, as the level of R-squared is not high enough to make these results conclusive. Common features were noticed for the models with the time lags.

The 3 years lagged **co-patenting with foreign regions** was observed to have a negative connection with growth. However, it changed to positive in long, 5 years period. Another important similarity was observed in the positive relation with the share of **number of establishments in the selected automobile cluster**.

Table 50 Regression results, panel with time lag, 1995-2011

Models	1	2	3
<i>Intercept</i>	1,853	3,773	-7,104
	1,691	1,386	-1,340
<i>Y</i>	-0,177	-0,279	-0,382
	-1,613	-1,816	-1,860
<i>Pop</i>	-	-0,750	3,274
		-0,535	1,383
<i>PopT3</i>	-	-0,757	-4,391
		-0,391	-1,624
<i>PopT5</i>	-	1,304	3,363
		1,237	2,320*
<i>Pat</i>	-	-	0,081
			1,455
<i>Pat T3</i>	-	-	-0,030
			-0,780
<i>Pat T5</i>	-	-	0,045
			1,487
<i>Co-Patlin</i>	-0,023	-	-0,058
	-1,838		-1,811
<i>Co-patlin T3</i>	0,005	-	0,010
	0,695		0,695
<i>Co-patlin T5</i>	-0,009	-	-0,013
	-0,967		-1,204
<i>Co-PatIout</i>	0,033	0,048	-
	1,267	2,398*	
<i>Co-patIout T3</i>	-0,010	-0,014	-
	-0,608	-1,198	
<i>Co-patIout T5</i>	0,015	0,004	-
	2,336*	0,416	
<i>Infr</i>	-	-	-0,025
			-0,524
<i>Infr T3</i>	-	-	-0,008
			-0,131
<i>Infr T5</i>	-	-	0,052
			1,109
<i>Dummy</i>	0,998	1,202	-1,025
	56,905**	2,082	-0,860
<i>R Square</i>	0,999	0,999	0,999
<i>Adjusted R Square</i>	0,999	0,999	0,998
<i>F</i>	2806,488	2608,812	1319,137
<i>N</i>	32	32	32

Table 51 Regression results, panel with time lag, 2000-2011

Models	1	2	3	4	5
<i>Intercept</i>	-0,688	2,044	-0,427	-0,876	-0,360
	-0,857	2,598*	-0,450	-0,969	-0,298
<i>Y</i>	0,161	-0,061	0,191	0,179	0,187
	2,067	-0,662	2,239*	2,055	1,867
<i>Spec.</i>	-	0,120	-0,068	-	-0,076
		0,607	-0,457		-0,380
<i>Spec.T3</i>	-	0,110	-0,178	-	-0,180
		0,559	-1,389		-1,022
<i>Spec. T5</i>	-	-0,511	-0,135	-	-0,139
		-2,471*	-0,981		-0,855
<i>Clust2Es</i>					
<i>t</i>	1,729	-	1,700	1,799	1,714
	6,760**		5,596**	5,719**	4,685**
<i>Clust2Es</i>					
<i>t T3</i>	0,266	-	0,242	0,200	0,252
	1,501		1,341	0,687	0,784
<i>Clust2Es</i>					
<i>t T5</i>	-0,085	-	-0,153	-0,267	-0,134
	-0,645		-0,966	-0,999	-0,445
<i>Clust1E</i>					
<i>mp</i>	-	-	-	-0,180	-0,071
				-0,361	-0,129
<i>Clust1E</i>					
<i>mp T3</i>	-	-	-	0,107	-0,014
				0,419	-0,045
<i>Clust1E</i>					
<i>mp T5</i>	-	-	-	0,134	-0,005
				0,773	-0,023
<i>Dummy</i>	-1,055	-1,036	-1,126	-1,044	-1,128
	70,046**	14,374**	23,788**	39,250**	14,021**
<i>R Square</i>	1,000	0,999	1,000	1,000	1,000
<i>Adjusted R Square</i>	0,999	0,998	0,999	0,999	0,999
<i>F</i>	7586,422	2644,930	4865,296	4087,443	2728,836
<i>N</i>	22	22	22	22	22

Note: Below the estimated coefficient is given the value of t statistics, this sign * indicates significance at 95%; ** - significant at 99%

Source: Input data based on OECD & Eurostat

Along with similarities there are also a number of considerable differences with earlier results. The relation between growth and **population** in The Basque Country was negative in year to year and in 5 year period, whereas on the contrary, in Upper Austria only in 3 year time lag. Another negative connection was also viewed in regard to the 3 years lagged **industrial specialization** in the Basque Country. Upper Austria model showed such behavior only in the long term lag.

Finally there were also several indicators which produced only region individual results, e.g. the positive role of **education** especially in combination with innovation or industry relative indicators was seen only in the Basque Country. We assume that such behavior could be caused by significant changes and improvements in the education system in this region and had a minor impact on growth, as it is difficult to claim causality. Furthermore the effects of **R&D expenditures, industrial specialization and the share of employment in the automobile cluster** were significant enough to produce acceptable fit only in the the Basque Country. Herewith, for except of R&D expenditures the above mentioned variables showed a positive relation. Beside this, in the case of lagged sub-models the additional results have also been tracked only in the Basque Country. There the role of **infrastructure and the number of employment in automobile cluster** was detected to have a negative relation if taken with both the 3 and 5 year time lag.

The main outcomes of this analysis are in line with the previously mentioned single results from the regional cases, but there are also certain distinctions to be made. The most significant agreement with the previous conclusions is the **positive** relation between a **number of establishments in the automobile cluster** with economic growth. This is seen in almost all studied models even with time lags. Other similarities are noticed for **specialization in industry and co-patenting with foreign regions**. The former has a negative correlation with economic growth in contrast to the later one, which turns out to be positive in 5 years lag.

New dependencies from the panel model appear in respect to the role of patents and co-patenting within the region. Table 49 shows that an increase of **cooperation within the region**, which is measured by co-patenting, and is one of the core objectives of most cluster policies, might have a negative correlation with economic growth. The models including the time lag do not indicate any substantial results in order to back or revoke the above argument. The small value of R-squared also doesn't assist us in our statement. Despite this, we think that the results are contributing enough to be included into the discussion. The **number of patent applications** has been used very often as an indicator for measuring innovation capacities of the territories or companies. The objectiveness of such an indicator is widely disputed. However, our results tend to go along with the general observation in regard to their positive connection with economic growth. Unexpectedly nothing with

enough statistical significance came out from the fit of the regression with time lag of the independent variable corresponding to patents behavior.

The various relations of **population** towards the economic growth mentioned earlier are further hindered by the outcomes of panel model. A significant negative relation between **GDP per capita** and employment rate to the growth is also absent. The indicators reflecting **industrial specialization or share of labour force with secondary and tertiary education** do not show significant enough results in order to re-confirm their positive connection.

In drawing the key conclusions we would stress only one outcome, which is the most relevant with our research questions and objectives. While considering the **change in number of establishments in the automobile sector** as a cluster performance variable, we can conclude that there have been noticed a certain positive year to year connection with economic growth. This, considering the flaws in the data, hints at the relevance of clusters in regard to economic performance of the regions. At the same time, as both regions have established one of the first cluster initiatives in these sectors and continue to see them as priority ones, we could also try to make a positive link with the performance of the regional cluster policy and economic development. Yet as this is only one cluster from a very specific industry such conclusions are very hard to establish with certainty. A certain further contribution in integration of other clusters in the model and extension of yearly observations would be needed in order to provide more substantial and assuring results.

3. Main findings from the review of the both regional cluster policy case studies

First of all we have noticed that in both regions cluster policies have been constantly modified since their start. In both there is around the same number of leading / priority clusters (9 in Upper Austria and 11 in the Basque Country, Annex 7 and Annex 8). Moreover we claim that in both regions **cluster policies have evolved along similar evolution stages**, such as building or setting the grounds for the cluster based development of the regions, then strengthening clusters and finally clusters started to be a natural core/ center of the regional economic development of the region (Graph 77). Indeed many aspects within the stages and periods of the cluster policy making were **similar among the two regional clusters polices**. In particular we want to highlight the aspects related to the stages of the cluster policy:

- The first period of the cluster policy evolution was in both cases the longest as it includes the introduction of many new terminologies, institutions, regulations, analysis, etc.
- **The discussion stage** was not always included in the cluster policy process, especially in the later periods of the cluster policy making. Thus in Upper Austria we note certain benefits from regular involvement of the key regional actors in the discussion of the effectiveness

and process of cluster policy implementation. This discussion stage from one side, assists in having a better awareness about regional business and market needs and from another side, informs businesses on current political trends and issues.

- **The economy and cluster analysis stage** included if not always complex but definitely more centralized, coordinated and broader studies in the first period of the cluster policy, especially due to the novelty of the concept, and turned to be more diversified and individual in later stages. Moreover only in the Basque Country since 2008 we have noticed the regular conduction of analysis on large scale regional cluster and economy performance in the form of the Basque competitiveness report.
- **Policy review** is very complicated stage, which was often neglected by the regional authorities, especially during the later periods of the cluster policy.
- **Policy development** stage receives high attention in both regions. Each policy plan is developed with a review of the previous one and by consideration of the required improvements. Consultation with the private sectors takes place, but more evidently in the Upper Austria. In addition to this the development of the cluster policy, especially recently, is being developed under close EU guidance, thus with the consideration of international trends as well as local/ cluster needs.
- **Policy implementation** - both regions have followed similar methods of cluster enhancement, in particular through co-public funding and establishing cluster initiatives. The activities, thematic lines within the cluster associations, its organizational, strategic and financial strategies are also very similar. The biggest distinction is in the communication/ coordination between cluster associations and government level.
- **The monitoring & evaluation** stage is extremely important, especially in order to draw conclusions for further policy improvement. Both regions tried to develop a broad matrix of indicators and faced difficulties in the development and systematic collection of the data. By 2014 we could see significant progress in Upper Austria in terms of tracking the results of the clusters' evolution in the region.
- **Policy improvement** took place in both regions but with different follow-up actions. E.g. in both regions some launched cluster initiatives were closed later. This reflects the intention of the policy makers to be open to changes and be more aligned with local cluster needs.

In addition to this we have seen that in both cases the cluster policy has passed from being **regional technology-driven cluster policy to regional smart specialization cluster-based innovation strategy**. The prime goal of cluster policy in Upper Austria was “innovation through cooperation”, which should have led to overall strengthening of regional competitiveness. In the Basque Country, from our point of view, the cluster policy was mainly applied for strengthening business

competitiveness with the final aim of overall enhancement of regional innovativeness. As the result of this different approach, it can be noticed that in the Basque Country a broad network of research institutions along with clearly above average innovation-related indicators can be traced, while in Upper Austria it can be seen that industrial development and sector specialization has been enhanced more. In addition, the cluster policy in the Austrian region is also more market driven than in the Basque Country.

Secondly we claim that both regions have **experienced evident and above national economic growth** since the start of the cluster policy.

The Basque Country has turned to be the leading region in Spain in terms of the GDP per capita, while it was only around 5th in the 1990s (Graph 81). Moreover in comparison to Spain the region has one of the lowest unemployment rates, while having the highest industrialization share, high number of patent applications per million inhabitants and high R&D employment. Meanwhile, based on the GDP per capita Upper Austria is still not the leading region in Austria, however its overall increase of GDP and GDP per capita from 1998 to 2011 was the highest among other Austrian federal provinces (Graph 82). In addition it was also accompanied by maintained industrial strengths (Graph 84), favorable labour market development, and technological & innovation leading upgrades (Graph 88).

At the same time although the economic improvement took place in both regions, **we couldn't highlight a clear link between the implemented cluster policy and economic growth**. In particular, as in both regions, the accomplishment of many collaborative projects as well as an increase in number of patent applications have been possible due to co-funding from in parallel existing technology-innovation and education related policies. The same situation can also be observed for Upper Austria, where the constant industrial and innovation focus and pro-active labour policies led to almost full employment of the population and have allowed the region to catch up with the leading Austrian provinces. That is why an important part of economic progress has to be attributed to other accompanied regional policies as well.

Both regions have applied **similar instruments** (establishment of cluster associations and public co-funding of the projects based on the cooperation between firms and research institutions) for the implementation of the cluster policy, although they have followed slightly different institutional and cluster conceptual approaches to the realization of cluster policy. While in the Basque Country the government driven matrix of experts served as a bridging link between the public/ government level and cluster associations/ firms, in Upper Austria after a 5 years top-down cluster driven approach, the policy was modified to a more independent bottom-up led cluster development. In addition to this we think that the selection of priority clusters and establishment of the cluster initiatives in both

regions took place on the basis of natural clusters, thus we claim that in the Upper Austria the development of the selected clusters was more focused (possibly due to more centralized promotion). This along with a larger share of the Upper Austrian economy within the national one and the strong public support of cluster policy on the national level might have resulted in a more progressive development and definition of clusters in the studied Austrian region. That is why we think that the **implementation of cluster policy in Upper Austria was more systematic and structured** leading to a clearer definition of competitive sectors/ clusters of the regions, which have **laid a stronger foundation for the economic growth of the region in the long-term.**

In drawing the key conclusions from the relation between the economic development and cluster policy based on the individual indicators and composed influence reflected in the regression model we would stress the following most relevant with our research questions outcomes. While considering the change in number of establishments in the automobile sector as a **cluster variable**, we can conclude that there has been a **definite positive year to year connection with economic growth.** This, considering some flaws in the data, could hint at the relevance of clusters in regard to economic performance of the regions. At the same time, as both regions have established one of the first cluster initiatives in these sectors and continue to see them as priority ones, we could also try to make **a positive link with the performance of the regional cluster policy and economic development.** Yet as this is only one cluster from a very specific industry such conclusions are very hard to state with certainty. A certain further contribution in integration of other clusters in the model and extension of yearly observations would be needed in order to provide more substantial and assuring results.

In addition to this we have noticed several further **common positive implications of the cluster policy on the economic development** in both regions. As such, cluster policy has contributed to economic development of the region by:

- Significantly **restructuring the overall economy of the regions.** In particular, apart from the metal industry Upper Austria discovered new sources/ industries of revenue, such as processed agriculture products, ITC, health sector, etc., while the same happened in the the Basque Country with new clusters such as e.g. biosciences and aerospace. Before the implementation of the cluster policies in both of the regions support was provided to classical, traditionally mature industries, like e.g. metal in Upper Austria. For both regions the identification and focus on clusters was a chance to redefine and build its new specialization and competitive advantages, which serve as a basis for technological and innovation progress.

- Boosting **support and development for SME's** along with a **change in the way of doing business**, both on the level of big & small companies. Indeed the launch of the cluster policy influenced the market-rooted mechanisms in the regions, enhanced entrepreneurship and competitive spirit among companies by stimulating the benefits of cooperation and raising awareness of the structure of sectors inside and outside of the local economy.
- **Assisting companies' internationalization strategy and market (in/ outside) positioning.** Cluster associations in both regions have dedicated a large part of their activities to learning the business needs in current globalized and internationalized world. This was absolutely new for most of the companies in both regions at the beginning of the 1990s.

Finally, the review of the regional economic performance, stages and periods of the cluster policy in both regions have provided us with some new and revised considerations regarding **common components contributing to an effective cluster policy**. In particular these factors were:

- In both regions the **role of personalities** for the launch and application of cluster policy was were important. For example in the Basque Country this personality was the official/ and minister of the Basque Government, J. Azua, while in Upper Austria the representative of the Upper Austrian Chamber of Commerce, Christoph Leitl, could be attributed to the people, who have strongly influenced the introduction of cluster policy into the region.
- The importance of the **availability of the financial resources** for the implementation and realization of the cluster policy. In the Basque Country a special fund (EZTEN) was created to finance forthcoming strategic programmes, whereas in Upper Austria special "Zukunftsfond" were created, from which the policy was funded.
- **Close alignment** of the cluster and regional policy priorities with **European framework**. As such, both regions in 2013/14 have set the objectives for their policy making to the year 2020, which is in alignment with EU requirements. This opens additional sources of funding and further integrates the regions and its actors into the European and global system.
- **Commitment, collaboration, dialogue & motivation** of the regional actors not only towards cluster policy but introduction of changes as a whole.
- In both cases the feeling of **trust and transparency** between key representatives from business, public authorities and academia was presented.
- The **long-term vision for the cluster policy** is necessary, as it builds the foundation for the economic development of the region, facilitates the strategic planning for companies and increases the investment climate.

- Cluster **policies** were **closely integrated into the general framework of territorial development**, especially in the last few years. Basically since 2005/7 clusters were seen as a central component in the regional development.

To conclude, the main research findings not only depict or compare the development of the two selected regional cluster policies, assist to respond to our main research question regarding of *how to build cluster policy leading to regional economic development*. In the Chapter Final Conclusions we will make an overall summary of our research and propose general as well as region specific recommendations.

FINAL CONCLUSIONS

1. Overview of the research

The main objective of the conducted research was to learn and broaden the boundaries of our knowledge in regard to **regional cluster policy making**. We were particularly interested in the influence of clusters and cluster policy on the pattern of economic development in the region. In the wave of globalization and internationalization numerous **theoretical models** analyze the possible drivers of economic development. From the reviewed theories (Classical, Keynesian, Export-based, Neo-classical, Endogenous, New Economic Geography, Growth-pole, Location, Central place, Institutional) we extracted factors and ways in which these factors may influence economic growth (Chapter 1). Within these different approaches it seems that **clusters** and herewith, building an economy based on clusters, can strengthen its overall competitiveness, innovativeness and lead to economic growth (Porter 1998; Porter 2000; Scott 1998; Krugman 1991; Fujita et al. 1999; Baldwin et al. 2003; Benner 2012; Genosko 1996; Sölvell 2008; Asheim 1996, 2006 and many others).

Clusters are agglomerations of firms and other related institutions in a particular sector which not only show close physical proximity but also collaborate. Under certain favorable conditions clusters develop and grow naturally. At the same time the growth of these economic structures can also be stimulated from the side by cluster policy. Theoretically building **cluster policy** (Andersson 2004; Brenner, Fornahl 2003; Raines 2000, 2001 and many others) may seem to be very simple, as it could e.g. exist by starting to see economy through the prism of clusters, reducing regulations which restrain the development of clusters or by combining pre-existing programmes originating from other policies under a common agenda. However, as these policies were implemented, they were showing different results, which increased the interest in the **analysis of cluster based policies**, its types and effects on the territorial development (Uyarra, Ramlogan 2012; Franco et al. 2012; Aranguren, Wilson 2013; Christensen et al. 2012; Kiese 2011 and many others). Within such a vast research on cluster policy, there are still numerous areas which need to be addressed. In particular: **on the way to build cluster policy leading to regional economic development**. Within this overall concern our research questions focused on **long-term evolution of cluster policy development, the components of effective cluster policy making and its implications on the regional economic development**.

To address and respond to the above research questions while referring to Yin (2003), and considering remarks of Lijphart (1971) and Creswell (2003) we followed the **qualitative approach** by the application of the **multiple (two) case study method**. The **qualitative research approach** enabled us to gain deep insides into the studied subject. The **case study method** was seen the most

appropriate for realizing the components of the effective cluster policy making and the multiple case study enabled us to draw more generalized common conclusions and provided the basis for deeper and broader learning. Within each case study we applied **mixed** techniques, where we used both quantitative (descriptive and regression) and qualitative (typology setting, pattern matching) tools for data analysis (Chapter 5). We follow the **replication approach** to multiple case study by exploring our research question in similar contexts and herewith strengthen the justification of our findings. The following two regions were selected: The Basque Country, an autonomous community in Spain, and Upper Austria, a federal state in Austria. We think that these two selected regions and their cluster policies in sufficient manner reflect important to the research study **context-based similarities**, which are a) regional level of the cluster policy, b) labeled as best practices within the European Union, c) earlier launch of the cluster policy approach, d) motivations for policy start: improvement of economic development and strengthening of competitiveness, e) political-administrative systems, f) members of the European Union – similar support schemes of the EU, have access to regional and structural funds, i) regional factors that aside of cluster policy might strongly influence the cluster and territorial development, like input economic, industrial, topographic and cultural conditions.

In our theoretical framework in Chapter 4 we defined the main conditions for the review of the cluster policies in order to respond to our research questions. Based on this, economic development was seen through its main target of economic growth. We proposed five core factors, capital, labour & human capital, technological progress, clusters and institutions that influence economic growth. Then we defined regional cluster policy by influencing economic growth primarily through one of its factors – clusters, and indirectly through other factors as well. In addition we considered that the cluster policy making/ administration also influences cluster policy. The regional cluster policy making is seen as a multi-stage process that includes key components. We expect that a closer resemblance of the implemented cluster policy with our multi-stage process scheme (Graph 10 and Table 12) should lead to higher growth (economic development) rates via more efficient cluster policy.

Although we focus on the above specified factors and policies, we also acknowledge that there is a room for “other” factors and policies, which can also effect regional economic development.

As a result of the performed research study we have gathered valuable and in-depth information on the cluster policies and economic development of the regions. Through this we enriched the knowledge on cluster policy from both a theoretical and a practical perspective. Below, we highlight the main research findings, which are structured in the following way: first, we give a brief **summary of each of the two cases studies**, then describe the **overall main findings** and

finally based on them, provide **recommendations for each regional case and the cluster policy making as a whole**. Further **research opportunities** are presented at the end of this chapter.

2. Outcomes from the case studies

Cluster policy in the **Basque Country** started at the beginning of the 90s. The motivation for the cluster policy was the need to re-define competitive strengths of the Basque Country, which economy was at that time in decline. The cluster policy was initiated by the Basque Government and until 2013 was almost fully coordinated by the officials from the Department of Economic Development and Competitiveness (name as to 2014). On the regional level the main actions which were taken to enhance clusters were established of clusters were 1) establishment of cluster associations as a “facilitator” of the sector/ cluster and “broker” between the business and the public/ government sector and 2) public support to projects in collaboration between the research and business institutions. Cluster associations are non-profit public-private institutions, which up to September 2014 are established in 11 priority and 11 pre-clusters. Although the establishment of cluster initiatives was more of a top-down approach, the original development of clusters, selected in 1991, was driven by path-dependency mechanisms. The communication with cluster associations took place through the matrix of technical officials, which were built up within one of the departments of the Basque Administrations. Since 2013 this matrix of cluster-specialists is established within the regional business development agency, SPRI.

Based on our interviews and literature review we have identified **4 periods of cluster policy evolution**, they are I) 1989 – 1999: Grounds building, II) 2000 – 2005: Improving and polishing, III) 2006 – 2013: Giving new opportunities and IV) Since 2013: Re-management boost (Table 20).

Furthermore, each period of cluster policy has passed through almost all stages of the cluster policy process (details on stages in each period of cluster policy see Annex 9 and Annex 10). Although with each subsequent period the number of key components in each stage of the cluster policy has increased, we couldn't identify a direct link between these components and their implications on economic development. At the same time we think that while the first period of the cluster policy is associated with the introduction of the cluster policy in the form of the pilot project, the cluster policy until 2000 was the most organized and systematized. We can also see one of the highest economic growth rates during this time. Most of the clusters, which were identified and prioritized during the first period of cluster policy have developed in mature and strongly competitive sectors (aerospace, machinery tools, maritime, automotive, energy). Along with several new sectors they will be building the basis of Basque economic competitiveness in the forthcoming years (RIS 3 main areas are: energy, advanced manufacturing and biosciences). Apart from the first period, we think that the third period is also worth attention. Despite coinciding with the financial crisis several

identified pre-clusters turned out to be very successful, especially in terms of the integration of SMEs and stimulating inter-cluster collaboration (e.g. HABIC). Finally, after the crisis the Basque economy is recovering faster than Spain as a whole. The credit for this is often given to established clusters and innovation system.

The review of **economic development** showed us that the Basque Country has the **highest levels of economic performance** in Spain. Although the average growth rates since 1991-2011 (Graph 21) in the Basque Country were slightly lower than in Spain, the main indicator reflecting economic growth, GDP per capita, (Graph 19) is the highest in Spain. Moreover, the increase of GDP per capita from 1995 to 2011 was also the highest in Spain (Graph 20). At the same time, in comparison to leading industrial and technologically strong regions in the EU the Basque Country has still slightly underperformed, whereas its position is similar or better in reference to EU28 average.

The study of **key economic factors influencing economic growth** has indicated that most of them were also **significantly improved** compared to the first years of the cluster policy. For example, improvements are seen in the unemployment rate (Graph 29 and Graph 32), labour costs (Graph 35), education in tertiary sector (Graph 37), number of patents (Graph 40) and/ or employment in R&D sector (Graph 43). The growth in clusters (measured in terms of export value - Graph 44, Table 24, employment - Table 25 and number of establishments - Table 26) has been positive in most of the priority clusters, especially metal and manufacturing, automation, production technology, engines and equipment, heavy machinery, oil and gas, forestry. At the same time only 6 clusters are star-marked by the European Cluster Observatory in the Basque Country (Table 27), which also represents an average performance for Spanish regions.

The examination of the **composed influence of the selected factors** (capital, labour and human resources, education, technology and innovation as well as clusters) on the economic growth **hasn't provided us with definite results** (Part Composite influence of factors on regional economic growth in Chapter 6). The only **confident conclusion** that can be drawn is with regard to the **positive connection to the performance of the automotive cluster and economic growth** in the Basque Country. Based on the positive result in the automotive cluster, which is a priority cluster in Basque Country and has been supported since the beginning of cluster policy, we can assume the effectiveness of cluster policy. At the same time considering the specific nature of this industrial sector, its growth might not be only attributed to the cluster policy in the region. That is why all in all we observe **positive implications** of the cluster policy on the economic development and its factors. At the same time we stress that the positive influence should be recognized only in

combination with other existing policies in the region, especially science, technology and innovation. More detailed conclusions for the case of the Basque Country see Chapter 6.

The cluster policy in **Upper Austria** officially started with the first strategic regional program in 1998. At the same time the first studies and cluster mapping in the regions had been conducted within the framework of the Austrian innovation research programme (“TIP” – “Technology, Information, Policy Consulting”) since the beginning of 1990s. The main rationale for the application of the cluster policy in Upper Austria was the need for economic re-structuring, observed effective implementation of pilot cluster initiatives in the neighboring region as well as the dominant role of markets in the implementation of the cluster policy. The goal of the cluster policy in Upper Austria was the desire to strengthen regional competitiveness by boosting **innovation through co-operation** between companies and other regional institutions from the same sector. On the regional level, two main instruments were selected to support the naturally existing and potential clusters: 1) increase and support the number of projects developed in cooperation between companies and other actors from the cluster, 2) establishment and promotion of cluster associations. The first cluster initiatives were constructed in a top-down manner by the regional business agency, Technology and Marketing Company (TMG) and later on transferred to a more bottom-up approach within the public-private company “Clusterland Upper Austria”. Up to 2014 9 cluster associations and 3 networks were in operation in the region. Furthermore, we observe that the established cluster initiatives were selected based on the natural but traditional industries (automotive, heavy manufacturing, mechatronics, biotech & pharmaceutical, IT) that are still dominant, which in reference to Maier and Trippel (2011), points to a high degree of path dependency mechanisms especially in traditional sectors. Moreover most of these clusters are now building the basis of regional RIS specialization and strategic focus for 2020: Industrial production, Health, Energy, Food and Mobility. At the same time we think that in the latest program, clusters are starting to lose their high regional focus and turning into more self-market driven bodies. The activities offered by cluster associations range from overall information services on the development of the clusters and sectors over the administrative and network support for the development of projects in co-operation to the assistance in internationalization and marketing activities.

Based on the interviews and reviewed literature we have identified 3 periods of the cluster policy evolution in Upper Austria. These periods are: I) 1992 – 2003: Grounds building, II) 2004-2012: Re-structuring management and going internationally, III) since 2013: Cross vertical-horizontal specialization boost (Table 36). As such, we can see that the cluster policy in Upper Austria has developed alongside the market needs. Each period has passed through almost all stages of the

cluster policy process (Annex 10). Similar as in the Basque Country we couldn't identify a direct link between these factors and the improvement of economic development.

The main outcomes of the economic review show that Upper Austria is the most industrialized region with an average level of economic performance in Austria and above average in comparison to European Union 28 (Part Economic development and growth in Chapter 7). Although Upper Austria occupied a similar position of in the middle of the 1990s, the increase of GDP per capita from 1998 to 2011 was the highest in the country. In addition to this, the economy of Upper Austria has also experienced higher growth rates than Austrian.

The study of key economic factors in Upper Austria showed similar trends to ones shown by indicators related to economic growth. While the level of productivity, disposable household income and number of personnel involved in R&D define the region's stable and confident middle positioning within Austria, the labour market (with the lowest national and European unemployment rates, Graph 63) and innovation related indicators (reflected through high rates of patent applications, Graph 71, and R&D personnel employed per in business sector, Graph 72) bring the region into the higher ranks. However one of the lowest public expenditures on R&D (Graph 71), an unbalanced educational system (Graph 67) and per sector unbalanced distribution of personnel in research and development personnel (Graph 72) might have hampered the economic boost during the last 10-15 years.

At the same time the first years after the implementation of the cluster policy (1998-2000) were marked by the highest growth rates. Moreover, Upper Austria has experienced the highest GDP per capita growth and almost the highest GDP increase from 1997 to 2012 compared to Austria (Graph 53). This, along with being the region with the highest exporting share within Austria, demonstrates the stable but average economic development of Upper Austria over the last 15 years. The performance of selected factors on the period /dynamic perspective shows in most of the cases high rates for the first period of cluster policy evolutions. The current GDP growth has renewed but has not yet returned to the rates as prior to the latest financial crisis of 2008.

Most of clusters in Upper Austria are developed based on the traditional sectors. Special positive development can be addressed to such clusters as automotive, IT, agriculture products, heavy manufacturing, production technologies, biotech and pharmaceuticals (Table 39 and Table 40) An especially positive relation between the performance of the automotive cluster (measured by the number of enterprises with time lag) and economic growth based on the results from regression model (Table 44) and on the individual base could be observed (Graph 76). However some of the traditionally strong clusters have reduced their European and national strengths (Graph 75) by redistributing their employment to other growing sectors, especially construction, tourism &

hospitality, entertainment or media & publishing. Surprisingly, a negative connection has been identified between economic growth and co-operation measured through co-patenting within and outside of the region in time lag perspective (Table 43). As such, we assume that economic development might not only be driven by the enhancement of cooperation through projects but also from enhanced knowledge and professional skills available in the regions (reflected in relation between education level of the labour force and economic growth, Graph 76).

All in all we observe **modest positive implications** of the cluster policy on the economic development and its indicators. Especially within the perception of economic convergence a stable but average performance of Upper Austria in relation to other regions in Austria was observed. More details on main findings from the case of Upper Austria can be found in the conclusions of the Chapter 7.

3. Overall findings

First of all we will refer to the evolution of the cluster policy since its start. We have noticed that in both regions cluster policies didn't stay same and have been modified. As a result of cluster policy in both regions around the same number of leading / priority clusters (9 in Upper Austria and 11 in the Basque Country, Graph 79, Annex 7 and Annex 8) were established. The study showed that cluster policies evolve through time similar to other policy types, often very close to the life-cycle of the main clusters. In addition the changes in the regional cluster policy are caused by the regional/ national/ global environment or through regional/ national/ European policy making institutions.

Moreover we claim that in both regions **cluster policies have evolved along similar evolution stages**, such as building or setting the grounds for the cluster based development of the regions, then strengthening clusters and finally clusters started to be a natural core/ center of the regional economic development (Graph 77). Indeed many aspects within periods of the cluster policy making were **similar among the two regional clusters polices**. In particular we want to highlight that at the beginning of the 1990s both economies were in **crises and needed restructuring**. One of the problems for both regions was a strong dominance of the steel, iron, metallurgy and big machinery production. Therefore, both regions were hit by the oil crises of the 70s, which resulted in the start of a period of decline, up to introduction of the new policies based on clusters. One of the main outcomes of the cluster policy was the succeeded re-structuring and reduced dependence from traditional industries. Here we make strong links with the cluster life-cycle models (Graph 3) and show the need of developing a similar approach towards cluster policies.

Both regions have applied similar instruments (establishment of cluster associations and public co-funding of the projects based on the cooperation between firms and research institutions) for the

implementation of the cluster policy, but they have followed slightly different institutional and conceptual approaches to cluster policy realization. While in the Basque Country the government driven matrix of experts served as a bridging link between the public/ government level and cluster associations/ firms, in Upper Austria after a 5 years top-down cluster driven approach, the policy was modified to a more independent bottom-up led cluster development. In addition to this we think that the selection of priority clusters and establishment of the cluster initiatives in both regions took place on the basis of natural clusters, but we claim that in the Upper Austria the development of the selected clusters was more focused (possibly due to more centralized promotion). This along with significance of the local economy on the national level and the stronger national public support of the regional cluster policy might have resulted in a more effective development of clusters in the Upper Austrian region. That is why we think than the implementation of the cluster policy in Upper Austria was more systematic and structured, leading to a clearer definition of competitive sectors/ clusters of the regions, which have laid a more solid basis for economic growth of the region in the long-term.

In addition to this we propose that in both cases the cluster policy has passed from being **regional technology-driven cluster policy** to **regional smart specialization cluster-based innovation strategy**. Meanwhile the prime goal of cluster policy in Upper Austria was “innovation through cooperation”, which should have led to an overall strengthening of regional competitiveness. On the contrary in the Basque Country, from our point of view, the cluster policy was mainly applied for strengthening business competitiveness with the final aim of overall enhancement of regional innovativeness. As a result of this different approach, it can be noticed that in the Basque Country a broad network of research institutions along with clearly above average innovation-related indicators can be observed, while in Upper Austria a more enhanced industrial development and sector specialization is seen. This once again underlines the diversity of cluster policy objectives mentioned earlier and the way there are being shaped by external or local policies (Borrás 2008).

Secondly both regions have **experience evident and above national economic growth** since the start of the cluster policy (Part Economic development and growth in Chapter 6 & 7). The Basque Country has turned to be the leading region in Spain in terms of the GDP per capita, while it was only 5th in the 1990s (Graph 81). Furthermore in comparison to Spain the region has one of the lowest unemployment rates, with the highest industrialization share, a high number of patent applications per million inhabitant and high levels of R&D employment (Part Factors of influence in Chapter 6 & 7). Meanwhile Upper Austria is not leading in Austria in terms of GDP per capita. Its overall GDP and GDP per capita growths from 1998 to 2011 was the highest among other Austrian federal provinces (Graph 82), which was also accompanied by maintained industrial strengths (Graph 84), favorable labour market development, and technological & innovation leading upgrade

(Graph 88). This helps us to confirm the arguments of positive implication of cluster and cluster policies for economic growth (Genosko, 2006; Porter, 1998; Karlsson, 2007).

In drawing the key conclusions from the relation between the **economic development and cluster policy** we stress the most relevant outcome with our research questions and objectives. While considering the change in number of establishments in the automobile sector as a cluster variable, we could conclude that there has been a **certain positive year to year connection with economic growth**. This, considering the imperfectness of data, could hint at the relevance of clusters with regard to economic performance of the regions. At the same time, as both regions established one of the first cluster initiatives in these sectors and continue to see them as priority ones, we could also try to make a positive link with the performance of the regional cluster policy and economic development. Yet, as this is only one cluster from a very specific industry such conclusions are very thin. A certain further contribution in integration of other clusters in the model and extension of yearly observations would be needed in order to provide more substantial and assuring results.

We noticed a **much stronger link** between a **broader set of regional policies and economic growth**. In particular, although the economic improvement took place in both regions, in the Basque Country we couldn't notice a direct link between economic growth and only the implemented cluster policy. This influence took place rather more in combination with other policies. The same situation is also observed for Upper Austria, where the constant industrial and innovation focus and pro-active labour policies led to almost full employment. That is why an important part of the economic progress has to be attributed to other accompanied regional policies.

Generally drawing stronger conclusions, especially regarding the impact of cluster policy on the regional economic and cluster development, is hampered by data validity and limitations. In particular, the following limitations emerge: 1) lack of sustainable data for the observed indicators until 1995 and after 2012/2013, 2) the disturbance of the economic development trend due to the financial crisis 2008 as well as by the oil, Russian and Asian crises of 1997 – 1998 and 3) the absence of long term indicators related to cluster policy implementation. The first two aspects limit our 20 years period of cluster policy observation in almost 10 years and the last one impede the quantitative observation and interpretation of cluster policy related data.

All in all we have noticed several additional similarities and further common positive implications of the cluster policy on the economic development in both regions. As such, cluster policy has contributed to economic development of the region by:

- Significantly **restructuring the overall economy of the regions**. For both regions the identification and focus on clusters was a chance to redefine and build its new specialization

and competitive advantages, which served as a basis for technological and innovation progress.

- Boosting **SME's supports and development** along with a **change in the way of doing business**, both on the level of big & small companies.
- **Assisting companies' internationalization strategy and market (in/ outside) positioning.**

Finally, the review of the regional economic performance, stages and periods of the cluster policy in the both regions have provided us with some new and revised considerations regarding **common components contributing to the effective cluster policy making**. First we highlight components, which were relevant in a certain stage of the cluster policy process and then conclude with their overall listening. Most of them once again re-assure and support our **theoretical arguments** highlighted in Chapter 3 on cluster policies.

- **The discussion stage** was not always included in the cluster policy process, especially in the later periods of the cluster policy making. At the same time, we think that this stage assists in having a better awareness about regional business and market needs and from another side, inform the business on current political trends and issues.
- **Economy and cluster analysis stage** should be repeated every time the policy is being revised. The performance of the analysis is especially relevant after a medium term of cluster policy implementation.
- **Policy review** is very complicated stage, which was often neglected by the regional authorities, especially during the later periods of the cluster policy, but is similarly necessary as the previous ones. Its main benefits are in possibility to align pre-existing policies and if not reducing, at least optimizing/ harmonizing the costs.
- **Policy development** stage should receive high attention in both regions. Each policy plan is developed by considering the necessary improvements based on the review of the previous one. The consultation with the private sector must take place due to their better understanding of market trends. In addition to this, the development of the cluster policy is proven to be more effective (cost, resource and global trends) by close EU guidance, and the consideration of international trends and local/ cluster needs.
- **Policy implementation** is the central stage in cluster policy making. Thus it could be the one which is also less influential from the public side and more business driven. We find that two cluster policy tools that have been applied: 1) establishment of cluster initiatives and 2) funding of projects in collaborations, were effective. Nevertheless, there is still space for other policy measures / tools, within these two as well as by combining/ using with other policies.

- **Monitoring & evaluation** is an extremely important stage, primarily in order to drive conclusions for further policy improvement. The constant self-learning as well as learning from others also contributes to effective policy making.
- **Policy improvement** stage is repeatedly needed as the cluster policy is a flexible tool, which is strongly related to the economic and industrial environment of its application.

Overall the key components in the cluster policy process were (details in conclusion in Chapter 8):

- In both regions the **role of personalities** for the launch and application of cluster policy was important.
- **Strong government and regional administrative** institutions are significant as they can greatly facilitate the level of policy implementation in the territory.
- The importance of the **availability of the financial resources** for the implementation and realization of the cluster policy.
- **Close alignment** of the cluster and regional policy priorities within **European framework** as it opens additional sources of funding and further integrates the regions and its actors into the European and global system.
- **Commitment, collaboration, dialog & motivation** of the regional actors toward not only cluster policy, but introduction of changes as a whole.
- In both cases the feeling of **trust and transparency** between key representatives from business, public authorities and academia was presented.
- A **long-term vision for the cluster policy** is necessary, as it builds the foundation for the economic development of the region, facilitates the strategic planning for companies and increases the investment climate.
- Cluster **policies** were **closely integrated into the general framework of territorial development**, especially in the last few years. Basically since 2005/7 clusters were seen as a central component in the development of the region
- **Participation of all actors from the triple helix** on all levels of regional cluster policy making.

4. Implication of the results

Our research has produced an in-depth analysis of regional cluster policies which offer valuable recommendations enriching our theoretical grounds, policy area and short- and medium term actions for the two regional cluster policies. In this sequence the aspects are presented below.

4.1. Recommendations for theory

Considering the above stated research findings, we see the following key implications for broadening the theoretical conceptualization addressing policy making, cluster and economic development dimensions.

In terms of policy making we have identified (1) key **components/ factors** within the defined stages of the cluster policy process and suggested a framework (Graph 9), which offers a more structural and detailed approach to cluster policy making and can be used as a toolbox by regional cluster policy makers. Furthermore, we noted that (2) cluster policies, similar to the other types of policy, also **evolve over time**. The changes can be caused by regional/ national/ global markets or through regional/ national/ European policy making institutions. (3) **Administration** or cluster policy making should be strongly addressed within economic studies. In the same way **policy-making institutions** (4) are also relevant for policy building and influence the effectiveness of the policy itself. This was addressed by institutional theories and indicates the need to develop stronger links between policy theories and theories of economic development/ growth. In addition it was again confirmed that (5) **cluster policies** are **difficult to evaluate** or measure. One of the reasons for this is that the success of the policy is often related not just to the level of the policy implementation or starting regional conditions, but also in alignment with the overall regional goals, policies objectives and later on within the global/ nation context. That is why we once again stress the need of more systematic theoretical grounds building, especially in terms of cluster policy related definitions.

From the side of cluster dimension we see the theoretical contribution of our study in providing further positive arguments in favor of cluster policy (1) **implications on regional development**. This has been already addressed earlier by e.g. Sölvell (2008), Asheim et al. (2006), Bathelt and Glückler (2002) and Christensen et al. (2012). In addition to this we want to stress the need for (2) further clear theoretical and practical **separation** between **natural clusters** and cluster policy tools such as **cluster associations**. In addition to this, maintaining clear differences between cluster associations and cluster networks is also necessary. The reason for these we see in the often blending of cluster and network related concepts within the theoretical dimension.

Finally we must underline once again that economic development is a (1) **complex and multi-dimensional matter**, which can be perceived various different ways. This has been numerously addressed by different economists (Chapter 2). This is clearly related to the broadness of development and growth theories. Yet, we managed to further address the relevance and important of (2) **economic growth** within the notion of development and observe its change under the influence of defined regional factors. Through this we have seen once again that within selected

factors (3) **clusters** proved to have positive implications on economic growth. However, due to the imperfectness of the data and the quantitative observation of only 1 cluster weakens our conclusions in this regard. However, they are aligned with such theoretical concepts as NEG, endogenous or growth poles. Finally, we could note that (4) **policy making** and government led decisions can influence the pattern of economic development in the region.

4.2. Recommendations for policy-makers

This in-depth review has produced practical recommendations for policy makers, which is reflected through a proposed scheme of the key components in the identified stages of the cluster policy (Graph 9, Table 11). It can and should be used by policy makers as a toolbox for cluster policy making. We have also gathered a number of the most relevant overall recommendations.

These overall recommendations seem to be especially important for the cluster policy makers in countries of the European Union, which have already been applying the cluster policy for more than 10 years.

Policy makers should give more attention to systematized, organized and platform based approaches to (1) **self-evaluation, monitoring and learning**. This gives a better and clearer vision of the processes and thus helps to realize the gaps where the introduction of changes is needed, in order to improve the policy implementation.

There is a need to involve active, risk taking and passionate (2) **people** in the coordination and implementation of cluster policy. Participation of people with these characteristics especially at the early stage of the cluster policy process is especially relevant, as they can motivate, convince and engage different groups of actors.

It is important to constantly (3) **upgrade the competencies of institutions**, which are actively involved in the cluster policy and cluster policy making. The policy making institutions should be on the frontline of economic, policy and innovation related trends. Their awareness in these issues sets the basis (in form of policy programs, plans) for all actions related to territorial development.

In order to achieve the knowledge exchange the (4) **close communication** between **government/administration and research institutions/ universities** is required. Universities or academic centers should serve as a knowledge generation platform, sharing their experience across the regions and among other.

Pro-actively communication tools of the regional cluster policy and with other policies, especially (5) **EU policies**, which set set an important synchronization element for regions and offer them

extensive financial and orientation support. In particular it could be relevant for regions where the countries' policies are misleading or controversial in terms of facilitating economic development.

Institutions and actors within their territory should realize that achieving policy goals and economic progress can only be realized in the environment of (6) **trust** and **transparent** relations and communication. This is beneficial for government itself, as well as for the business and civil sector.

Cluster policy should be seen as (7) **long-term instrument**, which is to be permanently adjusted and modified to the existing needs of businesses, clusters and global policy making trends. This means that the role of the new government is not to abolish and completely replace the policy, but to adjust it, maintaining its core objectives and principals.

Before starting the development of the cluster policies, as well as during the modification of instruments a thorough (8) **review of existing other policies and instruments should be conducted**. Most of the existing activities already indirectly stimulate and enhance cluster development. Their revision or grouping along with the focus on core clusters/ sectors would be not only cost-effective but also less-time and -resource consuming.

To conclude, cluster policy should always be **integrated** within the (9) **general framework of territorial development**. Only by being clearly centered and incorporated into the overall view and strategy of territorial / regional development can cluster policy make the full-scale contribution to strengthening regional economic development and competitiveness.

4.3. Recommendations for the Basque Country and Upper Austria

As the result of or case studies we would like to propose several key recommendations for the cluster policies in the Basque Country and Upper Austria. In Table 52 below we indicate region specific recommendations, after which we bring up general suggestions which are relevant for both regions.

Table 52 Recommendations for the Basque Country and Upper Austria

The Basque Country	Upper Austria
<ul style="list-style-type: none"> • Continue raising awareness of the cluster concept among broader number of companies, especially SMEs; • Enhance visibility of many aspects related to cluster initiatives, especially in terms of online presence and online data accessibility and availability; In addition experts and decision makers should learn to clearly express their broad knowledge on cluster concept and policy • Improve the communication/ cooperation between different departments within the government administration as well as on other administrative levels; • Stimulate learning from each other, especially between cluster initiatives themselves; • Improve the sectoral prioritization/ definition of clusters within the regional strategy for the next years and through this better align the character and the number of cluster initiatives, which are to be supported¹³⁷; • Increase alignment of the regional cluster policy with existing initiatives regarding regions (cluster) policy on the European and international level (e.g. PAXIS3 initiative, PRO INNO Europe initiative, European Cluster Alliance, etc.) 	<ul style="list-style-type: none"> • Improve and strengthen the communication and cooperation especially between research centers /universities into the activities of clusters with all types of companies; • Raise involvement of other departments into the development / implementation of cluster policy activities; • Diversify support of existing sector/ cluster as the current number (9) of cluster is small one and is limited to very traditional sectors. The opportunities coming through the support of non-traditional cluster would be very promising in specialization strategies in the next years; • Address closer cooperation between production and service oriented firms, especially in the area of high-technology services • Build up or encourage the formation of research centers, which assist public institutions, cluster initiatives and other agencies in systematic realization of deep analytical studies on regional and cluster development
Recommendations for both regions	
<ul style="list-style-type: none"> • There is room to increase R&D public funding for concrete cluster related projects in co-operation • Diversification of already existing and development of new (more output base/ tangible) cluster supporting activities. • Continue strengthening the relation between research centers & SME's; • Development of cluster policy impact assessment tool, which will include defined indicators (on companies', projects, cluster initiative and regional level) for systematic, long-term self-evaluation and learning; • Create a platform or network of people, who are aware and are involved on in the cluster and regional development. Maintain the network through regular special event, which should lead to raised awareness, easy access to pool of experts, knowledge/ experience exchange and establishment of new co-operations; • Continue strong focus and support to companies' needs and their alignment with global trends 	

Source: Author's development

Concluding, we want to stress, that although both regions have developed their cluster policy so that it closely aligns with the key components from the Graph 9 and Table 11 and have shown above average economic growth, still there is room for improvement, which should be part of every long term cluster policy.

¹³⁷ The necessary steps are already being underway as SPRI in the process of regrouping the clusters and cluster initiatives. The first results of these re-viewing was putting clearly the number of cluster (11) and pre-cluster (11) associations

5. Opportunities for future research

This dissertation research has identified and presented several opportunities for further research. Overall we think that cluster policies need (1) **more case comparison** based on in-depth study of regions and their policies, especially within different socio-economic setting and character (“successful/ non-successful” and/or “effective/ non-effective”) of cluster policies.

Furthermore, we see the need for analysing the way in which regional cluster policies are shaped by particular (2) **types of clusters**. In addition we think that further studies demand the application of theories and methods of (3) **behavioural economics** due to close links between cluster impact and social aspects of territories policy actors. Moreover we also see the need for application of (4) **action research methods** for studying cluster policy, in particular for stimulating learning and fast theoretical integration of changes into the regions, cluster initiatives and clusters. Finally, we think that the studies on cluster policies need stronger (5) **comparative quantitative analysis**, especially on the basis of the future **regional cluster index**. Indeed we think that the proposed **regression model** should be applied to a larger dataset, namely using the data for all EU member states’ regions. We see this idea to be reasonable and interesting for further research, in particular for producing more concrete quantitative results.

Final remarks

In this research work we addressed the overall research question on how to build cluster policy leading to economic development. This has extensively broadened and enriched our understanding of clusters and cluster policy making. In particular the focus on the process dimension of policy making was innovative and enriching for both researchers as well as policy makers. Analyzing the economic development of regions (the Basque Country and Upper Austria) and their cluster policies on a period and on a stage by stage basis have provided us not only with deep insights into the theories of cluster policy and economic development, but also into giving a more practical understanding of the policy on different levels and in different periods of its existence. The identified findings and highlighted recommendations have closed some of the old and opened a number of new disputes, providing a solid basis for further research endeavours in terms of cluster policy and economic development.

ANNEXES

Annex 1 List of selected definitions of economic development

Author/ Source	Definition
Meier and Baldwin, cited in Somashekar (2003, p. 2)	According to Prof. Meier and Baldwin; "Economic development is a process whereby an economy's real national income increases over a long period of time". This definition explains three ingredients of economic development. a) process, b) real national income, c) long period. The discussion of these three factors would help in understanding the concept of economic development. Economic development is a process consisting of a long chain of interconnected changes in fundamental factor supplies and in the structure of demand for products leading to a rise in real national income over a long period
Benard Okun and Richard W. Richardson, cited in Somashekar (2003, p. 3)	"Economic development may be defined as a sustained secular improvement in well-being, which may be considered to be reflected in an increasing flow of goods and services". It stresses on three important aspects of development; a) Economic development is a dynamic and long term phenomenon; b) It implies improvement in material welfare and c) National output is the measuring rod of material welfare
Baran, cited in Somashekar (2003, p. 4)	"Let economic growth or development be defined as an increase over time in per capital output of material goods."
Bachanan and Ellis, cited in Somashekar (2003, p. 4)	"Development means developing the real income potentialities of the under-developed areas by using investment to effect those changes and to argue those productive resources which promise to raise real income per person" In other words, for economic development the rate of increase real income should be higher than the rate of population growth.
Colin Clark, cited in Somashekar (2003, p. 4)	economic development from the angle of economic welfare. In his own words, "Economic progress can be defined simply as an improvement in economic welfare." Economic welfare, following Pigou, can be defined in the first instance as an abundance of all those goods and services which are customarily exchanged for money. Leisure is an element in economic welfare and more precisely: "We can define economic progress as the attaining of an increasing output of those goods and services for a minimum expenditure of effort, and of other scarce resources, both natural and artificial"
United Nations Expert Committee, cited in Somashekar (2003, p. 4)	"Development concerns not only man's material needs but also the improvement of the social condition of his life. Development is, therefore, not only economic growth, but growth plus change— social, cultural and institutional as well as economic".
Longman (2000, p. 129)	"When a country or area increases its wealth, for example by changing from an economy based on agriculture to one based on industry, or by changing to more modern industries and services"
Todaro, Smith (2012, p. 14)	"Achieving sustained rates of growth of income per capita to enable a nation to expand its output at a rate faster than the growth rate of population"
World Bank (2014)	"Qualitative change and restructuring in a country's economy in connection with technological and social progress".

Source: Authors' presentation based on reviewed sources

Annex 2 List of selected cluster definitions

Author/ Source	Definition
Crouch, Farrell (2001, p. 163)	“The more general concept of ‘cluster’ suggests something looser: a tendency for firms in similar types of business to locate close together, though without having a particularly important presence in an area.”
Enright (1996, p. 191)	“A regional cluster is an industrial cluster in which member firms are in close proximity to each other.”
European Committee (2002, p.14, cited in Linzenberger (2007, p. 156)	„Regionale (Branchen) - Cluster“ – „eine Konzentration ‘interdependenten’ Unternehmen innerhalb desselben oder verwandten Wirtschaftszweige in einem begrenzten geographischen Gebiet“
Feser (1998, p. 26)	“Economic clusters are not just related and supporting industries and institutions, but rather related and supporting institutions that are more competitive by virtue of their relationships.”
Krugman (1991, cited in Boja 2011, p. 35)	„Clusters are not seen as fixed flows of goods and services, but rather as dynamic arrangements based on knowledge creation, increasing returns and innovation in a broad sense.”
Linzenberger (2007, p. 156)	„Regional (industry) - cluster - a concentration 'interdependent' firms within the same or related industries in a limited geographical area. “
Morosini (2004, cited in Boja 2011, p. 35)	“Cluster is a socioeconomic entity characterized by a social community of people and a population of economic agents localized in close proximity in a specific geographic region”
Roelandt, Den Hertog (1999, p. 9)	“Clusters can be characterised as networks of producers of strongly interdependent firms (including specialized suppliers) linked each other in a value-adding production chain.”
Rosenfeld (1997, p. 4)	“A cluster is very simply used to represent concentrations of firms that are able to produce synergy because of their geographical proximity and interdependence, even though their scale of employment may not be pronounced or prominent.”
Swann et al. (1998, p. 1)	“A cluster means a large group of firms in related industries at a particular location.”
The “Community Framework for State Aid for Research and Development and Innovation” in Nadabán, Berde (2009, p. 774)	Innovation clusters are “groupings of independent undertakings — innovative start-ups, small, medium and large undertakings as well as research organizations — operating in a particular sector and region and designed to stimulate innovative activity by promoting intensive interactions, sharing of facilities and exchange of knowledge and expertise and by contributing effectively to technology transfer, networking and information dissemination among the undertakings in the cluster.”
UNIDO in Nadabán, Berde (2009, p. 77 4)	“Sectoral and geographical concentrations of enterprises that produce and sell a range of related or complementary products and, thus, face common challenges and opportunities. These concentrations can give rise to external economies such as emergence of specialized suppliers of raw materials and components or growth of a pool of sector-specific skills and foster development of specialized services in technical, managerial and financial matters.”
Van den Berg, Braun and van Winden (2001, p. 187)	“The popular term cluster is most closely related to this local or regional dimension of networks ... Most definitions share the notion of clusters as localized networks of specialized organizations, whose production processes are closely linked through the exchange of goods, services and/or knowledge.”

Source: Author’s presentation based on mentioned sources

Annex 3 List of interviews conducted in the Basque Country and Upper Austria

R1 – Basque Country	R2 – Upper Austria
1. Regional government authority	
<p>Juan Manuel Esteban Basque Government Department of Economic Development & Competitiveness (earlier: Coordinator Basque Country Cluster Policy, Basque Government) www.euskai.net Interview: 10.02.2014 Location: Vitoria-Gasteiz</p>	<p>Walter Winetzhammer Government Upper Austria Office of the Upper Austrian Government Department Economy www.land-oberoesterreich.gv.at Interview: 24.10.2013 Location: Linz</p>
<p>Juan Miguel López Uribe Basque Government Department of Economic Development and Competitiveness www.euskai.net Interview: 22.05.2014 Location: Vitoria-Gasteiz</p>	<p>Viktor Sigl President of the Upper Austrian Parliament www.ooe.gv.at (earlier: (Vice-)president of Upper Austria Chamber of Commerce, CEO of Economic Council Upper Austria) Interview: 31.10.2013 Location: Linz</p>
<p>Jon Azua, Dr. President and CEO E-novating Lab Ideas & Strategy www.enovatinglab.com (earlier: Minister for Industry and Energy, Basque Government) www.euskai.net Interview: 4.03.2014 Location: Bilbao</p>	<p>Christoph Leitl, Dr. President Chamber of Commerce Austria www.wko.at (earlier: Government of the Federal State of Upper Austria; Deputy Governor and Treasurer of the Federal State of Upper Austria) www.christoph-leitl.at Communication per Email: 09.01.2014</p>
2. Local developing/ cluster supporting institutions (agencies)	
<p>Olga Irastorza Programme Manager Bihartean - Cooperation programme between Chambers of Commerce in Gipuzkoa (Spain) and Bayonne (France) www.bihartean.com Interview: 21.03.2014 Location: San Sebastian</p>	<p>Hermann Pühringer Director of the Department Upper Austria Chamber of Commerce Division Economic Policy www.wko.at Interview: 31.10.2013 Location: Linz</p>
<p>Txomin Olabarri The Basque Business Development Agency, SPRI www.spri.es Interview: 28.03.2014 Location: Bilbao</p>	<p>Bruno Lindorfer, Dr. Managing Director Technology and Marketing Company Upper Austria www.tmg.at Interview: 31.10.2013 Location: Linz</p>
<p>Iñaki Tellechea Fernandez Director The Basque Business Development Agency, SPRI Promotion of Entrepreneurship www.spri.es Interview: 28.03.2014 Location: Linz</p>	<p>Werner Pamminger CEO Clusterland Upper Austria www.clusterland.at Interview: 30.10.2013 Location: Linz</p>
<p>Aitor Ruiz Knowledge Manager Basque Country Automotive Cluster, ACICAE www.acicae.es Interview: 28.01.2014 Location: Amorebieta-Etxano</p>	<p>Andreas Hubinger Business Manager Management & Research “marecon” www.marecon.at (earlier: Clustermanager, Automotive Cluster, AC) http://www.automobil-cluster.at/ Interview: 22.10.2013 Location: St. Florian</p>

R1 – Basque Country	R2 – Upper Austria
<p>Xabier Ortueta Director General Machine Tool, Accessories, Components Parts and Tools Manufacturers' Association of Spain, AFM www.afm.es Interview: 06.02.2014 Location: Donostia - San Sebastian</p>	<p>Gerlinde Pöchhacker-Tröscher, Dr. CEO PÖCHHACKER Innovation Consulting GmbH www.p-ic.at (earlier: Clustermanager, Automotive Cluster, AC) http://www.automobil-cluster.at/ Interview: 30.10.2013 Location: Linz</p>
<p>Leire Aldabaldetrek General Director Basque Hospitality, Wood & Design Cluster, HABIC www.clusterhabic.com Interview: 05.02.2014 Location: Azpetia</p>	<p>Erich Gaffal Clustermanager Furniture and Timber Cluster, MHC http://www.m-h-c.at/ Interview: 29.10.2013 Location: Linz</p>
<p>Cristina Murillo Clustermanager Association of Electronic and Information Technologies in the Basque Country, GAIA www.gaia.es Interview: 07.02.2014 Location: Donostia - San Sebastian</p>	<p>Jürgen Neuhold Clustermanager Food Cluster http://www.lebensmittelcluster.at/ Interview: 29.10.2013 Location: Linz</p>
<p>Fernando Alan Clustermanager The Basque Association of Language Industries, Languna http://www.langune.com/ (earlier: Cluastermanager, GAIA) www.gaia.es Interview: 03.04.2014 Location: Donostia - San Sebastian</p>	<p>Erich Mayr Head of Research Center School of Applied Health/ Social Sciences www.fh-ooe.at (Earlier: Clustermanager Health Technology Cluster, GC) www.gesundheits-cluster.at Interview: 30.10.2013 Location: Linz</p>
3. Companies (in cluster)	
<p>José Ramón González CEO Algon (member of Basque Hospitality, Wood & Design Cluster, HABIC) www.algonemm.com Interview: 13.02.2014 Location: Irun</p>	<p>Karl Rametsteiner Expert Ke Kelit (Member of Plastic Cluster) www.kekelit.com Telefon-Interview: 11.11.2013</p>
<p>Jose Iraolagoitia Otxandiano General Manager MICRODECO, S.A. (Member of Automotive Cluster) www.microdeco.com Telefon-Interview: 25.06.2014</p>	<p>Jürgen Bruckner Expert Fronius International GmbH (Member of Automotive Cluster) www.fronius.com Telefon-Termin: 05.12.2013</p>
4. Applied research institution	
<p>Begoña Sanchez Head of Regional Development Models and Policies Tecnalia Corporation Innovation Systems Unit www.tecnalia.com Telefon-Interview: 10.03.2014</p>	<p>Sonja Mündl, Dr. Senior Manager Softwarepark Hagenberg www.softwarepark-hagenberg.com Interview: 30.10.2013 Location: Hagenberg</p>
5. University/ academic institution	
<p>Mari Jose Aranguren, Dr. General Manager Basque Institute of Competitiveness, Orkestra www.orkestra.es Interview: 21.02.2014 Location: Donostia-San Sebastian</p>	<p>Peter Mayerhofer, Dr. Senior Researcher Austrian Institute for Economic Research, WIFO www.wifo.ac.at Telefon-Termin: 23.04.2014</p>
Total number	
15	15

Annex 4 Inquire letter to conduct interview

A. Example (German)

Von: Anastasiia Konstantynova [<mailto:anastasiia.konstantynova@orquestra.deusto.es>]

Gesendet: Donnerstag, 24. Oktober 2013 14:06

An: [REDACTED]

Betreff: Gespräch zur regionalen Clusterpolitik in Oberösterreich

Sehr geehrt [REDACTED],

ich bin wissenschaftliche Mitarbeiterin beim **Orkestra-Baskischen Institut für Wettbewerbsfähigkeit**, Spanien (<http://www.orquestra.deusto.es/>) und Doktorandin an der **Katholischen Universität Eichstätt-Ingolstadt**, Deutschland.

Zurzeit im Rahmen meiner Doktorarbeit untersuchen wir die erfolgreichen Regionalpolitik. Die Clusterpolitik, seit dem **Programme „Oberösterreich 2000+“** sowie auch weitere scheinen aus der wissenschaftlichen und praktischen Sinn sehr interessant zu sein. Unser Ziel ist die Feststellung des Prozesses der Politikbildung und der eingesetzten lokalen Instrumente durch die Gespräche mit verschiedenen regionalen Vertretern, unter denen auch Forschungseinrichtungen.

Hiermit wollten wir bei Ihnen als Assistentin des Leiters des Softwareparks Hagenberg, um ein kurzes **Gespräch-Interview** bitten. Ein Vorzugstermin wäre in der Periode von [REDACTED] **Oktober bis [REDACTED] November 2013**. Die gesammelten Informationen werden transkribiert und nur **indirekt** (ohne Namen) im Form von Gesamtbericht/Analyse interpretiert und dargestellt. Bei den Leitfragen geht es nicht über internen Stand des Zentrums, sondern um Ihrer Auffassung zur eigensetzten Programme und wirtschaftlichen Entwicklungen in der Region.

Auf Ihre positive Rückmeldung würden wir uns sehr freuen und bei den weiteren Fragen wenden Sie sich gern an mich.

Mit freundlichen Grüßen,
Anastasiia Konstantynova, M.A.

Research Assistant
Orkestra-Basque Institute of Competitiveness
Department Territory, Innovation and Clusters
Mundaiz 50, San Sebastián, 20012, SPAIN

Ph.D. Student
Catholic University Eichstaett-Ingolstadt
Department Economic and Social Policy
Auf der Schanz 49 85049 Ingolstadt, GERMANY

Tel.: [+34 622 32 622 7](tel:+34622326227)
Skype: me_anastasia

B. Example (Spanish/ English)

De: Anastasiia Konstantynova [<mailto:anastasiia.konstantynova@orquestra.deusto.es>]

Enviado el: viernes, 17 de enero de 2014 11:57

Para: [REDACTED]

Asunto: Entrevista sobre la política de los clústeres en el País Vasco

Estimad [REDACTED],

Actualmente me desempeño como doctorando investigador en Orkestra-Instituto Vasco de Competitividad y además soy doctorando en la Universidad Católica de Eichstätt - Ingolstadt en Alemania.

Como parte de mi tesis doctoral, estoy realizando investigaciones sobre diferentes políticas regionales. La política de Clusters en el País Vasco se considera un caso referente y por ello resulta muy interesante para comparar con otras

regiones. El objetivo de este trabajo es determinar el proceso y la forma de organización de dichas política mediante entrevistas con diversos representantes regionales.

Tengo entendido que Usted está desarrollando un papel muy importante en la promoción de la Asociación Española de Fabricantes de Máquinas-herramienta. Por ello quisiera ver la posibilidad de desarrollar una corta entrevista con Usted o con quien Usted indique dentro de su organización.

La información de dicha entrevista será transcrita y presentada anónimamente, es decir sin nombres dentro de un informe general. Las preguntas abarcan principalmente 3 subtemas: el desarrollo regional, la construcción de la política y las organizaciones.

Estaría muy agradecida por su respuesta positiva y su valioso apoyo.
Si Usted tiene alguna otra pregunta, por favor no dude en ponerse en contacto conmigo.

Saludos,

Dear [REDACTED],

I am a PhD researcher at Orkestra-Basque Institute of Competitiveness and a PhD Student at Catholic University Eichstaett-Ingolstadt in Germany.

Currently, as part of my doctoral thesis, I study different successful regional policies. The cluster policy in the Basque Country is often referred as a best practice case and thus is very interesting from the comparison in the research terms. The goal of the work is to determine the process and organizational form of policy formation by conducting interviews with several key regional representatives.

As far as I know, you and your team are playing an important role in the establishment of cluster association Advanced manufacturing technologies. Hereby I would like to ask you for a short interview.

The gathered information will be transcribed and only indirectly (without names) in the form of general report presented. The questions center mainly around 3 sub-topics: regional development, policy building and inter-organizational collaboration.

I would be very grateful for your positive response and valuable support. If you have any further questions, please do not hesitate to contact me.

Best regards,
Anastasiia Konstantynova, M.A.

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Annex 5 Framework for semi-structure interviews, Example (English)

Brief introduction into the interview and the topic... *Please disclose the following statements by paying attention to the highlighted words: Some statements are precisely formed and require an exact answer*

1. Region & cluster characteristics

A. Region

- **Socio-economic development** of the region in the last 20 years
- Main regional **strengths** and **weaknesses**

B. Clusters

- Your **understanding**/ interpretation of clusters (its meaning, application, key advantages)
- **Cluster(s)** in the region (*in brief*): in what industries, their size, actors, period of existence, formation processes, success level

2. Cluster policy in the region

2.1. General information

- Your **understanding**/interpretation of a cluster policy

A. Bringing up the cluster issue:

- **Initiating** the discussion on cluster concept in the region: time, actors, reasons, form
- Any previously adopted **“trendy” policy**? (*the one, which was very popular in other regions*)

B. Economy & cluster analysis

- **Conduction of economy & cluster analysis**: time, actors, organizational form, methods used (qualitative/ quantitative)
- **Choice of cluster**: process, argumentation, reflection of regional characteristics, engaged actors, their competences, consensus with the choice among local actors

C. Previous policy review

- Has been done a **review of an old policy**?
 - if yes: time, actors (especially private sector), form/ if no: why?

D. Development of new policy

- Setting the **framework of the regional cluster policy**: time, actors, form (e.g. dialog)
- **Goal** of the developed regional policy?
- What are the main **objectives** of this policy?
- **Correlation** of the developed policy: with regional characteristics & within affected authorities' responsibilities and powers;
- **Other existing policies** and their capacity to influence clustering processes?

E. Policy implementation

- Approach towards the **implementation** of the policy: time, actors (especially administrative level by public institutions), appliance of/ combination with already existing activities, instruments, financial resources (duration, amount, share between actors...), control mechanism
- Is there a **leader or a main organization**, responsible for implementation (control) of the policy & its' programs? If yes manager(s), funding, scope, quality of personal
- # Implementation in (all/ particular) **cluster(s)**:
 - Industry, participants, structure, economic situation, vision, atmosphere
 - Institutionalized (initiative)? If yes: launch time, strategy, goals, structure, funding, leader, activities

F. Monitoring & evaluation

- Policy **monitoring** mechanisms: timeframe, actors, control indicators, their aim, first source of information, financing
- Did policy **evaluation** take place? If yes: time, actors, methods, results, financing/ If no: why?
- What is the significance and what are the **results** of monitoring and/ or evaluations?

G. Modification

- Have been done some **modifications** into the policy? If yes; what, reasoning, actors, consensus between actors/ If no: why?

2.2. Effectiveness of policy

3. Relationships & attitude of different national & regional actors

- **Administrative structure** in the country
- **Regional authorities**: responsibilities, financing, taxes

Annex 6 Star methodology of the European Cluster Observatory

Category	Description
Number of Stars	Based on the European Cluster Observatory the amount and quality of knowledge circulating and spilling over between firms located in a cluster is dependent upon the cluster's size , the degree to which it is specialised and the extent to which the locality (the region) is geared towards and focused upon production in the relevant industries comprising the cluster. The European Cluster Observatory shows the extent to which clusters have achieved this specialised critical mass by employing measures of these three factors as described below, and assigning each cluster 0, 1, 2 or 3 'stars' depending on how many of the below criteria are met. If the number of employees in a cluster is less than 1,000 persons, the cluster is not given any stars to prevent the appearance of very small insignificant clusters.
1) Size	If employment reaches a sufficient share of total European employment, it is more likely that meaningful economic effects of clusters will be present. The 'size' measure shows whether a cluster is in the top 10% of all clusters in Europe within the same cluster category in terms of the number of employees. Those in the top 10% will receive one star.
2) Specialisation	If a region is more specialised in a specific cluster category than the overall economy across all regions, this is likely to be an indication that the economic effects of the regional cluster have been strong enough to attract related economic activity from other regions to this location, and that spill-overs and linkages will be stronger. The 'specialisation' measure compares the proportion of employment in a cluster category in a region over the total employment in the same region, to the proportion of total European employment in that cluster category over total European employment. If a cluster category in a region has a specialisation quotient of 2 or more it receives a star.
3) Focus	If a cluster accounts for a larger share of a region's overall employment, it is more likely that spill-over effects and linkages will actually occur instead of being drowned in the economic interaction of other parts of the regional economy. The 'focus' measure shows the extent to which the regional economy is focused upon the industries comprising the cluster category. This measure relates employment in the cluster to total employment in the region. The top 10% of clusters which account for the largest proportion of their region's total employment receive a star.
Additional information	The basis for all calculations is the corresponding indicator (total employment or share of a certain industry in total employment) of the EU27 countries. Data limitations restrict to the use of employment data to identify and evaluate clusters. This creates a certain bias in our measures towards employment-intensive clusters. Ideally to use data on wage bill, productivity, or value added, which would have shifted the balance in favour of capital- or knowledge-intensive cluster categories such as biopharmaceuticals.

Source: European Cluster Observatory (2014)

Annex 7 The Basque Country cluster initiatives

Period of cluster policy evolution	Nr	Name/ Abbreviation of cluster association	Name (full) of cluster association (english/ spanish)	Year of establishment	Type in policy strategy	Sectoral focus of cluster association	Cluster sector (Approximate in European Cluster Observatory)	Number of members (2013)	Number of employees, thsd. (2012, 2011 for pre-clusters)	Exports (in % of sales) (2012, 2011 for pre-clusters)	Webpage
I period	1	ACEDE	Cluster of household appliances of the Basque Country/ Cluster del Hogar de Euskadi	1992	priority	Household appliances	metal manufacturing	7	3,06	77	www.acede.es
	2	AFM	Spanish Association of Machine Tool Manufacturers, Accessories, Components and Tools/ Asociación Española de Fabricantes de Máquinas-herramienta, Accesorios, Componentes y Herramientas	1992	priority	Machinery tools	heavy machinery; production technology	99	7,15	92	www.afm.es
	3	ACICAE	Automotive cluster of the Basque Country/ Cluster der Automoción de Euskadi	1993	priority	Automotive	automotive	104	16,76	86	www.acicae.es
	4	UNIPORT Bilbao	Association for development and promotion of the port of Bilbao and its surroundings/ Asociación para el desarrollo del puerto de Bilbao y su entorno	1995	priority	Port of Bilbao	maritime; oil & gas	135	5,05	-	www.uniportbilbao.es/
	5	GAIA	Industrial Association of Electronic and Information Technologies of the Basque Country/ Asociación de Industrias de las Tecnologías Electrónicas y de la Información del País Vasco	1996	priority	Information and Technology Communication	IT; telecom	267	10,81	36	www.gaia.es
	6	ACLIMA	Cluster Association of	1995	priority	Environmenta	business	85	2,71	21	www.aclim

Period of cluster policy evolution	Nr.	Name/ Abbreviation of cluster association	Name (full) of cluster association (english/ spanish)	Year of establishment	Type in policy strategy	Sectoral focus of cluster association	Cluster sector (Approximate in European Cluster Observatory)	Number of members (2013)	Number of employees, thsd. (2012, 2011 for pre-clusters)	Exports (in % of sales) (2012, 2011 for pre-clusters)	Webpage
			companies in environment sector of the Basque Country/ Asociación Cluster de Industrias de Medio Ambiente de Euskadi			l Industries	services				a.net
	7	Energia	Energy cluster/ Cluster de Energia	1996	priority	Energy Cluster	oil & gas	90	12,70	34	www.clusterenergia.com/
	8	Conocimiento	Cluster in Bussiness Knowledge/ Cluster en Conomimientto Empresarial	1996	closed	Business Knowledge Management	education & knowledge creation				-
	9	HEGAN	Association of Aeronautics cluster of the Basque Country/ Asociación Cluster de Aeronáutica y Espacio del País Vasco	1997	priority	Aerospace	aerospace	38	4,04	62	www.hegan.com
	10	FMV	Association of Maritime Industries of the Basque Country/ Agrupación de Industrias Marítimas de Euskadi	1997	priority	Maritime/ Ship Building	maritime	322	6,43	85	www.adimd.e.es
	11	Papel	Association of Basque Paper cluster/ Asociación Cluster del Papel de Euskadi	1998	priority	Paper	paper products	21	1,92	57	www.clusterpapel.com

Period of cluster policy evolution	Nr.	Name/ Abbreviation of cluster association	Name (full) of cluster association (english/ spanish)	Year of establishment	Type in policy strategy	Sectoral focus of cluster association	Cluster sector (Approximate in European Cluster Observatory)	Number of members (2013)	Number of employees, thsd. (2012, 2011 for pre-clusters)	Exports (in % of sales) (2012, 2011 for pre-clusters)	Webpage
II period	12	EIKEN	Basque Audiovisual cluster association/ Cluster Audiovisual de Euskadi	2004	priority	Audiovisual	entertainment; media & publishing; telecom	38	1,36	-	www.eikencuster.com
	13	FEAF	Foundry Association of the Basque Country and Navarra/ Asociación de Fundidores del País Vasco y Navarra	2009	pre-cluster	Iron & steel, foundry	metal manufacturing	66	7,37	65	http://www.feaf.es/
III period	14	BBC	Association of Bioscience cluster in the Basque Country/ Asociación Basque Bioscience Cluster	2010	pre-cluster	Biosciences	biotech	45	1,30	16	www.basquebiocluster.com
	15	Alimentacion	Feeding cluster of the Basque Country/ Cluster de Alimentacion de Euskadi	2009	pre-cluster	Food	agriculture products; processed food	43	2,83	-	www.clusteralimentacion.com
	16	HABIC	Sector Cluster Association House space, Wood Office and Contract/ Asociación Cluster del Sector del Hábitat, Madera, Oficina y Contract	2009	pre-cluster	Habit & construct	furniture	103	5,20	33	www.clustehabic.com
	17	SIFE	Forging Industries Association Sociedad Industrias Forja por Estampación	2009	pre-cluster	Forging & casting	metal manufacturing	14	1,83	63	www.forjas.org

Period of cluster policy evolution	Nr.	Name/ Abbreviation of cluster association	Name (full) of cluster association (english/ spanish)	Year of establishment	Type in policy strategy	Sectoral focus of cluster association	Cluster sector (Approximate in European Cluster Observatory)	Number of members (2013)	Number of employees, thsd. (2012, 2011 for pre-clusters)	Exports (in % of sales) (2012, 2011 for pre-clusters)	Webpage
	18	Herramex	Spanish Association of Hand tools Manufacturers/ Asociación Española de Fabricantes de Herramientas de Mano	2010	pre-cluster	Hand tools	production technology	26	1,75	21	www.herramex.es
	19	SIDEREX	Spanish Association of Sider Exporters and Producers/ Asociación Española de Exportadores de Productos e Instalaciones Siderúrgicas	2010	pre-cluster	Cider	agriculture products; processed food	71	13,14	58	www.sidere.x.es
	20	ERAIKUNE	Construction cluster of the Basque Country/ Cluster de la Construcción de Euskadi	2010	pre-cluster	Construction	building fixtures, equipment and services; construction; construction materials	80	11,50	2	www.eraikune.com
	21	Langune	Association of language industries of the Basque Country/ Asociación de Industrias de la Lengua en el País Vasco	2012	pre-cluster	Languages	education & knowledge creation	60	5,00	17	www.langune.com
	22	MAFEX	Spanish Association of Manufacturers and Exporters of Equipment and Rail Services/ Asociación Española de Fabricantes Exportadores de Material, Equipos y Servicios Ferroviarios	2012	pre-cluster	Railways	transportation & logistics	22	9,55	70	www.mafex.es

Period of cluster policy evolution	Nr.	Name/Abbreviation of cluster association	Name (full) of cluster association (english/ spanish)	Year of establishment	Type in policy strategy	Sectoral focus of cluster association	Cluster sector (Approximate in European Cluster Observatory)	Number of members (2013)	Number of employees, thsd. (2012, 2011 for pre-clusters)	Exports (in % of sales) (2012, 2011 for pre-clusters)	Webpage
II period	23	ClusterTIL / MLC ITS	Association of Mobility and Logistics cluster of the Basque Country/ Asociación Clúster de Movilidad y Logística de Euskadi	2005	(pre-)priority	Transport, mobility & Logistic	transportation & logistics	108	37,29	7	www.mlcluster.com

Source: Author's development based on SPRI (2013), Basque Government (2014), Aranguren, Wilson (2013), Parrilli (2013); Tecnalía (2011), Landart et al. (2005); Gomez-Larrañaga (2009)


Annex 8 Upper Austria cluster initiatives

Period of cluster policy evolution	Nr.	Name/Abbreviation	Name (full) of cluster association (english/german)	Year of establishment	Type in policy strategy	Sectoral focus of cluster association	Cluster sector (Approximate in European Cluster Observatory)	Number of members (2013)	Number of employees, thsd. (2013, LC - 2015)	Turnover, Mrd. € (2013, LC - 2015)	Webpage
I period	1	AC	Automotive Cluster/ Automobil-Cluster	1998	cluster	Automotive	automotive	246	86,6	28	http://www.automobil-cluster.at/
	2	CDT	Drive Technology Cluster/ Antriebstechnik Cluster	1999	closed	Drive technology & motors	automotive	-	-	-	
	3	KC	Plastics Cluster/ Kunststoff-Cluster	1999	cluster	Plastics	plastics	433	61,7	19,8	http://www.kunststoff-cluster.at/
	4	MHC	Furniture and Timber Construction Cluster/ Möbel- und Holzbau-Cluster	2000	cluster	Furniture, timber and construction	furniture	271	15,7	2,7	http://www.m-h-c.at/
	5	OEC	Eco-energy Cluster/ Ökoenergie-Cluster	2000	cluster	Ecological energy	lighting and electrical equipment	170	n.a	n.a	http://www.oec.at/
	6	LC	Food-Cluster/ Lebensmittel-Cluster	2000	cluster	Food	agricultural products, processed food	243	23,8	2,2	http://www.lebensmittel-cluster.at/
	7	GC	Health Technology Cluster/ Gesundheitstechnologie-Cluster	2002	cluster	health technology and devices	medical devices	227	45,3	4,7	http://www.gesundheits-technologie-cluster.at/
	8	MC	Mechatronics Cluster/ Mechatronik-Cluster	2003	cluster	Mechatronics	heavy machinery; production technology	348	59,4	11,6	http://www.mechatronik-cluster.at/
II period	9	NHR	Network Human Resources/ Netzwerk Humanressourcen	2004	network	Human Resources	business services	158	n.a	n.a	http://www.netzwerk-hr.at/

Period of cluster policy evolution	Nr.	Name/Abbreviation	Name (full) of cluster association (english/german)	Year of establishment	Type in policy strategy	Sectoral focus of cluster association	Cluster sector (Approximate in European Cluster Observatory)	Number of members (2013)	Number of employees, thsd. (2013, LC - 2015)	Turnover, Mrd. € (2013, LC - 2015)	Webpage
	10	NFTI	Network Research, Technology, Innovation/ Netzwerk Forschung, Technologies und Innovation	2004	closed	research, technological development and innovation	education and knowledge creation	-	-	-	
	11	NL	Network Logistics/ Netzwerk Logistik	2004	network	Logistics	transportation and logistics	n.a	n.a	n.a	http://www.vnl.at/portal
	12	NDM	Network Design & Medien/ Netzwerk Design & Medien	2004	closed	Design & Medien	media and publishing	-	-	-	
	13	UC	Environmental Technology Cluster/ Umwelttechnik-Cluster	2006	network/ cluster since 2009	Environmental technology	building fixtures, equipment and services; construction	163	15	5,5	www.umwelttechnik-cluster.at
	14	NREE	Network Resource- and Energy Efficiency/ Netzwerk Ressourcen- und Energieeffizienz	2009	network	resource- and energy efficiency	building fixtures, equipment and services; construction	n.a	n.a	n.a	http://www.nree.at/
III period	15	ITC	Information Technology Cluster/ Informationstechnologie-Cluster	2013	cluster	information technology	IT	81	4,9	n.a	http://www.itcluster.at/








Source: Authors' interpretation based on the information provided on the homepages of clusters & Clusterland Ltd. Homepage (2014)


Annex 9 Table in brief on key components of the cluster policy periods and stages in the Basque Country¹³⁸





Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
Years	1989-1999	2000-2005	2006-2012	Since 2013
1. Discussion initiation				
1.1. Established forum/ network for communication between all affected actors 	<p>! Before the decision was taken to implement the cluster policy most of the discussions were among the policy makers. While the establishment of cluster initiatives already included consultations with business centers</p>	<p>! During the renewal or continuation of the cluster program the involvement of various firms and institutions took place, thus looked more as an internal and irregular process</p>	<p>! In 2005 a research based think tank “Orkestra- Basque Institute of Competitiveness” was established. Since then it assist government on some projects/ programs. Potentially serves as platform for the forum</p>	<p>! The opinions of business and technology sectors are considered, thus it still doesn’t reflect the form of the platform or network</p>
1.2. Awareness of the cluster concept and its potential advantages/disadvantages for the region between main regional participants	Due to the close collaboration between a group of government representatives and the group of expert from Monitor group and Michael Porter, the awareness on the cluster issues within this group was well developed.	More and more officials were aware on the issue. Especially as the number of studies has increased.	From the interviews could be seen that the government representatives as well as experts from other institutions are aware of benefits and risks coming from the clusters and cluster policy application.	The awareness continues to be raised, which can further assure by the fact that the 52nd TCI Cluster Conference has taken place in the Basque Country.
1.3. Trust building	<p>! Due to little evidence, we assume that at this stage there were no specific actions made for trust building among key policy actors.</p>	At the same time we assume that due to the small scale of the regions the key actor as well as cluster members had already naturally established certain level of trust	We assume that positive results from the implemented projects in collaboration has contributed to strengthening trust	Same as in the previous period
1.4. Existence of previously adopted “trendy” policy	Due to experience with EU integration regional institutions may have already collected some experience with adaptation of the “trendy” policy	The implementation of cluster policy in the first period has created the basis for experience on a “trendy” policy.	Same as in the previous period	Same as in the previous period


¹³⁸ The Table in this Annex represents summary brief information from the applied pattern matching method. Details of the method are described in Chapter 5. Table informs shortly on key components for each stage and policy period, and the key factors, which were missing or not fully presented in the process of cluster policy development in each stage are marked with an orange exclamation sign and then if appear more than 3 times (the Basque Country) receive “orange bullet”.




Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
2. Economy & cluster analysis				
2.1. Organized group for performing economy & clusters analyzes	For the conduction of the first economy and cluster analysis a special group of experts from Porter's lead Monitor Group company was done.	! Further analysis were done either by technical from the Basque Administration, external consulting firm, e.g. Boston Consulting Group, or independent researchers	Orchestra – research institute can serve as a platform for organized and systematic economy and cluster research especially considering their expertise and knowledge in the matter	Finally, within the framework of latest changes in 2014, seems that SPRI might fully overtake and form its group for managing cluster policies.
2.2. In-depth cluster-based analysis for evaluation & understanding of current situation and perspectives of regional economy	The analysis were performed by Monitor Group and included the review of the Basque economy, Porter's Diamond, SWOT Analysis, demand and supply side mechanism, clusters based on exports	Numerous studies and analysis on the cluster and economy performance have been done (Table 21)	Basque Competitiveness Report, which is being published every second year entails unique information on the economy and cluster development in the region	Same as in the previous period
2.3. Application of a variety of methods for cluster analysis, emphasizing the combination of qualitative and quantitative approaches	All the cluster related analysis in this period were related to the Porter's methodology	Numerous studies and analysis on the cluster and economy performance have been done (Table 21)	Orchestra research institute tires to develop and apply different methodologies to analyze natural clusters	Same as in the previous period
2.4. Clear understanding of cluster-based approach to analysis	Porter's company was not only performing analysis but also actively involved in the implementation of cluster policy, guidance of working groups and communication with policy makers	The rotation of personal in the government as well as in other regional institutions and business sector is low, knowledge is maintained, first tangible cluster related signs	! Understanding on the benefits from cluster policy might have started to decrease. First of all as the initial reason for the launched of cluster policy had to be realized or partially achieved, and required new definition of rationales and secondly, the lack of knowledge and expertise with the change of governance and appearance of new generation of policy makers and businessman	Understanding of benefits from cluster based approach to analysis is improved due to TCI conference, which took place in the Basque Country, enhanced cooperation with the European Union and increased knowledge exchange with other European and international actors










Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
2.5. Clusters have been chosen from existing or promising ones	 Clusters have been established in only 3 sectors from the around 10, which have been suggested ones by the study of Monitor Group	Cluster policy did not forced the establishment or identification of almost any new clusters	The new group of potential clusters has been identified and supported through pre-cluster associations. These were selected based on the industries/ sectors with high internationalization orientation, quality of production and export potentials	SPRI is in the process of analyzing and re-defining clusters. Within this re-grouping new and re-grouped old clusters are to be prioritized.
2.6. Choice of clusters is based on unique regional characteristics	The selected clusters for the policy targeting is the representation of unique regional characteristics (e.g. port Bilbao, maritime) along with more internationally & globally potential clusters (energy, aerospace)	Same as in the previous period	The choice of additional clusters is also based on the combinational with unique regional (e.g. cider, languages) along with more internationally competitive clusters (construction, logistics)	It is still early to say, we assume that the selection of clusters will be based on the similar approach
2.7. Chosen clusters (their sectorial orientation) overlap and have good market connections	As mentioned by Torres and Lagendijk (2000) the identified clusters in the Monitor study were built on the Porter's cluster methodology and reflected unique regional characteristics. Most of the clusters had a natural origin of the establishment	Same as in the previous period	The selection of pre-clusters identified and suggested for further development was mostly based on their export potentials as well as the future market trends	The re vision of clusters associations and herewith the clusters for further policy support is mainly done on the approach of identifying overlaps between sectors of existing clusters and adopting them to the needs of supply markets
2.8. Choice of clusters is done based on the opinions of internal and/or external expert analysis, actors within clusters and then combined with instincts of policy makers	The selection of the clusters for establishment of cluster initiatives and for policy support was always done based on public/ private communication, prior to that was the conduction of research and consultation with foreign & local experts	Two cluster initiatives were established in consultation with private sector	 The choice of additional cluster for cluster policy targeting is done in consultation with private sector, but in limited way with research institutions and foreign experts	The choice of clusters is done in limited consultation with research institutions
2.9. Political fairness and publicity in 	 Limitations in fairness and	 Similar as to the first period	 Further limitation in fairness and	

Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
choosing clusters	transparency. The selection of clusters was based on the results of the study and negotiated with the government of the Basque Country. Final decision on the choice of the clusters for support was done in communication with companies		transparency.	Only Partial transparency.
2.10. Chosen clusters have consensus within public and private sector actors	The decision to apply cluster policy was based on following several key reasons: a) represented a demand side support of economic development and went well along the technology – supply side of regional economic promotion and b) Government saw an important role for themselves as institution within the cluster policy, namely as moderation and initiator	Inclusion of new clusters (audiovisual and logistics) was done based on the interest of both sides	The selection of clusters and establishment of cluster associations was based on the direct communication with private sector	The opinion on the consensus between public and private sector is still early to express
3. Policy review				
3.1. Cluster policy developers demonstrate competence through existing policies	Policy makers are new in the area of cluster policy making thus they had gathered experience through earlier developed and implemented research and technology oriented policy	Policy makers broader their experience through communication with other foreign policy makers and academics	Due to different international events and publications, which are aimed at spreading the knowledge and experience, regional policy makers could increase their competences	Same as in the previous period
3.2. Strong engagement of private sector in review of the existing policy 	! Private sector had almost no direct involvement in the review of the previous policies and/ or existing policies.	! Private sector is only on individual basis involved in the policy review, e.g. they are consulted via surveys or direct communication	! In the latest years the engagement of private sector has increased, especially on the level of cluster associations, thus it is still limited	! Private sector is stronger involved in the review and development of the policy, which starts to be systematized
3.3. External organizations participate in the policy analyzes	By the review of the policy the Basque Government in 1989 has involved Monitor Group.	A number of consulting companies, such as e.g. Deloitte or Accenture	Along with consulting companies a research institute and think thank Orkestra Basque Institute of Competitiveness was involved	Same as in the previous period
3.4. Understanding & defining key	The choice in favor of cluster approach was in its opportunity to provide as	Later on in 2000 cluster policy was prolonged due to its international	The decision to further continue cluster policy and stimulate	Positive international and local experience




Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
reasons/rationales for the choice of using cluster policy	demand side push for the development of the regional economy.	popularity and seemed positive results bringing for regions	development of pre-cluster or cross-cluster cooperation stimulation was related to the beliefs of stronger discovering existing but hidden potential in the regions.	stimulated further implementation of the cluster policy
3.5. Strong commitment to the cluster concept by key actors	 In the first years there was strong commitment from the side of leading policy makers and some big companies in the private sector as well, thus limited - from the side of universities and research institutions	The strong commitment continues to be seen by government bodies, increased commitment from the business community and research centers	Private sector seems to show now even stronger commitment than the government one. Other actors are also seeing the positive results and see their benefits in contributing to the cluster policy	Most of the private sector engaged in the cluster policy making is intensively committed to cluster policy, which requires lower motivational push from the government side
4. Policy development				
4.1. Cluster policy has a clear defined strategy & vision 	 The vision of the cluster policy was clearly defined in line with re-defining and strengthening regional competitiveness and innovativeness. The strategy towards it was also developed to identifying regional clusters, strengthen firms within them (primarily SMEs), bridge these firms with technological centers and overcoming of identified regional weaknesses. But it was only on the paper and further it wasn't integrated within the overall context of regional development strategy	Since 2000 even more organized and strategic approach to cluster development has appeared. It is reflected in clear strategic plans reported by cluster associations. Furthermore, cluster policy was more aligned with achieving regional needs within the global (especially EU) context.	 Development of clusters is seen as a heart of regional competitiveness strategy until 2015, thus the strategy to achieve is not fully revised. Although competitiveness is seen as a vision of regional and cluster policy in reality it is more innovation or technology oriented, rather than only industrial or private sector strengthening	Innovation stays to be a very relevant part of the vision, but it is now stronger harmonized with other relevant policies, e.g. internationalization or industrial. The strategy for cluster policy is being revised
4.2. Cluster policy is directed toward more than one cluster	In the first as well as the follow up programmes, the focus has always been set on more than 1 cluster. As a proof of these serve the years of the established cluster associations and priority sectors indicated in the	Similar to the previous stage. Cluster policy was targeting at earlier defined cluster, which number was around 12.	As a result of the Quality policy (in place until 2002) several additional export-potential sectors have been identified and built the basis for further cluster policy support and building the basis for pre-cluster	The latest changes in the cluster policy has expressed support of more than 1 cluster by continuing assistance through 11 priority & 11



Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
4.3. Cluster policy aims at creating spill-overs &/or developing networking, agglomerations, reducing market failures and enhancing fair competition	<p>programs.</p> <p>1st competitiveness programme/ Herewith the main objectives of the programme, were targeted towards overcoming the core weaknesses (OECD 2007a), which were:</p> <ul style="list-style-type: none"> - Poor marketing of local products, especially internationally - Absence of coordination among companies, universities and other regional institutions 	<p>During this period cluster policy continued on already initiated baselines. At the same time the supporting activities and their utilization was strengthened by considering such matters as internationalization, strategic thinking and collaboration</p>	<p>initiatives</p> <p>The strengths of the existing clusters were seen to be recognized through links that they might have with other less developed clusters. In this sense the inter-clustering was facilitated. In addition the cooperation between companies, research institutions and government was stressed. Time when pre-cluster appear</p>	<p>pre-cluster associations</p> <p>Integration into global value chains, along with facilitation of knowledge sharing is extremely promoted for creation of spill-overs</p>
4.4. Cluster policy highly considers the peculiarities of clusters (especially their evolution stage) and the region 	<p>The first programs, where cluster issues were addressed has considered both regional and cluster peculiarities. That is why its core intention was to address regional weaknesses, and facilitate the awareness and stimulate cooperation among its cluster members</p>	<p>! 2000 all clusters had to build strategic plans identifying the development strategy and activities for the clusters. Although these activities were created along the overall thematic lines, they were still very cluster-specific. At the same time all clusters regardless their level of development were receiving similar financial resources and similarly treated on the regional level.</p>	<p>! The appearance of division of priority and pre-cluster association brought also differentiation in the way certain natural clusters were treated. At the same time within priority clusters were some, which were in maturity and others in declining stage of cluster development, while the same was to observe in the sectors managed by pre-cluster associations.</p>	<p>! Cluster associations have started to receive financial resources on more differentiated bases (justification of activities within the call). Thus the two big groups of cluster associations exists with the same cluster sectors within them, despite that some clusters could be treated as priority and are in the pre-cluster group or vice a versa</p>
4.5. Cluster policy fits (political resources) in within existing responsibilities and powers of the regional policy making authorities	<p>Basque Government at the beginning of the 90s was one of the strongest and competent institutions in the region especially in terms of the cluster policy making</p>	<p>The created matrix of the Government officials, which was a communication link between the cluster associations and government, was serving well as informative platform for cluster policy</p>	<p>! Cluster initiatives are well functioning cluster policy implementation institutions, at the same time especially companies noted a need for a stronger involvement of the chambers of commerce, research centers, SPRI, etc. in facilitating the cluster policy</p>	<p>The migration of certain responsibilities (coordination functions) from the Basque Government to SPRI improves the possibility of clusters to reach needed financial and informational resources</p>





Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
4.6. Ultimate goal of cluster policy is strengthening regional competitiveness 	<p>! In the first competitiveness program it was mentioned that the goal of the cluster policy is strengthening regional and firms' competitiveness through overcoming of identified core weaknesses. Thus we think that until the third period of the cluster policy the ultimate goal was strengthening regional innovativeness through improved companies' cluster competitiveness</p>	<p>! Same as in the previous policy period</p>	<p>implementation ! Same as in the previous policy period</p>	<p>The ultimate goal of cluster policy is being revised</p>
4.7. There is a good mix of existing other policies, which also address clustering & stimulate the development of business environment in general 	<p>! Clusters development is being supported from other policies as well, e.g. innovation, education, industrial policy. Thus we don't note the existence of a harmonized mix of these policies</p>	<p>! Clusters development is being supported from other policies as well, e.g. innovation, education, industrial policy. Thus we don't note the existence of a harmonized mix of these policies</p>	<p>! Clusters development is being supported from other policies as well, e.g. innovation, education, industrial policy. Thus we don't note the existence of a harmonized mix of these policies. Thus certain improvement have been done with the development of the above mentioned policies under general Competitiveness framework</p>	<p>! Same as in the previous policy period. At the same we expect positive changes to come under coordination of SPRI, that seems to have good overview of all regional, national and European policy measures</p>
4.8. Engagement in cluster policy development appears at different administrative levels 	<p>! Engagement in the cluster policy development was almost completely done at the regional level (by Basque Government in cooperation with Monitor Group and some leading companies)</p>	<p>! Companies and innovation/research centers have involvement in the cluster policy making through their cluster associations, thus this involvement in not only limited to the one we have mentioned above, but also in terms of limitation in relation to companies, which are outside of</p>	<p>! Almost the same as in the previous policy period</p>	<p>! Companies and other institutions (research, academia) have increased their involvement in the policy development through their participation in the review and the composition of the policy plan on the regional level,</p>

Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
		these cluster associations		thus this involvement is still limited and not systematic
4.9. Policy makers realize the advantages of the concept and are willing to adopt the change	 Most of the policy makers from the ministries and government realized possible advantages of the concept. At the same time willingness and risk taking was not always present.	Positive feedback from the private sector and research institutions stimulated the support of key public institutions in favor of cluster policy	 Certain level of doubts and questioning has appeared from the side of the government officials to the cluster policy, in particular to its alignment to the interpretation of global trends	The advantages of clusters as well as the willingness to adopt the change are realized. Thus the question of strategic planning is open
4.10. Development of cluster policy is conducted in dialog between different affected actors 	 The pilot phase of the cluster policy was mostly developed by the government officials with limited communication with the business sector (partial exception can be made in terms of the launch of the cluster associations)	 On the level of the cluster association strategic plans are being developed in the dialog with the business groups. On the level of regional general policy / program planning this was not the case.	 Same as in the previous policy period	 Different policy actors start to be stronger integrated in the cluster policy on the regional level, thus it is still limited
5. Policy implementation				
5.1. Implementation is done by efficiently using/combining already developed programs and institutions 	For the implementation of the cluster policy several instruments were taken, one in form of financial support for the research centers, and another in establishing working groups from the side of the Government.	Cluster associations only start being a fruitful link between companies and research centers. Moreover sharing information between companies is still an issue.	The funding for a particular project within the members of association or any other strategy related activity can be funded not only from the resources of 1 department but also from the sources of other departments. This depends on the type of the sector/ service, which builds the core of the association.	Cluster associations are seen as reference institutions with respect to information of the events, workshop, financial support of the activities, etc. Moreover, recent program papers indicate other external to the region sources of funding.
5.2. Understanding the reasoning for cluster policy	The policy makers in the government and ministries were well aware with the need to apply an alternative to existing approach to regional development. Cluster policy had to stimulate supply side	Interest from the SMEs as well as the international popularity of the cluster policy put the reasons for policy application	Policy makers due to cluster policy popularity are clear on the reasons for its application	 Support to cluster policy exists and new approach to its application is being designed, but certain



Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
<p>5.3. Following aspects of cluster are highly taken into consideration: a. Spatial proximity; b. Critical mass (number of actors); c. Cluster life-cycle; d. Nature of cluster actors; e. Dynamics and linkages within the cluster: Connection between cluster actors, Mutual trust, Common vision and strategy, Institutionalization, Balance between cooperation and competition</p>	<p>Within each cluster association strategic plans were / are to be developed based on their needs within very general theoretical frameworks In such they all could take account of their important features. The level of how far it was considered depends on the capacities of each particular expert in each particular cluster association. As we were concerned with more general review, we can't provide sufficient details in regard to these issue.</p>	<p>Since this period each of the cluster associations aiming to promote its cluster were in need to develop a sectoral long term and an annual plan of activities. In this way the needs of each cluster had to be covered. Moreover during this period cluster associations started to open their earlier closed membership to SMEs as well</p>	<p>Cluster associations gain experience in developing activities, plans and communication with the companies. In addition to this not only companies are welcomed into the associations, but also research institutes, universities, etc. Moreover pre-cluster and cluster associations are intensively seeking the common grounds for collaboration. The difference between cooperation and competition as well as trust is clearly realized by companies</p>	<p>unsure attitude to its application exists Due to partially adjusted funding scheme for each of the cluster association the needs of clusters at different stages of their life-cycle could be addressed. Clusters with interest in international markets are extremely supported through internationalization plan 2014 - 2016</p>
<p>5.4. Methodological indicators for evaluation has been defined and are collected during the implementation by affected actors</p>	<p>! Some basic indicators, like number of projects or events per cluster association have been developed. But the number of these indicators is very small and is only on the level of cluster associations</p>	<p>! The character of indicators collected has been broadened (include the costs spend per projects, number of member), thus their number is still limited, not integrated into the indicators related to development of natural clusters</p>	<p>! Same as in the previous policy period. Although the number of indicators has been broadened, now their aggregation is systematized especially in the regional development context. Orkestra – research institution performs some analysis on the level of natural clusters, which are integrated in the Basque report on Competitiveness</p>	<p>! Same as in the previous policy stage, the indicators have to be clearer defined and more systematically gathered</p>
<p>5.5. Early action</p>	<p>As soon as the officials from the government/ ministries learned about the concept the Monitor Group was recruited to perform the analysis and the policy is designed to promote them</p>	<p>Since the first years of the cluster policy the funding for cluster associations (partially also for projects in collaboration) hasn't been stopped</p>	<p>Similar to the previous period, at the same time around 2005 there was a small gap in policies related to the drafting of the more comprehensive competitiveness framework for regional development</p>	<p>! Within the long-term competitiveness policy framework cluster policy and activities are being funded under different policy programs</p>

Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
5.6. Multilevel cooperation 	! The cooperation dominantly existed between the public governing institutions and selected big firms	! In the cluster policy on contrast to the previous period the participation of broader number of companies is to notice thus not all research institutions or universities realize the benefits	! Universities and research centers are more active in regard to the participation in the implementation of the policy, nevertheless the strong competition between the actors still exists	! Almost the same as in the previous period, thus with stronger interest of multiple diverse regional actors in the cluster policy implementation
5.7. Existence of leader or leading organization 	! Officially there is no leading organization or leader in the coordination and management of the clusters. Thus later on the matrix of government officials (experts in cluster policy) was established. Within each of the cluster initiatives, there was no leader up to 2000.	! The matrix from the government officials is further in place and serves as a bridging link between the government and cluster associations/ clusters. Within each cluster association a clear organizational structure headed by chief cluster manager was established.	! Same as in the previous policy stage.	! Since 2013 the coordination of cluster policy is done by the similar matrix of experts based on the SPRI. Officials from the government are only responsible for the normative part of the policy
5.8. Implementation is institutionalized in a form like a cluster initiative, which aim is to increase the clusters competitiveness	The implementation of cluster policy is dominantly done by cluster initiatives (associations), which are in responsible for the enhancement of the cluster's competitiveness	Same as in the previous policy stage	Same as in the previous policy stage	Same as in the previous policy stage
5.9. Cluster organization has a clear & sizable vision for the participants	! Cluster associations are established as pilot projects and institutions. Their mission at the beginning was to inform and motivate leading companies to support cluster policy	Each cluster initiative started to submit annual and 3-4 years strategic plans. Thus building overall clear vision was still challenges for many cluster initiatives	Most of the cluster associations learned how to write the strategic and annual plans easily. At the same time there were still challenging in integrating these plans into the overall regional development policy	Same as in the previous policy stage. Cluster associations feel confident in writing down their development plans.
5.10. Timeframe of the funding is formulated 	! The funding for the cluster associations and projects is assigned only in the framework of the overall program (industrial or innovation) and	! Same as in the previous period. On the level of cluster associations the funding is revised every year	! Same as in the previous years. Long term feature of the funding is not considered. As since the beginning the members of the	! The process of getting the funding has changed. The justification of the resources is needed

Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
	in generally very short term		cluster association pay the fees, which have almost been not revised	through the participation in the overall call
5.11. Clusters are primarily supported by public money with constant reduction over time 	! The establishment of cluster associations, funding of their activities and the projects in collaboration between cluster members were mix funded. Participation in cluster associations had of a fee, and the cost for the research projects had to be partially covered by projects partners	! Same as in the previous policy period. Public resources were maintained on the same level	! Same as in the previous policy period	! More differentiated public funding was introduced, which is taken place through annual calls
5.12. Cluster initiatives are led by representatives from business	The working groups within cluster associations were led by companies	Companies are leading decision makers on the level of cluster associations	Same as in the previous policy period	Same as in the previous policy period
5.13. Cluster management has highly qualified personal with multiple competences and very strong motivation	! At this period so called “cluster managers” were competent representatives from the Basque Government, who were promoting the realization of the cluster policy	Cluster managers are trained people, who naturally have features of bringing the right people together, motivate them, and at the same time know well industry, business local needs	Same as in the previous policy stage. The project mangers intent to upgrade their qualifications by visiting the cluster (policy) related events	Same as in the previous policy period
5.14. Cluster participants are motivated & interested to participate	See the Stage 8: during the whole process of the cluster policy	-	-	-
6. Monitoring & Evaluation				
6.1. Monitoring and evaluation is an integrated part of the cluster policy (2 levels, on the regional by general policy makers and on the level of the cluster association.) 	! Monitoring is integrated in the cluster policy (regional level), but without specific indicators. Mainly as the period is considered to be as a pilot one. Evaluation is not integrated neither on regional nor cluster association level	! The monitoring is started to be more integrated part of the cluster policy on the regional and cluster associations´ level. Evaluation is only as a post-policy element.	! Similar to the previous period.	! Evaluation starts to be more integrated into the cluster policy development especially on the regional level. At the same time cluster associations also realize this need.


Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
6.2. Evaluation has clear idea about the results that must be reached 	The objective of the post-pilot policy evaluation had been the need to understand whether companies had started to show interest and are interested in active engagement. There was also will to identify some positive changes in the economic development of the region.	! The post-policy evaluation didn't set clear idea on its aims.	! The post-policy evaluation as well as the ones, which are being carried during the policy period had different aims. In most of the cases the objective of the cluster policy was the observation of the evolution of cluster associations and the benefits for the regional performance from strengthening of clusters.	! Still early to say on the clear idea. Thus rather pessimistic than optimistic forecast can be made if the evaluation objective won't be set clearer.
6.3. Key stakeholders are involved in the evaluation process 	! We don't have not information on whether all stakeholders were involved. We assume that among them companies certainly were.	! Companies in the cluster associations were involved. The participation of other is still unclear.	! Situation similar to the previous. At the same time seems that research institutions and universities could have been stronger involved.	! Same as in the previous period.
6.4. Evaluation has a long-term perspective 	! Evaluation does not have a long term perspective	! Same as in the previous period	! Same as in the previous period	! Positive changes are expected, considering that the need of the long term evaluation is realized on all levels
6.5. Policy makers have developed a balanced range of methodological approaches to be used for cluster evaluation	Post-policy evaluation on regional, cluster associations' and individual level had a number of evaluation approaches: qualitative (communication, interview) and quantitative (surveys), but it was not systematic	! The evaluation is done with application of several but not very diversified approaches	! The methodological range of cluster policy evaluations increased and applies also action research, comparative studies, more advanced quantitative methods	! Same as in previous and more positive trends in the application of bigger range of methods is expected
6.6. Control indicators (for monitoring and evaluation) are formulated 	! No specific control indicators were formulated neither for monitoring nor evaluation	! Some control indicators are being introduced into the monitoring and evaluation part on the level of cluster associations	! Same as in the previous stage. In addition to this policy papers (regional level) started to include some control indicators	Cluster associations have introduced specific control indicators, which are especially relevant while applying for calls.

Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
6.7. The results increase the awareness of the cluster situation and policy approach	The gathered results provide information on the situation within the participants of the cluster initiative, however, they still lack general picture on the situation on the sector/ cluster or other more systematized matters	Same as in the previous period	Same as in the previous period	Same as in the previous period
7. Policy improvement				
7.1. Lessons driven from the evaluation are considered and integrated in cluster policy	Yes, the post-policy evaluation provided good insights into the changes needed to be undertaken	! Partially, due to non-systematic nature of evaluation	Mainly integrated, as there is a set of international and local experts in the region, which is able to convince.	No information yet
7.2. New assessments are explained and understandable, and correlate with participants needs	Experts from the Monitor Group as well as Porter. M. were able to clearly transmit the knowledge	! Results are realized but the transmission and explanation is not done on a unified base	The new assessment are very well explained, especially to companies in cluster associations and research centers	No information yet
8. During the whole process				
8.1. Political support	There was a strong political support from the leading parties and government. At the same time there was also a space for debate	Political support slightly reduced but continues after an intensive round of the debates around the effectiveness of the cluster policy	Political support is again strengthened, which can be seen from the decision in the establishment of new type, pre-cluster, associations	Medium political support is maintained
8.2. Presence of strong regional government/authority	There was a strong regional authority - the Basque Government	Same as in the previous period	Same as in the previous period. At the same time since the 1 st period Basque Government tries to reduce its dominance in regulating market relations	Same as in the previous period
8.3. Political stability	! Political stability in the region was hindered due to the activities of the Basque separatist group Euskadi Ta Askatasuna (ETA, or the Basque Country and Freedom), who was causing numerous armed attacks on different institutions and caused the	! Almost the same as in the previous period	The latest ceasefire EAT declared in 2010 and is still in force, moreover since 2011 the group has pronounced the revoke of its armed activities. Overall EAJ-PNV, had the majority in the Basque Parliament and could dominantly form their Government bringing	The latest parliament elections took place in 2012 with victory in biggest number of seats to EAJ-PNV. Stability expected, thus still early to say



Period of cluster policy/ Stages of cluster policy process	I	II	III	IV
	killing of more than 800 people related to the policy making.		stability	
8.4. Participation of all actors from the triple helix 	! Mostly companies and government are involved. Research institutions are still acting passively	! Mostly companies and government are involved. Research institutions are still acting passively	! Mostly companies and government are involved. Research institutions are still acting passively	We expect more active involvement from key institutions such as research centers and non-member cluster associations
8.5. Long term commitment of actors & motivation	Strong commitment is dominantly shown by the government	Companies started to be more interested, motivated	Long term commitment exist by government officials, companies in cluster associations, and starts to be by research centers	We expect increase in motivation and long term commitment by further set of institution, e.g. universities
8.6. Collaboration & dialog 	! The collaboration willingness between the private and public sector is very poor. Moreover research centers also don't see clearly benefits for them	! The interest to collaborate from the side of companies raises due to realization of the benefits coming from clusters	Research centers, universities as well as diverse related service companies start seeing clear benefits from clusters and herewith are opening themselves for intensive collaboration and dialog	We think that the positive trend on the collaboration and dialog will be pursued
8.7. Trust between actors (achievement & sustaining)	Due to the cultural peculiarities within the regions, most of the actors trust each other	Same as in the previous stage	Same as in the previous stage	Same as in the previous period


Source: Author's development


Annex 10 Table in brief on key components of the cluster policy periods and stages in Upper Austria¹³⁹

Period of cluster policy/ Stages of cluster policy process	I	II	III
Years	1992-2003	2004-2012	Since 2013
1. Discussion initiation			
1.1. Established forum/ network for communication between all affected actors	Cluster policy has been brought up in the region by national scientific personal within the state research and consulting programme RIP. Herewith the first discussions around the concept were with key people from the public administration, business organizations and academic experts.	The existence of a network for the communication can be argument by referring to the existence of constant Advisory Boards within each cluster in particular, where leading managing organization Clusterland OO, TMG and Innovation Holding are also participating. Furthermore, due to allocation of the major part of institution, involved in the regional cluster policy development, in Linz, the communication within many actors of education, business and government areas has often very informal character	In addition to activities in the previous stages, here the involvement of the civil society has also been incorporated. This is done through the online tool, which was opened and accessible before/ during the latest policy program development to all representatives of the society.
1.2. Awareness of the cluster concept and its potential advantages/disadvantages for the region between main regional participants	Limited due to the general worldwide lack of information and experience on the clusters and cluster policies, experience gathered form cluster policy implementation in the neighboring to Upper Austria regions	Regional cluster policy participants have developed deeper understanding on the concept. Furthermore, many of the experts, responsible for the development of previous program, haven't changed. This can mean: 1) they are aware of actions, that they have been doing; 2) with time & work experience, their knowledge of cluster issue has been broadened up; Other regions in Europe and worldwide also start implementing cluster policies, local experts have more access to information and can increase their knowledge on the cluster issue.	Some experts have changed but the policy-makers and key regional actors have good awareness on the cluster issues. As argument: the answers in the interview are clear and precise, showing their competence in these matters
1.3. Trust building	 No evidence on special tools or actions applied for building trust.	Building trust can be seen through the application of following activities: involvement of different experts in events on the reporting from the actions taken, transparency in actions, accessibility, etc.	Same as in previous stage. There are no direct actions towards trust, as most of the actions, which are done have an indirect influence on trust building

¹³⁹ The Table in this Annex represents summary brief information from the applied pattern matching method. Details of the method are described in Chapter 5. Table informs shortly on key components for each stage and policy period, and the key factors, which were missing or not fully presented in the process of cluster policy development in each stage are marked with an orange exclamation sign and then if appear more than 2 (Upper Austria), receive "orange bullet".









Period of cluster policy/ Stages of cluster policy process	I	II	III
1.4. Existence of previously adopted "trendy" policy	<p>! Previous implementation of some kind of popular policy haven't been observed.</p>	<p>Each next regional strategic policy was built on the bases of the previous existing one. This meant learning and improving. Additionally, the existence of policy review assisted the experts in upgrading their new ones.</p>	<p>The common practice in EU countries on sharing experience of so called "best practices" facilitates the learning capacities on the "trendy" policies</p>
2. Economy & cluster analysis			
2.1. Organized group for performing economy & clusters analyzes 	<p>Cluster review and analysis have been done by external research institution thus under single contractor, which was newly established regional agency, TMG</p>	<p>! Haven't observed any special study for re-analysis of economy or cluster, which was done not by TMG or cluster associations themselves</p>	<p>! Most of the analyses are being done on the level of cluster associations. Individually on the demand of the Government of Upper Austria, TMG or some other organizations experts or groups of experts are being contracted to perform the analysis</p>
2.2. In-depth cluster-based analysis for evaluation & understanding of current situation and perspectives of regional economy 	<p>Apart of the cluster study, ÖFZS-Study (1993), although a number of other studies was done, thus mostly on the national level. At the same time for this period, we find this number sufficient</p>	<p>! No special broader study (expect of Technopolis Brighton / KPMG Mödling (2004)) on cluster-targeted evaluation haven't been observed. Thus there is a number of observation done on the level of cluster associations</p>	<p>! The latest studies Joanneum Research/ Ploder, M./Wagner-Schuster, D. (2013), Mayerhofer, P., WIFO (2013) covers some key aspect on the economic development of the region and its cluster, thus it can only partially serve as in-depth cluster based analysis</p>
2.3. Application of a variety of methods for cluster analysis, emphasizing the combination of qualitative and quantitative approaches	<p>If making the reference to Dobusch (2004/2005) the method used in the earlier studies was more quantitative-driven and lacking a qualitative and in depth-analysis. At the same time studies on the national level included qualitative features of data analysis. Moreover, later on TMG experts have performed numerous interviews with regional experts.</p>	<p>Since the launch of the cluster supporting projects, the analysis of clusters take place on individual bases and are within the responsibility of cluster manager. Overall the cluster analysis on the regional level are done by individual companies or researchers and may reflect different estimation methods</p>	<p>The latest study done by Mayerhofer, P., WIFO (2013) includes both quantitative and qualitative elements of research in their analysis of economic and cluster situation in the region</p>
2.4. Clear understanding of cluster-based approach to analysis	<p>The results of the ÖFZS Study (1993) and others have indicated clusters with different grade of co-operation development and critical</p>	<p>From the conducted interviews it seems that all projects managers as well as public officials are very competent in understanding the notion of</p>	<p>Same as in the previous period</p>










Period of cluster policy/ Stages of cluster policy process	I	II	III
	mass. Furthermore, the clear understanding of the cluster concept is also expressed by one of the first cluster manager in his publication (Hubinger 2012), where he states that each sector with a critical mass in Upper Austria was identified as a cluster.	clusters.	
2.5. Clusters have been chosen from existing or promising ones	The cluster identification was done both through national and local expertise. The choice of clusters for the further support was the combination of academic results and interest of the policy makers (industrial strengthening and diversification). That is the reason automotive sector and not aluminum and steel was chosen for the support in the first years	During this period mostly network appeared. Their establishment were closely connected with the needs expressed by companies and accompanied by the political/ global trends to the development of the specific sector (e.g. environment, eco-energy)	The latest established ITC cluster is clearly based on the established local competences in IT area and has shown its benefits, especially in relation to Softwarepark Hagenberg
2.6. Choice of clusters is based on unique regional characteristics	The choice of the clusters for the support was done based on the cluster studies done on the regional and national level, political decisions and expressed support of business. The clusters very well reflect the regional characteristics	 Several sectors/ areas, which have been identified as with perspective are only partially reflecting local specialization and are more aligned with over European trends	Identified ITC cluster reflects well the unique regional features
2.7. Chosen clusters (their sectorial orientation) overlap and have good market connections	All identified and priorities in this period core six cluster can have both overlaps between each other and good market connection. Steel, aluminum, metal products; Machinery and industrial plants; Vehicles, engines, components; Environmental engineering and plastic products due to strong product and process inter-dependency from each other.	Same as in the previous period. In addition new networks, which have been created (research, technology and innovation), can address the challenged related to all earlier identified clusters. Other 2 network Logistic and energy efficiency follow the global market needs	The latest established cluster association and perceived ITC cluster can contribute to the development and growth of already matured clusters
2.8. Choice of clusters is done based on the opinions of internal and/or external expert analysis, actors within clusters and then combined with instincts of policy makers	The identification of clusters is done by dominantly Austrian experts, which was due to financial restrictions in terms of involving foreign specialists. But the results of the study are combined with policy makers instincts	The decision on the support of transversal areas as human resources, research and innovation, etc. was mostly advised by EU expert and combined with local needs.	Only one more additional cluster was identified, which was done in the consultation with local expertise. The aim of establishing the cluster association in this area was to facilitate the international links of this sector


Period of cluster policy/ Stages of cluster policy process	I	II	III
2.9. Political fairness and publicity in choosing clusters 	<p>! The choice of clusters for the cluster policy support hasn't been purely transparent. The strategic policy paper clearly refers to only 1 cluster for further support. At the same time most of the cluster associations have been established in sectors earlier recommended in the ÖFZS Study (1993)</p>	<p>! The process of decision making in regard to establishment of specific network in this period of cluster policy is also not fully transparent. We are aware of contribution (financial and/ or information) from the side of the European Commission and some Austrian research institutions.</p>	<p>The decision to establish ITC cluster association is very transparent and clear and related to the desire to have stronger links between ITC cluster and other clusters on regional and international level</p>
2.10. Chosen clusters have consensus within public and private sector actors*	<p>The level of consensus between the public and private sector varied dependent on the cluster. Strong influence on the decision making was done from the side of the Upper Austrian Chamber of Commerce (especially special organizations of the Upper Austria Chamber of Commerce). The reason for this in reference to Dobusch (2004/2005) is the institutionalized Sector-based lobbying.</p>	<p>Same as in the previous period, thus with the reduced confrontation between different sides</p>	<p>Same as in the previous period</p>
3. Policy review			
3.1. Cluster policy developers demonstrate competence through existing policies	<p>The review of the previous policies was done, but the information on its extend is not sufficient to draw certain statements</p>	<p>In the review of the existing policies were involved employees/ experts from special regional agency, TMG were involved. The process of policy review is in detail described in the program paper</p>	<p>Same as in the previous period.</p>
3.2. Strong engagement of private sector in review of the existing policy	<p>! In the first phase of the cluster policy development the involvement in the policy as well as economy review was limited or fast absent from the side of the private sector.</p>	<p>Since this period of the cluster policy private sector has strong and further strengths its engagement in the review of the cluster policy.</p>	<p>Same as in the previous period.</p>
3.3. External organizations participate in the policy analyzes	<p>During this period a review of the previous policies was done. Dominantly the participation of national and regional research and other organizations was noticed (e.g. Austrian Center Seibersdorf, Technopolis Austria, Austrian Institute of Economic Research)</p>	<p>Same as in the previous period, plus e.g. Ramsauer und Stuermer Consulting</p>	<p>Same as in the previous period</p>
3.4. Understanding & defining key	<p>Reasons for initiating cluster policy: 1) studies on the national level within TIP programme; 2)</p>	<p>The continuation of the cluster policy was due to: 1) shown interest from the side of companies and</p>	<p>The cluster policy makers were aware of the benefits arising from its applications,</p>








Period of cluster policy/ Stages of cluster policy process	I	II	III
reasons/rationales for the choice of using cluster policy	desire to go from manufacturing dependency to industrially competitive & innovative economy base on broad industry base; 3) existence of local experts, who were convinced and strongly aware with the concept	research institutes, 2) first positive results in form of realized projects between companies, 3) world-wide support towards this concept	in particular due to ability to support regions on their way to smart specialization strategies (promoted by EU)
3.5. Strong commitment to the cluster concept by key actors	! At the beginning there was some confrontation of the views between different representatives of policy makers, especially among ministries, chambers of commerce and industrial associations	The positive results from the first years of the cluster policy implementation brought diverse regional actors to almost the same page, resulting increase in commitment to the cluster policy	Key regional actors express commitment to cluster policy
4. Policy development			
4.1. Cluster policy has a clear defined strategy & vision	! The clear strategy and vision for cluster policy during this period was partially missing, as most of the cluster-oriented activities were done under the pilot-scheme framework	The strategy for cluster development has been shaped and précised on the level of the regional policy as well as on the level of cluster initiatives.	The strategy and vision for cluster policy is very well elaborated and integrated in the regional development strategy
4.2. Cluster policy is directed toward more than one cluster	In the programme paper the results of the ÖFZS-Study (1993) have been presented, highlighting the core 6 clusters, 2 potential ones and 3 crossing-areas. Thus further in the policy guideline the focus has been set on three prime clusters: automobile, plastic & timber. At the same time, it was also stated that in case of justification, the industries and geographic scope could be broadened. The first focus was set on the pilot case - automobile cluster. Its success has given necessary input for establishment of further clusters.	During this period dominantly networks (topics and associations) in different cross-cutting management related innovation aspects have been established. Later on one network (Environmental Technology) turned into a cluster.	By 2013 9 clusters and 3 networks have been supported through cluster policy. For a general overview on the clusters see the Annex 8
4.3. Cluster policy aims at creating spill-overs &/or developing networking, agglomerations, reducing market failures and	The first cluster policy activities were primarily aiming to make companies from the same sector aware of their existence and by realizing this discover the possibilities for collaborative projects, building trust and networking	The decision to establish network association in cross cutting issues was aiming to increase innovation through additional to technical development.	The latest policy program addresses multiple regional issues and clusters, and sees the latest fully integrated (as a driver) of sustainable and competitive industrial regional progress in the next




Period of cluster policy/ Stages of cluster policy process	I	II	III
enhancing fair competition			years
4.4. Cluster policy highly considers the peculiarities of clusters (especially their evolution stage) and the region	In the programme there is a description and identified and selected cluster (the selection of clusters is done on the basis of regional peculiarities). For the development of clusters cluster associations have been established. Their aim is to develop activities considering the peculiarities of their particular cluster. Based on this the public funding for each association differs.	! The cluster policy does consider the peculiarities of each cluster. At the same time the funding schemes for collaborative projects are unified and do not consider the differences between clusters,	All clusters are now very well integrated in the overall regional cluster policy.
4.5. Cluster policy fits (political resources) in within existing responsibilities and powers of the regional policy making authorities	The responsible managing organization was TMG. In the programme paper it was stated that they are themselves responsible for the number of personal they are needed. Furthermore, “soft” support had to be provided by Chamber of Commerce. This type of organization was responsible for the organization of these activities, namely due to the access to the business contact database, workshop-room availability.	For realization of cluster policy a separate organization “Clusterland” Ltd. has been created. First of all it had to create the credibility among the cluster member. This was gained as the companies were themselves interested in building such an organization. At the same time the close links with TMG were maintained. In this way the managers of Clusterland had a direct contact with the policy makers in regional institutions, such as Chamber of Commerce of Government Administration	Same as in the previous year. Moreover, cluster associations were put together with other innovation and research development organization into one holding. This tightens the communication between the institutions and facilitates their project based cooperation.
4.6. Ultimate goal of cluster policy is strengthening regional competitiveness	The goal of cluster policy in Program 2000+ was to strengthen regional competitiveness of Upper Austria through focus on innovation through cooperation, having in target SMEs as the main element.	In Program 2010 and 2010+ the development of clusters was placed at the heart of the transformation of the regional economy to a more diversified. Along with it cooperation in cluster was seen as key for innovation leading to strengthening regional competitiveness	The ultimate goal of cluster policy has been maintained, in particular - industrial diversification and regional competitiveness through innovation and cooperation
4.7. There is a good mix of existing other policies, which also address clustering & stimulate the development of business environment in general	! Cluster policy is also supported by other programs and projects, but mostly in the area of research and innovation. The stronger contribution from side of other policies, especially educational is needed.	The development of clusters is not only supported through the establishment of cluster initiatives, but also through other policies, namely research & development, labour market and internationalization	Cluster policy is closely aligned with national and European policies and funding pipelines. This ensures the complex effect on cluster development within the region
4.8. Engagement in cluster policy development appears	! Dominantly regional (public & private) level	In the cluster policy development more different levels are involved. Stronger involvement is evident	Same as in the previous period with stronger involvement of universities and

Period of cluster policy/ Stages of cluster policy process	I	II	III
at different administrative levels	(Regional Government Administration, The Upper Austria Chamber of Commerce and TMG) were involved in the cluster policy development	from the side of companies and technological centers.	other regional institutions
4.9. Policy makers realize the advantages of the concept and are willing to adopt the change	 There have been several programmes after the first one at the same time at the moment of the interview it was difficult to estimate the awareness level by policy-makers.	Policy makers started to realize the benefits of the cluster policy, especially as an instrument enhancing internationalization of the region, companies and research organizations, and also provides links for cooperation with other regions within Austria and EU	All cluster policy makers in different institutions as well as companies and universities are clearly seeing the benefits and the advantages of the cluster policy for the regional development
4.10. Development of cluster policy is conducted in dialog between different affected actors	 Prior to launch of the cluster policy multiple consultations took place. Thus dominantly it was between public institution with only limited consultation with companies or R&D centers	The development of cluster policy during this period took place in the framework of the extensive consultation and dialog with multiple regional actors	In this period the development of the regional as well as cluster policy took place event with the involvement of the civil society (all spheres of the society were able to submit their recommendation to be considered during the development of the policy paper)
5. Policy implementation			
5.1. Implementation is done by efficiently using/combining already developed programs and institutions 	 The implementation of the cluster policy was done by developing almost absolutely new program, but with involvement of already existing institutional basis (e.g. TMG and Upper Austria Chamber of Commerce). Moreover a new instrument for financial support has been created – grants for projects in cooperation.	 For the implementation of the cluster policy partially new institution was established (Clusterland) and partially already existing Industry associations were used for taking the responsibilities of cluster associations. Furthermore more attention was set on utilization of existing programs	Same as in the previous period, but with even further involvement of resources in the programs on the regional and national level
5.2. Understanding the reasoning for cluster policy	In the Programme 2000+ there is a reference on the work of Porter and his diamond of regional competitiveness. This is brought up as an explanation for actions' focus not only on one or several companies, but on the industrial complexes.	In the Program 2010+ there is a reference to different cluster policy studies or cases. These analyses, along with positive interest from the side of the companies and research centers served as a reason for further cluster policy continuation.	The latest Program 2020 doesn't mention directly reasons for the cluster policy, thus indirectly the clusters are seen as a driver of the economic development and competitiveness of the region.
5.3. Following aspects of cluster are highly taken 	 Each group for the promotion of cluster was in charge of developing activities, which are	 The activities of the established cluster associations were closely tailored to the needs of	Similar to the previous stage, but with possible changes in regard to the project funding approach.

Period of cluster policy/ Stages of cluster policy process	I	II	III
into consideration: a. Spatial proximity; b. Critical mass (number of actors); c. Cluster life-cycle; d. Nature of cluster actors; e. Dynamics and linkages within the cluster: Connection between cluster actors, Mutual trust, Common vision and strategy, Institutionalization, Balance between cooperation and competition	very specific to the certain cluster. At the same time the overall requirements for the receipt of the funding were similar. The amount of this financial support varied from the planned activities/ project.	each specific cluster. At the same time this activities were also aligned with overall regional strategy and cluster policy. The approach to the funding has maintained on the same baselines, support is provided based on the foreseen activity but without the differentiation between the clusters	
5.4. Methodological indicators for evaluation has been defined and are collected during the implementation by affected actors 	This information is not reachable for us.	 The indicators on the level of cluster associations exist and were developed along with the implementation. At their level the indicators for projects in cooperation are defined. This is however not the case for overall regional cluster policy	The indicators for some categories can be found in the regional strategy policy paper 2020. Some of them can be related to the cluster policy.
5.5. Early action 	 The studies on regional and national level on the cluster identification took place in early 90s, while the concrete actions were taken only in 1997/98	 After the termination of the first strategic program in 2003 there was a 2 years delay with the next program, which was due to the need to reconsider and perform analysis in respect to the early implemented activities.	The latest policy program including the action related to cluster development started directly after the termination of the previous one, as since the third strategic program the next one is developed 1 year prior to the termination of the previous one
5.6. Multilevel cooperation 	 In the implementation of the cluster policy mainly following institutions has been participating: regional development agency TMG and Upper Austria Chamber of Commerce. At the same time Government of Upper Austria as well as Industrial Association and the WIFO institute were also informational	 Same as in the previous period but with the involvement of newly established organization, Clusterland Upper Austria, and other regional associations, e.g. Energy Association	 Same as in the previous period

Period of cluster policy/ Stages of cluster policy process	I	II	III
	contributing.		
5.7. Existence of leader or leading organization	The first measures for cluster development were implemented by the department of TMG	Since 2005 established cluster managing association “Clusterland Upper Austria” (coordinates most of the existing cluster associations) is taking a lead in the implementation of the cluster policy, and is often seen as a reference point. At the same time there are some clusters, which are being facilitated from other agencies, e.g. Food Association is under the management of Upper Austria Chamber of Commerce	Same as in the previous period
5.8. Implementation is institutionalized in a form like a cluster initiative, which aim is to increase the clusters competitiveness	Implementation is done through the group of experts initially coming from the regional agency TMG. With time these groups were turned into the cluster associations/ initiatives	Clusterland Upper Austria composes of number of cluster initiatives being in charge of developing the cluster. Thus most of their activities are targeted at their members and aiming to attract all related cluster parties	Same as in the previous period
5.9. Cluster organization has a clear & sizable vision for the participants	The strategies and visions of the working groups reflecting later cluster associations were not available for our review.	The visions of the cluster associations, especially the ones, which are under the coordination of Clusterland Upper Austria or Upper Austria Chamber of Commerce are very transparent & clear	Same as in the previous period
5.10. Timeframe of the funding is formulated 	! The clear information on the timeframe of the funding either for the cluster association or for overall cluster policy implementation was not accessed.	! Each program orientated funding includes information on scope of resources but not its duration	Same as in the previous period
5.11. Clusters are primarily supported by public money with constant reduction over time	! The first cluster associations/ groups of professionals in charge of the cluster related activities were completely supported by the regional public money	Since around 2003 the cluster associations have introduced fee, through which part of the association’s cost is being co-funded from private side. The overall regional cluster policy is almost completely funded from state money. Projects are do-funded from the side of companies as well.	Same as in the previous period. Further reduction of public costs and increased co-funding from national, European level and private institutions
5.12. Cluster initiatives are led by representatives from business	! Cluster promotion groups are led by the representative of the regional development agency TMG	Each cluster association is headed by the Advisory Board, which is build up from the representatives from different industries, which are represented in the particular cluster.	Same as in the previous period

Period of cluster policy/ Stages of cluster policy process	I	II	III
5.13. Cluster management has highly qualified personal with multiple competences and very strong motivation	Based on the interviews with the experts directly involved in the identification and development of clusters, it could be noted that the motivation as well as competence in regional, industrial and partially cluster (some had done their Master thesis with clusters as thematic focus) competences were present.	Based on the interviews almost all representatives from public, government, business and research institutions are very knowledgeable in cluster concept, cluster and regional development. In addition to it have good managing skills.	Same as in the previous period and assuming further upgrade in cluster promotion competences.
5.14. Cluster participants are motivated & interested to participate	See the Stage 8: during the whole process of the cluster policy	-	-
6. Monitoring & Evaluation			
6.1. Monitoring and evaluation is an integrated part of the cluster policy (2 levels, on the regional by general policy makers and on the level of the cluster association.)	 Monitoring and evaluation based on the information, which could have been gathered, was not integrated neither in the regional overall nor cluster related part of the policy	On the level of cluster associations starting from around 2004 the evaluation is integrated into the policy. The gathering of data is done in a very structural way. Every two years the member review survey takes place (Kundenumfrage), which is targeted to find the strengths and weaknesses of the developed activities. We think that here the cluster managers can effectively operate with gathered type of data. Furthermore, all cluster members are aware about existing evaluation instrument and its purposes.	Although the aspects of monitoring and budgeting are enclosed in the programme planning, there is a lack of substantial integral evaluation mechanism. However, this should be more faced within the next programme period 2014-2020
6.2. Evaluation has clear idea about the results that must be reached 	Evaluation is aimed at clarifying the impact and contribution of the regional development based on the strategic plans and the decision/ activities in the support of the clusters promotion.	 Several evaluation documents analyze the situation in the region and make the review of the implemented actions, as well as provide recommendations for further actions. Thus these studies look more generic	Information is not yet available
6.3. Key stakeholders are involved in the evaluation process 	 Companies are being asked and interviewed, thus there is not sufficient evidence on the evaluation of public government personal. The intent to involve key stakeholders , through approach “legitimation by negotiation” have been remarked by Stahlercker (2012, p. 12)	 We assume that most of the key stakeholders are involved in the evaluation of the cluster associations. At the same time we see the lack in the engagement of the companies and research centers, which are outside of the cluster associations.	 In the program paper the reference to active involvement of the private sector as well as other key players are made. Thus we think that non-members of the cluster associations are still excluded from the decision process

Period of cluster policy/ Stages of cluster policy process	I	II	III
6.4. Evaluation has a long-term perspective 	! Neither on the level of cluster development groups nor overall cluster policy we note the long-term perspective of the evaluation	! The long term perspective of the evaluation is introduced on the level of cluster associations. It is still not the case for the macro level of cluster policy	! Same as in the previous period, we assume some positive development in terms of introduction of the long-term perspective of evaluation
6.5. Policy makers have developed a balanced range of methodological approaches to be used for cluster evaluation 	! Low diversity of evaluation methodologies exists	! On the level of cluster associations bigger diversity of methodological approaches exist, but in overall still very poor	! Same as in the previous period. Positive trends are to observe
6.6. Control indicators (for monitoring and evaluation) are formulated 	! Program 2000+ does not mention any control indicators neither for monitoring nor evaluation	! Regional government level: in the programmes there is information on the objectives that should be reached, but without control or monitoring indicators; In the strategies for cluster association there is a certain reference to specific indicators	Same as in the previous period. Moreover in the program paper 2020 a mid-term milestones are introduced
6.7. The results increase the awareness of the cluster situation and policy approach	The gathered results provide information on the situation within the participants of the cluster initiative, however, they still lack general picture on the situation on the sector/ cluster	Very same as in the previous period. The results from the evaluation and monitoring do increase the awareness, but lack on systematic information in the bigger regional picture	Information is not yet available
7. Policy improvement			
7.1. Lessons driven from the evaluation are considered and integrated in cluster policy	One of the most significant recommendations from the evaluation was implemented, namely members of the cluster promotion groups were willing to have more independence from the public coordination – the result of which is the established independent public-private organization “Clusterlnad Upper Austria”	Lessons from the evaluations after the discussions with key stakeholders are also considered and introduced, e.g. the establishment of new cluster association in ITC sector or more clear and structured indicators for the cluster policy analysis	Information is not yet available
7.2. New assessments are explained and understandable, and correlate with participants	No information received on this matter. We assume that the changes are being agreed with specific interest groups.	Same as in the previous period. The process of sharing information can be regular member-meetings and/ or specific thematic events	Information is not yet available

Period of cluster policy/ Stages of cluster policy process	I	II	III
needs			
8. During the whole process			
8.1. Political support	We agree with the view of Stahlercker (2012) and also thinks that along the existence of special funds for the cooperation projects, the strategic and financial commitment, done by government, were important for the success of the cluster policy in Upper Austria.	Political support and existing unity in the vision on the role of clusters in the regional economic development is present	Same as in the previous period
8.2. Presence of strong regional government/authority	In Upper Austria we see Chamber of Commerce as well as Confederation of Austrian Industry and other existing Associations for important and strong in terms of the decision making	In the first period mentioned institutions maintain their strengths and power in decision making	Same as in the previous stages
8.3. Political stability	The level of confrontation is very low between the parties. As a sign for this serve the example of the Governor of Upper Austria, who is the same person since 1995 and is the representative of the political party, which has also always had the majority of votes (ÖVP)	Same as in the previous period	Same as in the previous period
8.4. Participation of all actors from the triple helix	<p>! During this period only a basis for the participation of actors from the triple helix can be noted. This is due to their low awareness on this cluster concept/ policy matter</p>	On the level of cluster initiatives the participation of all actors from the triple helix can be observed. Following aspect can serve as justification example: by the application for the project funding representatives of companies and universities/ research institutions have to be involved, or that the advisory board of the cluster associations is composed of the representatives from different industrial groups	<p>Similar to the previous stage, moreover at the level of regional policy planning it seems from interviews that all cluster relevant actors are participating.</p> <p>From the interviews it gets clear that the participation of research institutions and universities is desired to be higher</p>
8.5. Long term commitment of actors & motivation	<p>! We think that in the first period of cluster policy the motivation and commitment could have been shown dominantly by public based institutions. This had to do with their will to introduce cluster policy in order to enhance economic development of the region</p>	We think that the long term commitment to cluster policy really / on practice has appeared only in this period, when the cluster associations started to be more company driven. Especially this institutional division increased the level of responsibility and commitment of companies	The benefits in form of the higher investment rates and easiness in receiving financial support from the EU can speak as motivator for the strengthened commitment and motivation of all regional actors

Period of cluster policy/ Stages of cluster policy process	I	II	III
8.6. Collaboration & dialog	Collaboration and dialog existed along with the conflict due to the interest of different political and (even more) industry or labour related groups. The desire of some regional institutions to try out the cluster concept was challenged by unwillingness to cover the cost of this risk in case if its non-success	Overall due to relatively small scale of the region and allocation of core institutions and companies in only several location the communication and awareness of people, which are needed to be contacted is very high. Similar opinion is presented by Maier and Trippel (2011), who mentions that “all important actors from government, academia and business seem to be in constant informal contact” (p.9).	The benefits, which are apparent and tangible, especially for companies serve as a good justification for continuation of collaboration and dialog
8.7. Trust between actors (achievement & sustaining)	The feeling of trust to key representatives from business, public authorities and academia seems to be presented. First of all due to already long experience in working with the people and secondly due to existence of often informal agreements on the conduction or origination of certain activates. Finally, as we already mentioned, as the geographical scale of the regions is small, everyone knows almost everyone, herewith bad service would result in bad reputation and losing clients. That is why regional actors care about their public image, which leads to building trust	Similar as in the previous period with increased trust between public and private sector	Similar as to the previous period

Source: Author's development

Annex 11 Distribution of grant per cluster (in EUR), 1997 – 2004, the Basque Country

Year	1997		1998		1999		2000		2001		2002		2003		2004		
	Ind.	Coop.	Ind.	Coop.	Ind.	Coop.	Ind.	Coop.	Ind.	Coop.	Ind.	Coop.	Ind.	Coop.	Ind.	Coop.	
Project per cluster																	
Machine Tools	1169670	745602	1290954	480822	1082064	845664	895739	1717852	1201833	982872	1667670	1016090	2081790	1215360	2658860	1115390	
Electronic Household Appliance	436518	1036632	638154	302580	746226	373536	573463	447555	369307	287415	481380	150500	989480	177510	1313720	96240	
Automotive	1235088	814362	1134318	831462	652806	884850	551160	929802	1181747	406444	1308390	699410	1017130	901220	998780	1531550	
Aeronautics	467532	84186	272202	57216	491982	26496	494396	98923	676159	1555488	631290	185510	857620	174550	993960	351590	
Electromechanics-Computing	2567082	1258308	2017758	701544	1473102	290694	1516342	804892	2251033	698911	2918700	847360	3174770	497250	3486360	642470	
Environment	957960	158976	1368366	144810	1681824	107562	1052295	5999329	1257968	441565	1027990	327400	1110700	270350	1166140	287480	
Knowledge	-	46470	112080	232482	414468	28968	578454	31018	303947	114357	363190	116570	138660	341810	374610	584050	
Energy	125562	996720	452910	700700	772248	302208	1059932	500805	1628852	685653	1977510	805220	2074260	772000	2466710	939610	
Furniture	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	-	-	163215	73566	248760	26900	136600	36410	171550	69290	
Paper	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	229880	89390	255940	50330
Naval	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	in "other"	-	65580	-	-
Other	1473666	3617940	1643178	1344666	1579668	1762548	2625761	3672275	4651544	2280523	5485320	3699980	4274810	2956470	4268150	3618240	
Total	6959412	8759196	8929920	4796282	8894388	4622526	9347542	14202451	13685605	7526794	16110200	7874940	16085700	7497900	18154780	9286240	

Source: SPRI, INTEK Programme 1997 -2005 (Basque Country Competitiveness Atlas 2015, pp. 5–6)

Annex 12 Different typologies of stages included in (cluster) policy process

Policy	Researcher	Stages of cluster policy
Public	Hogwood (1987)	<ol style="list-style-type: none"> 1. Analytical 2. Development 3. Implementation 4. Evaluation
	Hogwood and Gunn's model of the policy process cited in Tansey and Jackson (2008)	<ol style="list-style-type: none"> 1. Deciding to decide (issue search or agenda setting) 2. Deciding how to decide 3. Issue definition 4. Forecasting 5. Setting objectives and priorities 6. Options analysis 7. Policy implementation, monitoring and control 8. Evaluation and review 9. Policy maintenance, succession, or termination
	Rist (1994)	<ol style="list-style-type: none"> 1. Policy formulation, 2. Policy implementation, 3. Policy accountability
	Raines (2000)	<ol style="list-style-type: none"> 1. Auditing regional economy <ol style="list-style-type: none"> a. Cluster identification b. Cluster selections 2. Auditing the policy framework 3. Developing a cluster-based policy <ol style="list-style-type: none"> a. Making the policy=Articulating the policy itself b. Getting commitment="Selling" c. Changing the policy=Set mechanism for revising cluster policy 4. Implementing a cluster-based policy <ol style="list-style-type: none"> a. overall control (management of cluster policy) b. individual programme coordination c. project management 5. Monitoring and evaluation
	McPherson (2001)	<ol style="list-style-type: none"> 1. Determine the overall goals and the scope of the policy initiative. 2. Initiate discussion on the cluster development process 3. Identify and map existing clusters and location-specific attributes in the economy. 4. Strategic prioritization of efforts by clusters. 5. Clarify the roles of the relevant public, private, and support entities with respect to the individual clusters 6. Collect detailed information on each cluster 7. Engage key groups and individuals to lead and drive the process 8. Assess and plan direction and targets 9. Co-ordinate the public and private activities including investment/co-investment in public goods 10. Establish an appropriate cluster organization to oversee the process. 11. Market and disseminate information about the cluster and the locational advantages it offers. 12. Continuous evaluation of both the individual cluster and the national policy 13. Decide whether to terminate or institutionalize mechanisms that have been successful.
Cluster	Benneworth, Charles (2001)	<ol style="list-style-type: none"> 1. Decision to use a cluster policy approach 2. Determination of the state role - debate on the state role in the approach has to be debated 3. Selection and designation of clusters 4. Strategy formulation (Policy tool kit decisions) 5. Programme delivery (Policy tools for clustering) 6. Implementing clusters 7. Evaluation & reporting back - learning of the lessons and possibilities

Policy	Researcher	Stages of cluster policy
		for subsequent policy phases
	Aranguren et al. (2006)	<ol style="list-style-type: none"> 1. Identification and selection of clusters 2. Cluster policy design 3. Cluster policy implementation 4. Cluster policy evaluation
	INNO Germany AG (2010)	<ol style="list-style-type: none"> 1. Getting started 2. Planning a cluster policy <ol style="list-style-type: none"> 2.1. Assessing the existence of clusters 2.2. Characterizing the cluster (cluster) 2.3. Assessing a cluster market position (cluster) 2.4. Assessing the need for cluster policy (policy development) 2.5. Assessing the appropriate policy-mix (policy development) 3. Implementing cluster policy <ol style="list-style-type: none"> 3.1. Set up cluster programme 3.2. Set up cluster agencies 3.3. Selection and setting up cluster initiatives (fostering cluster initiatives) 3.4. Defining proper financial amount 4. Evaluation of cluster policy

Source: Author's development based on the mentioned literature sources

Annex 13 List of region's codes

Spain and Spanish autonomous communities	Austria and Austrian federal provinces
ESP: Spain	AUT: Austria
ES11: Galicia	AT11: Burgenland (AT)
ES12: Asturias	AT12: Lower Austria
ES13: Cantabria	AT13: Vienna
ES21: Basque Country	AT21: Carinthia
ES22: Navarra	AT22: Styria
ES23: La Rioja	AT31: Upper Austria
ES24: Aragon	AT32: Salzburg
ES30: Madrid	AT33: Tyrol
ES41: Castile and León	AT34: Vorarlberg
ES42: Castile-La Mancha	
ES43: Extremadura	
ES51: Catalonia	
ES52: Valencia	
ES53: Balearic Islands	
ES61: Andalusia	
ES62: Murcia	
ES63: Ceuta	
ES64: Melilla	
ES70: Canary Islands	

Source: OECD 2014

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EHRENWÖRTLICHE ERKLÄRUNG

Ehrenwörtliche Erklärung

Ich, Anastasiia Konstantynova, erkläre hiermit ehrenwörtlich, dass ich die vorliegende Arbeit selbständig und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe.

Die Arbeit wurde noch keiner anderen Prüfungsbehörde vorgelegt und auch noch nicht veröffentlicht.

Ich bin mir bewusst, dass eine unwahre Erklärung rechtliche Folgen haben wird.

Ingolstadt, den 6 Juli 2015

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(Unterschrift)

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