



Microfoundations of dynamic capabilities:  
employee involvement, managerial trust, control, and  
routinization

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## **English abstract**

This dissertation examines possible actor-related and process-related microfoundations of dynamic capabilities. In particular, I examine the actor-related microfoundations: employee involvement in strategic renewal, managerial trust in employees, and control of employees. I hypothesize that employee involvement in strategic renewal and social control mediate the positive relationship of trust and dynamic capabilities. Regarding process-related microfoundations, I focus on routinization at the operational level as well as at the strategic level. Drawing on controversies in the literature, I derive rival hypotheses for their effects on dynamic capabilities. Furthermore, the interrelation of processes and actors is discussed and mediations of the relationship between routinization and dynamic capabilities through control and employee involvement are proposed. I test the hypotheses using survey-data of small German manufacturing firms. Support for the mediation of the positive relationship between trust and dynamic capabilities through employee involvement and social control is found. Moreover, I find support for the positive effect of outcome control on dynamic capabilities. The proposed negative effect of behavior control is not supported. Furthermore, I find support for a positive direct and total effect of routinization at the strategic level on dynamic capabilities. Regarding routinization at the operational level, I cannot support a direct effect, but I can support a negative total effect. Some of the rival conceptualizations in the literature can be confirmed partially. However, none of the concurring conceptualizations is supported fully. The relation of routinization and dynamic capabilities appears to be mediated by employee involvement, social control, and outcome control. I contribute to the literature on dynamic capabilities by exposing controversies in the conceptualizations. Moreover, I examine the effects of various microfoundations. My results provide directions to a further combination of routines within dynamic capability possessing organizations. I also outline the impact of actor-related mediators. Moreover, I add to the trust and control literature by supporting their complementarity, which has been the subject of debate for a long time.

**Keywords:** dynamic capabilities, trust, control, routines, employee involvement, microfoundations

## **German abstract**

### **Zusammenfassung**

Diese Dissertation untersucht mögliche akteursbezogene und prozessbezogene Mikrofundierungen dynamischer Fähigkeiten. Im Speziellen untersuche ich die akteursbezogenen Mikrofundierungen: Mitarbeiterbeteiligung bei strategischen Veränderungen, Vertrauen der Führungskraft in Mitarbeiter und Kontrolle von Mitarbeitern. Dabei entwickle ich die Hypothesen, dass Mitarbeiterbeteiligung bei strategischen Veränderungen und soziale Kontrolle Mediatoren der positiven Beziehung von Vertrauen zu dynamischen Fähigkeiten sind. Bezüglich prozessbezogener Mikrofundierungen konzentriere ich mich auf die Routinisierung der operativen und strategischen Ebene. Basierend auf Kontroversen in der Fachliteratur, entwickle ich konkurrierende Hypothesen zu deren Einfluss auf dynamische Fähigkeiten. Des Weiteren wird das Zusammenwirken von Prozessen und Akteuren diskutiert. Hypothesen für die Mediation der Beziehung von Routinisierung zu dynamischen Fähigkeiten durch Kontrolle und Mitarbeiterbeteiligung werden entwickelt. Ich teste die Hypothesen anhand einer umfragebasierten Stichprobe deutscher Kleinunternehmen des produzierenden Gewerbes. Die ermittelten Ergebnisse stützen die positiven Mediationen der Beziehung zwischen Vertrauen und dynamischen Fähigkeiten durch Mitarbeiterbeteiligung und soziale Kontrolle. Darüber hinaus kann der positive Effekt von Ergebniskontrolle auf dynamische Fähigkeiten bestätigt werden. Die Hypothese bezüglich eines negativen Effekts von Verhaltenskontrolle kann nicht bestätigt werden. Ferner stützen die Ergebnisse den positiven direkten und totalen Effekt einer routinisierten strategischen Ebene auf dynamische Fähigkeiten. Bezüglich der Routinisierung auf der operativen Ebene kann kein direkter, jedoch ein negativer totaler Effekt nachgewiesen werden. Einige der konkurrierenden konzeptionellen Modelle in der Literatur können teilweise bestätigt werden. Es wird jedoch kein Modell vollständig unterstützt. Die Beziehung von Routinisierung und dynamischen Fähigkeiten scheint des Weiteren von den Mediatoren Mitarbeiterbeteiligung, sozialer Kontrolle und Ergebniskontrolle beeinflusst zu werden. Ein Beitrag zur Literatur wird durch die Offenlegung von Kontroversen in verschiedenen Konzeptionen von dynamischen Fähigkeiten geleistet. Es wird außerdem der Einfluss verschiedener möglicher

Mikrofundierungen getestet. Die Ergebnisse deuten auf eine weitere mögliche Kombination von Routinen hin, welche den Besitz dynamischer Fähigkeiten fördern könnte. Es wird auch auf den Einfluss von akteursbezogenen Mediatoren hingewiesen. Ich leiste ebenfalls einen Beitrag zur andauernden akademischen Diskussion über die Beziehung zwischen Vertrauen und Kontrolle. Die Ergebnisse stützen die Komplementarität der beiden Konstrukte.

**Schlagwörter:** Dynamische Fähigkeiten, Vertrauen, Kontrolle, Routinen, Mitarbeiterbeteiligung, Mikrofundierungen

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Despite the huge academic and administrative support, arguably the most influential pillar of finishing such a project is of a relational nature. The European University Viadrina and the German Graduate School of Management and Law are role models regarding family support. During the writing of this thesis, I became married, my son was born, and I went on parental leave. Without that support, balancing my private and academic life would have become a lot more challenging.

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## Table of contents

English abstract.....	II
German abstract.....	III
Acknowledgments .....	V
List of figures.....	XII
List of tables.....	XIII
List of abbreviations .....	XIV
List of symbols.....	XV
1 Introduction .....	1
1.1 Dynamic capability perspective.....	1
1.2 Agency of dynamic capabilities .....	2
1.3 Routinized processes and dynamic capabilities.....	4
1.4 A holistic perspective on actors and processes within the dynamic capability framework.....	5
1.5 Course of the investigation .....	6
2 Dynamic capabilities .....	8
2.1 Origins of the concept and initial conceptualization by Teece et al. (1997) .....	8
2.2 Further developments and fragmentation of the field.....	10
2.2.1 Conceptualization by Eisenhardt and Martin (2000).....	10
2.2.2 Conceptualization by Winter (2003).....	12
2.2.3 Conceptualization by Helfat et al. (2007).....	13
2.3 Positioning within the fragmented field .....	14
2.3.1 Sustained competitive advantage and idiosyncratic capabilities .....	14
2.3.2 Dynamic capabilities, performance, and the object of action.....	16
2.3.3 Impact of routines and managers .....	18
3 Microfoundations of dynamic capabilities .....	19



3.1	Management-based microfoundations of dynamic capabilities .....	20
3.1.1	Dynamic managerial capabilities.....	20
3.1.2	Employee involvement through managers and dynamic capabilities...	22
3.1.3	Trust and control as microfoundations of dynamic capabilities .....	24
3.1.3.1	Trust and control as managerial coordination-mechanisms in dynamic environments.....	24
3.1.3.2	Trust .....	27
3.1.3.3	Trust, dynamic capabilities, and employee involvement in strategic renewal.....	29
3.1.3.4	Control.....	30
3.1.3.5	Control and dynamic capabilities.....	32
3.1.3.5.1	Behavior control and dynamic capabilities .....	33
3.1.3.5.2	Outcome control and dynamic capabilities .....	34
3.1.3.5.3	Social control and dynamic capabilities.....	35
3.1.3.6	Complementary nature of trust and control .....	36
3.2	Routinization as a microfoundation of dynamic capabilities .....	40
3.2.1	Routines .....	40
3.2.2	Capabilities and routines.....	42
3.2.2.1	Dynamic capabilities and routinization following Eisenhardt and Martin (2000).....	44
3.2.2.2	Dynamic capabilities and routinization following Winter (2003) .....	47
3.2.2.3	Dynamic capabilities and routinization following Schreyögg and Kliesch-Eberl (2007).....	48
3.2.2.4	Further conceptualizations .....	50
3.3	Interrelation of managerial and routine-based microfoundations and their effects on dynamic capabilities.....	52
3.3.1	Employee involvement in strategic renewal and routinization.....	53

3.3.2	Control and routinization .....	54
3.4	Summary of hypotheses.....	59
4	Method.....	61
4.1	Sample and data collection .....	61
4.1.1	Sample selection and level of analysis .....	61
4.1.2	Sample characteristics.....	63
4.1.3	Data collection procedures.....	65
4.2	Measures .....	70
4.2.1	Dependent variables.....	70
4.2.1.1	Dynamic capabilities .....	70
4.2.1.2	Performance .....	71
4.2.2	Independent variables .....	72
4.2.2.1	Employee involvement in strategic renewal .....	72
4.2.2.2	Managerial trust in employees .....	73
4.2.2.3	Social control, outcome control, and behavior control .....	75
4.2.2.4	Routinization at the operational level .....	76
4.2.2.5	Routinization at the strategic level.....	76
4.2.2.6	Environmental dynamism .....	76
4.2.2.7	Control-variables.....	78
4.2.3	Treatment and general characteristics of deployed measures.....	79
4.3	Measurement properties and descriptive statistics .....	86
4.3.1	Missing data.....	86
4.3.2	Factor analyses.....	86
4.3.3	Reliability.....	87
4.3.4	Validity .....	88
4.3.5	Goodness of fit.....	88

4.3.6	Descriptive statistics .....	89
4.3.7	Non-response bias .....	91
4.3.8	Informant qualification and common method bias .....	93
4.3.8.1	Informant qualification.....	93
4.3.8.2	Procedural methods for common method bias.....	94
4.3.8.3	Dyadic validation .....	95
4.3.8.4	Statistical tests for common method bias.....	96
4.4	Data analysis and results.....	97
4.4.1	Tests for the assumptions of OLS regression .....	97
4.4.1.1	Normal distribution of residuals.....	97
4.4.1.2	Autocorrelation of residuals .....	98
4.4.1.3	Covariance between residuals and independent variables .....	99
4.4.1.4	Heteroskedasticity .....	100
4.4.1.5	Misspecification of the model.....	105
4.4.1.6	Multicollinearity.....	106
4.4.2	Direct effects.....	107
4.4.3	Post-hoc analyses of direct effects.....	110
4.4.4	Mediated effects.....	110
4.4.5	Summary of hypotheses support.....	120
4.4.6	Sensitivity analysis .....	122
5	Discussion.....	124
5.1	Employee involvement, trust, and dynamic capabilities .....	124
5.2	Control and dynamic capabilities .....	124
5.3	Trust and control as complements .....	125
5.4	Routinization and dynamic capabilities.....	126
5.5	Routinization, actors, and dynamic capabilities .....	127

5.6	Dynamic capabilities and performance .....	128
5.7	Limitations.....	128
6	Conclusion .....	130
6.1	Review of major propositions and findings.....	130
6.2	Theoretical implications and further research .....	131
6.3	Managerial implications .....	133
	References.....	135
	Statement of originality .....	165
	Curriculum vitae .....	166
	List of publications and presentations .....	167

## List of figures

Figure 1. Course of the investigation.....	7
Figure 2. Classification of control-types following Ouchi (1979).....	32
Figure 3. Visualization of hypotheses.....	60
Figure 4. Histogram of residuals.....	98
Figure 5. Scatterplot for heteroskedasticity tests .....	100
Figure 6. Illustration of direct and indirect paths.....	111
Figure 7. Visualization of supported hypotheses.....	121

## List of tables

Table 1. Rival hypothesized effects of routinization on dynamic capabilities .....	50
Table 2. Overview of hypotheses .....	59
Table 3. Measurement scales .....	82
Table 4. Descriptive statistics, correlations, discriminant validity .....	90
Table 5. Sample composition.....	91
Table 6. Comparison of means for early and late respondents .....	92
Table 7. Respondents' characteristics .....	94
Table 8. Intraclass correlation of informants .....	95
Table 9. OLS regression results for residual model.....	99
Table 10. Breusch-Pagan-test for heteroskedasticity of individual independent variables against dynamic capabilities.....	102
Table 11. OLS regression results for adjusted Breusch-Pagan test .....	103
Table 12. Comparison of errors for OLS regression with non-robust errors, robust errors following Cribari-Neto (2004), and robust errors following Davidson and McKinnon (1993).....	104
Table 13. VIF of the independent variables.....	107
Table 14. Results of regression analysis for the direct effects.....	108
Table 15. Results of regression analysis for mediated effects .....	114
Table 16. Bootstrapped results for indirect effects of managerial trust in employees on dynamic capabilities .....	115
Table 17. Bootstrapped results for indirect effects of routinization at the operational level on dynamic capabilities .....	117
Table 18. Bootstrapped results for indirect effects of routinization at the strategic level on dynamic capabilities .....	118
Table 19. Overview of hypotheses support .....	120
Table 20. Sensitivity analyses.....	123

## List of abbreviations

AVE	average variance extracted
CFI	comparative fit index
CR	composite reliability
d.f.	degrees of freedom
e.g.	exempli gratia (English: for example)
env.	environmental
et al.	et alli (English: and additional)
GFI	goodness-of-fit index
i.e.	id est (English: that is)
ICC(1)	intraclass correlation(1)
impl.	implementation
involv.	involvement
n.s.	not significant
n/a	not applicable
OLS	ordinary least squares
p.	page
resp.	respondents
RMSEA	root mean square error of approximation
rou. oper. lev.	routinization operational level
rou. stra. lev.	routinization strategic level
S.D.	standard deviation
SE	standard error
SIC	standard industrial classification
SPSS	statistical package for the social sciences
TLI	Tucker-Lewis index
VHB	Verband der Hochschullehrer für Betriebswirtschaft (English: association of professors of business in german speaking countries)
VIF	variance inflation factor
VRIN	valuable, rare, inimitable, non-substitutable

## List of symbols

%	percent
a-path	effect of independent variable on mediator
b-path	effect of mediator on dependent variable
c-path	total effect of independent variable on dependent variable
c'-path	direct effect of independent variable on dependent variable
d	d-value (Kolmogorov-Smirnov test)
F	F-value (F-test)
H	hypothesis
M	mediator
n	sample size
p	significance
r	correlation
R <sup>2</sup>	coefficient of determination
t	t-value (t-test)
w	w-value (Shapiro-Wilk test)
X	independent variable
Y	dependent variable
$\alpha$	Cronbach's alpha
$\beta$	coefficient
$\Delta$	delta
$\chi^2$	chi-square-value



# 1 Introduction

## 1.1 Dynamic capability perspective

The dynamic capability perspective has received increasing attention since Teece, Pisano, and Shuen's (1997) seminal work. Numerous scholars have provided valuable contributions and the amount of related yearly publications is rising (Di Stefano, Peteraf, & Verona, forthcoming). The perspective's intent to explain strategic renewal in regimes of dynamism has even been described as "the Holy Grail of strategic management" (Helfat & Peteraf, 2009: 91). However, as evidenced by existing criticism the dynamic capability perspective remains a relatively young concept, that might not yet have fully unfolded (Helfat & Peteraf, 2009).

First and foremost, the field is plagued by a confusion about the concept itself (Di Stefano, Peteraf, et al., forthcoming; Vogel & Güttel, 2013; Wilden, Devinney, & Dowling, 2013). Various conceptualizations of dynamic capabilities exist that differ regarding the nature of the construct, the aim, the agents, the actions, and the object of actions (Di Stefano, Peteraf, et al., forthcoming). Some argue that dynamic capabilities are an idiosyncratic ability (e.g. Teece et al., 1997), while others argue for a best-practice process that can be found in various organizations (e.g. Eisenhardt & Martin, 2000). Along these lines of reasoning, some regard dynamic capabilities as the source of sustainable competitive advantage and one reason for a firm's ability to be competitive in regimes of dynamism (e.g. Teece, forthcoming), whereas others regard dynamic capabilities simply as an adjustment mechanism to meet the demands of the environments (e.g. Eisenhardt & Martin, 2000; Winter, 2003). The agents that exercise dynamic capabilities are a further concern. There is a strong literature base that regards managers as key agents for dynamic capabilities (e.g. Adner & Helfat, 2003; Helfat & Peteraf, forthcoming; Martin, 2011). Others regard complex collective routines as the modus operandi (e.g. Drnevich & Kriauciunas, 2011; Zollo & Winter, 2002). Furthermore, the literature is divided regarding the actions and the object of the actions. Some regard dynamic capabilities as an adjustment mechanism (e.g. Kale & Singh, 2007; Santos & Eisenhardt, 2005; Winter, 2003), whereas others emphasize the creation of something new (Katkalo, Pitelis, & Teece, 2010; Teece,

2007). It is therefore not surprising that various scholars repeatedly criticized the concept of dynamic capabilities for its lack of coherent theoretical foundations and for the fragmentation of the literature (e.g. Arend & Bromiley, 2009; Argyres, Felin, Foss, & Zenger, 2012; Barreto, 2010).

The different stances regarding the conceptualization of dynamic capabilities represent serious challenges for further developments in the field (Peteraf, Di Stefano, & Verona, 2013). However, instead of regarding the different stances as contradictory and mutually exclusive, I support the perspective that they should be integrated to enhance a richer theoretical development of the field (Peteraf et al., 2013). A possible direction is a stronger focus on micro-perspectives (Ambrosini & Bowman, 2009; Easterby-Smith, Lyles, & Peteraf, 2009; Felin & Foss, 2009; Salvato, 2003), and respective empirical support (Arend & Bromiley, 2009). It is not clear yet, what microfoundations constitute and support a dynamic capability. Creating knowledge about underlying mechanisms might therefore clarify our understanding.

With this dissertation, I seek to illuminate some of the confusions regarding the aim of the construct and expose actor-related, as well as process-related microfoundations of dynamic capabilities. Regarding actor-related microfoundations, I focus on trust and control. Regarding process-related microfoundations, I focus on routinization. I intend to integrate some of the different understandings of dynamic capabilities productively.

## **1.2 Agency of dynamic capabilities**

I regard trust and control as important potential actor-related microfoundations of dynamic capabilities. The relevance of these microfoundations can be derived from the confusion around the agents of dynamic capabilities in the literature. Somewhat obviously, the first starting points are the actors inside the organization. Trust and control are primary modes of interaction across echelons (Sitkin & George, 2005). A main criticism raised in the dynamic capability literature is the oversimplification of organizational change as a managerial concern (e.g. Salvato & Rerup, 2011;

Schreyögg & Kliesch-Eberl, 2007). I want to address this concern in various ways. I discuss and test the impact of employee involvement as a further crucial aspect for the possession of dynamic capabilities. Thus far, only very few scholars have emphasized the importance of employees (for exceptions see Hallin, Øgaard, & Marnburg, 2009; Sprafke, Extenbrink, & Wilkens, 2012). Instead of regarding managerial impact and employee impact as mutually exclusive, I seek to analyze the interaction of all actors. I follow the view that dynamic capabilities are a firm spanning mechanisms that requires the involvement of all employees (Schreyögg & Kliesch-Eberl, 2007). When considering managerial actions, I focus on behavior that is employee related, rather than task related. Thus, I focus on trust and control as primary interaction modes across the echelons. Particularly dynamic capability research that is influenced by entrepreneurial perspectives (e.g. Augier & Teece, 2009; Katkalo et al., 2010; Pitelis & Teece, 2010) emphasizes the creative spirit of managers, but is less focused on the day-to-day interaction with subordinates. I want however, to emphasize the importance and explain possibilities of enabling subordinates to contribute to strategically relevant adaptations. Control as a primary function of management, is proposed to affect dynamic capabilities directly, while trust in subordinates might indirectly affect dynamic capabilities through employee involvement. Knowledge about the appropriate amount of control and trust might redirect managers towards enabling employees to perform dynamic adjustments, rather than adjusting themselves.

The inclusion of trust as a crucial tool for managers might appear surprising. Management research has been influenced strongly by neo-institutional economics in recent years. This perspective emphasized the importance of control, but neglects trust, as the permanent threat of opportunism is one underlying assumption (Jensen & Meckling, 1976; Williamson, 1975). Opportunism is defined by Williamson (1975: 255) as “self-interest seeking with guile”. Hence, employees are seen as non-virtuous, non-benevolent, and immoral. In other words, they are not trustworthy regarding their affective commitment or goodwill as defined by McAllister (1995). In later publications Williamson (e.g. 1993) reconsidered and tried to integrate trust into his conceptualizations. However, this has widely been ignored by other researchers as it is in fundamental conflict with the general logic of neo-institutional

economics. Emphasizing the importance of trust, thus appears to be more relevant as it has largely been neglected during the last decades (Eberl, 2012).

By combining trust and control perspectives, this research is not only relevant for the conversation on the desperately sought microfoundations of dynamic capabilities (Ambrosini & Bowman, 2009), but also for the conversation on trust and control. The complementary (e.g. Bachmann, 2001; Barney & Hansen, 1994; Luhmann, 1979; Poppo & Zenger, 2002; Weibel, 2007) and/or substitutional (e.g. Bradach & Eccles, 1989; Costa & Bijlsma-Frankema, 2007; Gulati, 1995) nature of trust and control has been the subject of a long debate. Mishra and Mishra (2013) exposed that context with a high degree of uncertainty and stress, such as dynamic environments, appear particularly relevant. However, the complementary and/or substitutional nature of trust and control has not been researched intensively in dynamic environments. My specific research questions are: 1) *What degree of managerial trust maximizes the subordinates ability to contribute to the dynamic capabilities of the firm?*; 2) *Is control beneficial for the achievement of dynamic capabilities;* and 3) *Have trust and control complementary effects in the facilitation of dynamic capabilities?*

### **1.3 Routinized processes and dynamic capabilities**

- Process-oriented conceptualizations of dynamic capabilities mainly differ regarding their degree of routinization (e.g. Eisenhardt & Martin, 2000; Schreyögg & Kliesch-Eberl, 2007; Winter, 2003) or the type of underlying processes (e.g. Li & Liu, 2014; Teece, 2007). Thus, the process-oriented microfoundations of dynamic capabilities are not clear either. This does not only apply to processes that perform the actions, but also to the processes that are the object of actions (Peteraf et al., 2013). The literature appears to be particularly diverging in regard to routines and their impact. In the fragmented field, the conceptualizations do not only differ, but are at times directly opposing. Some argue that processes at the strategic level should be routinized and so too should be the processes that are subject to change at the operational level (e.g. Winter, 2003). Others argue in a directly opposing manner (e.g. Eisenhardt & Martin,

2000). The status quo in the literature is hence somewhat unsatisfying. In a first empirical test, I want to contribute by assessing the different perspectives in a small firm setting to derive contingency effects for the respective conceptualizations. I chose small firms as they tend to change and adapt more frequently as both growth and learning effects are quicker and the firm is more flexible (Arend, 2013). Thus, dynamic capability research appears to be particularly relevant here. Again, I intend to merge perspectives rather than to discredit conceptualizations. The specific research question here is: *What degree of routinization at the operational level and the strategic level is supportive for dynamic capabilities?*

#### **1.4 A holistic perspective on actors and processes within the dynamic capability framework**

I also seek to combine perspectives that emphasize the importance of actors, such as managers and employees, with rather process-oriented perspectives, such as conceptualizations regarding routines. Thus, instead of regarding substantialist and relational thinking as different roads of analysis (see Emirbayer, 1997 for an overview), I hold the view that they should be integrated and their interaction should be analyzed. Besides analyzing the complementary effects of various actors, I also seek to analyze the interaction of processes and actors. Nearly no process exists without the influence of actors. Conversely, actors are heavily influenced by existing processes (Feldman & Pentland, 2003). Breaking the rules of existing processes is seen as a reason to leave the existing paths and to create innovation (Garud, Kumaraswamy, & Karnøe, 2010). However, managers cannot only break the rules, they also have to create structure, guide employees, and give direction (Shane & Venkataraman, 2000). As conceptualized by some scholars (e.g. Teece, 2007; Winter, 2003) structures and stable processes can also lead to successful adjustments and innovations. Thus, regarding actors and processes separately appears to be somewhat incomplete. Felin and Foss (2009) for example emphasized that research on microfoundations should focus on individual-level actions, processes, and structure.

Keeping in mind that structure and actors interact, guides my argumentation that intends to integrate structural and procedural perspectives on dynamic capabilities. I analyze the impact of routinization on the manager's ability to exercise control and thus to further impact dynamic capabilities. I also analyze the impact of routinization on employee involvement. The analyzed indirect effects might also clarify why a multiplicity of process-related conceptualizations exist. The specific research question here is: *Does the routinization of processes inside an organization affect exercised control and employee involvement and thus indirectly the possession of dynamic capabilities?*

## **1.5 Course of the investigation**

I proceed as follows. I begin by outlining different conceptualizations of dynamic capabilities. Thereby, I clarify my positioning regarding the intention and the value of the concept concerning the achievement of sustainable competitive advantage. I seek to emphasize the distinguishing elements of dynamic capabilities and alternative conceptualizations of flexible firms to position dynamic capabilities as a strategic concept, rather than a change mechanism.

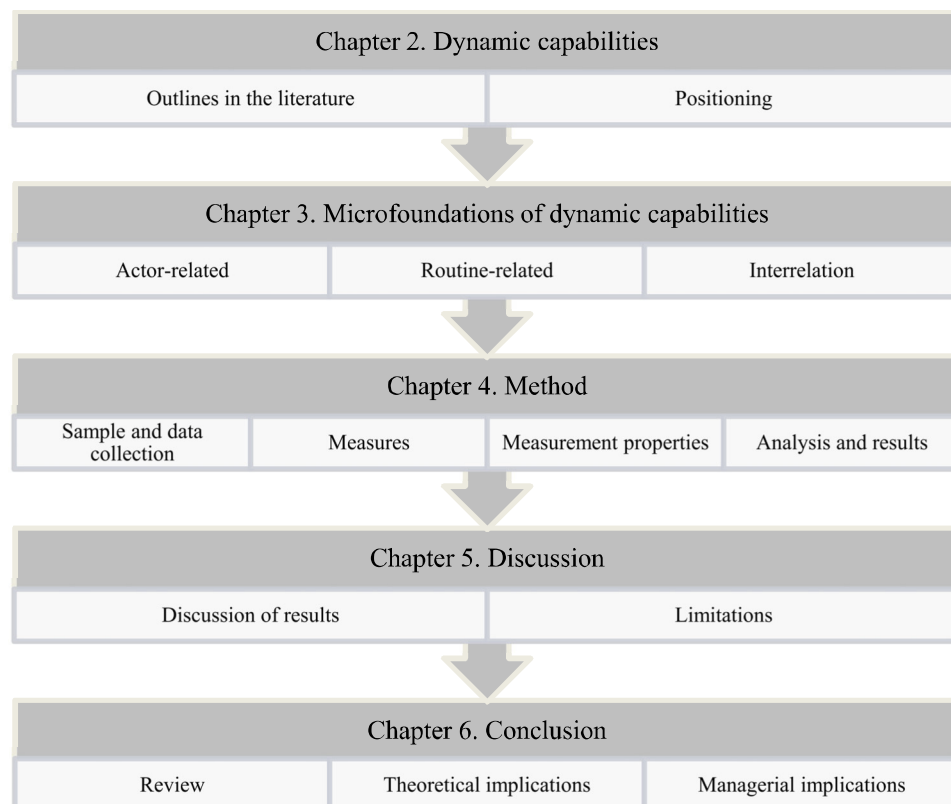
After positioning myself in the fragmented field, I summarize recent calls for research on microfoundations and assess some of the research that has been conducted on the managerial microfoundations of dynamic capabilities. I emphasize the importance to focus on employee involvement as well rather than solely analyzing the impact of managers. To explain coordination mechanisms that can be used to facilitate employee involvement, a literature review on trust and control is provided. I derive hypotheses on the indirect effect of trust on dynamic capabilities through employee involvement and the direct effect of control on dynamic capabilities. I also discuss the complementary and/or substitutional nature of trust and control and derive a hypothesis of the supplementary effect of trust on social control and thus also on dynamic capabilities.

Next, I summarize the conceptualized effects of routinization on dynamic capabilities to expose contradictions in the literature. Based on those conceptualizations, I derive

rival hypotheses for the total effects of routinization at the operational and strategic level on dynamic capabilities. I focus on adjustment actions at the strategic level and the object of action at the operational level. Thereafter, I also hypothesize indirect effects of routinization on dynamic capabilities through the mediators control and employee involvement. I seek to combine procedural and actor-related microfoundations of dynamic capabilities.

Within the descriptions of the sample selection and the data collection procedures, I discuss reasons for focusing on small German firms in the manufacturing industry. Thereafter, I describe the operationalizations of the constructs. I also explain properties and the treatment of the collected data, such as test for biases, reliability, and validity. The analysis of the data can be found in the following chapter. Afterwards, I discuss the results and explain their contribution to the academic conversations on the microfoundations of dynamic capabilities as well as on trust and control. I conclude by deriving practical implications and recommendations on how to move the academic field forward. Figure 1 provides an overview of the structure.

Figure 1. Course of the investigation



## **2 Dynamic capabilities**

### **2.1 Origins of the concept and initial conceptualization by Teece et al. (1997)**

Strategy research is fundamentally about the achievement of a sustainable competitive advantage (Porter, 1996; Rumelt, Schendel, & Teece, 1994; Teece et al., 1997). Various explanations posit, why some firms perform superior to others in the long run. Examples are the choice of a very attractive industry (Porter, 1980) or the possession of idiosyncratic resources (Wernerfelt, 1984). Most conceptualizations however, failed to explain the sustainability of competitive advantage in regimes of dynamism. The initial intention of the dynamic capability framework was to provide an explanation of this (Teece et al., 1997; Teece & Pisano, 1994).

The dynamic capability perspective builds on assumptions and considerations of the resource-based view. Here, the maximized exploitation of resources and their acquisition are regarded as key to competitive advantage (Wernerfelt, 1984). In order for resources to be of strategic value, they need to be valuable, rare, inimitable and non-substitutable (VRIN-criteria) (Barney, 1991). Whilst the resource-based view has been proven as an effective theoretical perspective in static environments, it is arguably less so in dynamic environments (Teece et al., 1997). The dynamic capability perspective aims to fill that particular gap by providing possibilities to allow for permanent change and adaptation. It is therefore regarded as an extension of the resource-based view by some scholars (e.g. Eisenhardt & Martin, 2000; Helfat et al., 2007; Zollo & Winter, 2002).

Initially, dynamic capabilities were defined as “the firm’s ability to integrate build and reconfigure internal and external competences to address rapidly changing environments” (Teece et al., 1997: 516). The conceptualization by Teece et al. (1997) also includes a trisection of dynamic capabilities into processes, positions, and paths. The authors claim that the processes: coordination, learning, and reconfiguration might allow for a dynamic adjustment. Similarly, the current positions of a company are crucial aspects of this line of reasoning. Specific assets, such as technological knowledge, financial slack, advantageous institutional



positions, and reputational capital are also regarded as requirements that foster the adjustment to the environment. Paths, in the sense of available alternative options, are the third antecedent. They are dependent on technological opportunities and the firm's prior positioning (Teece et al., 1997). The trisection has been the subject of debate however. Some regard them as independent pillars (e.g. Arend & Bromiley, 2009), whilst others see a causal relationship between them (e.g. Helfat & Peteraf, 2009) where prior paths influence a firm's positions, which then influence a firm's processes. Teece et al. (1997) also mention causal relationships, however they partly propose opposite directions of cause and effect. Nevertheless, processes as the key component, are attributed with the ability to change paths and positions (Teece et al., 1997).

A major concern regarding the initial conceptualization is the necessity of achieving competitive advantage. Dynamic capabilities are not plainly about changing the company, but rather about adjusting it *successfully* to the environment, i.e. by addressing the environmental changes. Dynamic capabilities might therefore only be proposed ex post, once the success can be proved (Williamson, 1999). The conceptualization risks being tautological as every firm that successfully altered its resource-base would possess dynamic capabilities (Ambrosini & Bowman, 2009). Although, dynamic capabilities can be proposed ex post, it is still unlikely that it can be predicted whether the particular firm might again be able to alter their ordinary capabilities successfully in the future. To provide an example: Based on an in depth case study, Rindova and Kotha (2001) proposed that Yahoo And Excite possess the ability of *continuous morphing* as they successfully altered their resource base until 2001. However, Yahoo lost 99 percent of their stock value in the dotcom bubble burst afterwards (Arend & Bromiley, 2009). Excite already suffered financially in 2001 (Arend & Bromiley, 2009), went bankrupt, and was finally acquired by ask.com in 2004. It is thus not only difficult to declare dynamic capabilities ex ante, but also to predict a further successful altering with ex post declared dynamic capabilities. Further theoretical conceptualizations therefore dropped the achievement of a sustained advantage (e.g. Eisenhardt & Martin, 2000; Winter, 2003).

## **2.2 Further developments and fragmentation of the field**

The field developed further during the last decade. However, as evidenced by recent bibliographic reviews (e.g. Peteraf et al., 2013; Vogel & Güttel, 2013; Wilden et al., 2013), the field has become highly fragmented, and multiple exclusive sub-conversations exist within the general framework. Despite recent attempts to converge the field (e.g. Peteraf et al., 2013), it rather appears to diverge. Different assumptions and influences of additional theoretical perspectives underlie the contributions of the sub-conversations.

The lack of coherent theoretical foundations is a concern that has been articulated by many researchers (e.g. Arend & Bromiley, 2009; Argyres et al., 2012; Barreto, 2010). On the other hand, Helfat and Peteraf (2009) claimed that this might even be advantageous as limited consistency in definitions increases flexibility and allows for further theoretical development. They also argued that the concepts will become proximate and further theoretical development will provide coherent theoretical foundations. However, the latest bibliographic review provides evidence that the field is still diverging rather than converging (Di Stefano, Peteraf, et al., forthcoming). In the next chapters, I am going to discuss the differences in the arguably most popular sub-streams within the framework.

### **2.2.1 Conceptualization by Eisenhardt and Martin (2000)**

The second seminal conceptualization of dynamic capabilities is the paper by Eisenhardt and Martin (2000). It differs from Teece et al.'s (1997) ideas in many respects. Teece (forthcoming: 34) even noted that the “article misinterpreted (or reframed) the dynamic capability framework”. A major difference is that not all of the resource-based view's VRIN-criteria (Barney, 1991) are shared anymore. The criteria *valuable* and *rare* still apply for dynamic capabilities. However, *inimitability* and *non-substitutability* do not apply completely. Eisenhardt and Martin (2000) argued that dynamic capabilities do not necessarily need to be entirely of an idiosyncratic nature. Common features can exist, that are referred to as *best practice* in popular parlance. In fact, they make dynamic capabilities recognizable in the first

place, which might be a requirement for claiming their existence and identifying them ex ante. This commonality of some features originates from their equifinality and leads to the possible substitutability of dynamic capabilities. Thus, according to Eisenhardt and Martin (2000) dynamic capabilities might not always have to be non-substitutable in order to create a competitive advantage. Moreover, as some standardization can be identified among competitors (Eisenhardt & Martin, 2000), they might also be partly imitable. Dynamic capabilities are only idiosyncratic in detail and Eisenhardt and Martin (2000) conceptualize best-practice adaption. However, they fail to explain the sustainability of competitive advantage in dynamic environments.

Similarly to Teece et al. (1997), dynamic capabilities are characterized as patterned behavior, based on prior knowledge in moderately dynamic environments. In highly dynamic environments however, Eisenhardt and Martin (2000) regard dynamic capabilities as ad hoc adjustment. Accordingly, stable patterns should be replaced by simple rules and relatively unstable processes to enable quick adjustments. The reduced degree of structure only assures some coherence in the firm's behavior, but is simple, experiential, iterative, and primarily a managerial concern. Referring to Kauffmann (1995), this operational and strategic structure is at the "edge of chaos" (Eisenhardt & Martin, 2000: 1113). It appears therefore to be very different from Teece et al.'s (1997) focus on structured processes.

Teece repeatedly emphasized that his thoughts on dynamic capabilities not only draw on the resource-based view, but also on the theoretical considerations of Schumpeter's (1934) entrepreneurial innovation (e.g. Augier & Teece, 2008, 2009; Katkalo et al., 2010; Pitelis & Teece, 2010; Teece, 2007, 2012, 2014). Particularly the idea of not only adapting to the environment, but shaping the environment seems to be strongly related (Teece, 2007). Although it is not explicitly mentioned, it appears that the conceptualization by Eisenhardt and Martin (2000) has an entrepreneurial influence as well. Particularly descriptions of dynamic capabilities as a primarily managerial concern accentuate this line of reasoning.

### **2.2.2 Conceptualization by Winter (2003)**

In contrast to the prior conceptualizations, Winter's (2003) definition of dynamic capabilities is not influenced by the entrepreneurship literature, but rather draws on considerations of evolutionary economics (e.g. Nelson & Winter, 1982). This theoretical perspective has become more influential for the conversation on dynamic capabilities in recent years. Although it is not as apparent as the resource-based view, evolutionary economics have become the second most influential theoretical foundation of dynamic capability research (Di Stefano, Peteraf, et al., forthcoming). Winter (2003) defined dynamic capabilities as higher-order capabilities. An organizational capability is "a high level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization's management a set of decision options for producing significant outputs of a particular type" (Winter, 2003: 983). Routines are treated here as a collective process (see also Chapter 3.2.1 Routines). Dynamic capabilities are therefore not primarily a managerial concern by nature, but rather a firm-spanning phenomenon.

Following Winter (2003), a capability cannot serve a general purpose, but only a specific purpose. As the impact of various capabilities on the organization differs, he described them as being in hierarchical order. The zero-order (also termed ordinary or operational) capabilities are the "how we earn a living now capabilities" (Winter, 2003: 992). Higher-order capabilities (first-order, second-order, etc.) govern the change of the next lower level capabilities. There is an infinitive amount of levels above the zero-level capabilities (Collis, 1994). These higher-order capabilities are referred to as dynamic capabilities (Heimeriks, Schijven, & Gates, 2012; Winter, 2003). While most research mainly focuses on first-order capabilities, Schilke (forthcoming) described major differences in the effects of second-order and first-order dynamic capabilities.

Winter (2003) explicitly states that a main thought that led to the development of his definition, was the separation of dynamic capabilities and competitive advantage to avoiding the risk of tautology. He proposes that a change of ordinary capabilities is what characterizes a dynamic capability. He also states that dynamic capabilities are just one of many strategic options to adjust to the environment. Makadok (2001) for

example proposes, based on resource-based view considerations, that ex ante resource picking routines for future exploitation are an alternative way of adapting to environmental changes. He argues that capabilities do not need to change when the organization selected the right resources and capabilities upfront, or selected extensions to existing structures. According to Winter (2003), dynamic capabilities must therefore neither lead to competitive advantage in rapidly changing environments, nor do successful firms in rapidly changing environments necessarily possess dynamic capabilities. The literature based on this definition does thus not risk tautology. Furthermore, dynamic capabilities as defined by Winter (2003) are of limited use in static environments as they bind crucial resources that might be more useful elsewhere. They are therefore related to weaker performance in static environments (Drnevich & Kriauciunas, 2011). As for the conceptualization by Eisenhardt and Martin (2000), dynamic capabilities are less about a sustained competitive advantage in dynamic environments. Winter's (2003) conceptualization is rather a technical categorization within a larger definition set of capabilities and routines.

### **2.2.3 Conceptualization by Helfat et al. (2007)**

In a further development and an attempt to converge conversations, Helfat et al. (2007: 4) defined dynamic capabilities as “the capacity of an organization to purposefully create, extend, or modify its resource base”. This definition is deployed often in more recent research, as it aims to provide a common ground. It does not suffer from the claimed tautological nature either. A weakness of this definition is that dynamic capabilities are reduced to a mechanism that purposefully adjusts capabilities. Certain characteristics, which have been part of Teece et al.'s (1997) initial definition are now excluded. The term *integration* in the initial definition posits that a meta-capability could be used not only to change the firm's competences, but for the search of newly developed strategic fields where the existing competences and capabilities from other strategic units can be deployed as a source of competitive advantage. However this cannot be concluded from Helfat et

al.'s (2007) definition. Similar to Winter (2003), dynamic capabilities are just one possible option to address change here.

## **2.3 Positioning within the fragmented field**

### **2.3.1 Sustained competitive advantage and idiosyncratic capabilities**

The initial intention of the dynamic capability perspective was not to elaborate on change mechanisms, but to explore how to gain a sustainable competitive advantage in a dynamic environment (Teece et al., 1997). As Teece (forthcoming: 4) put it recently: “The fundamental question being asked, perhaps the most fundamental question in all of business, is ‘what is the source of enterprise-generated future cash flows?’”. The historical drift based on tautology considerations has made this less clear. More recent conceptualizations, such as the ones by Eisenhardt and Martin (2000) and Winter (2003), dropped the sustainable advantage element. In a less deterministic positioning Helfat et al. (2007) reduced the impact of sustainable advantage by making it the purpose rather than the outcome. Indeed, a sustainable advantage might not solely be achieved through the possession of strong dynamic capabilities, but only in combination with a suitable strategy and sufficient additional idiosyncratic resources. However, dynamic capabilities are also the driver of strategy and resource possession (Teece, forthcoming).

The inclusion of sustainable competitive advantage might be the difference to other theoretical concepts that describe flexible firms (see Volberda, 1998 for an overview), e.g. organizational learning (Levitt & March, 1988), change management (Lewin, 1947; Weick & Quinn, 1999), ambidexterity (Gibson & Birkinshaw, 2004) and double-loop learning (Argyris & Schön, 1978). I therefore hold the view that dropping the sustainable advantage as part of the concept, might thus mean dropping the concept's initially intended contribution. On the other hand, a tautological concept is of no use either. Integrating aspects from the different conceptualizations might provide a solution here.

From the perspective of the resource-based view (Barney, 1991), as well as from a competitive positioning based perspective (Porter, 1980, 1996), and a more general

strategic perspective (Rumelt et al., 1994) the question arises how a sustainable competitive advantage can be achieved by deploying identifiable, substitutable, and partly imitable dynamic capabilities, such as described by Eisenhardt and Martin (2000). By definition, a sustainable competitive advantage might only be achieved when this is explicitly not the case (Barney, 1991) and the firm chooses to perform activities differently than rivals do (Porter, 1980, 1996). Teece (forthcoming) therefore rejected the proposed substitutability. On the other hand, in case a firm acts idiosyncratically, how can we predict that this specific action will lead to success in the future? The results of empirical investigations on other firms are not applicable and dynamic capabilities might not even be identifiable (Eisenhardt & Martin, 2000). Thus at first glance, there appears to be a trade-off between the possession of idiosyncratic dynamic capabilities that lead to a sustained competitive advantage and the ability to identify them upfront. In case dynamic capabilities can be identified, how can the organization assure that competitors do not imitate them, which would diminish the advantage?

Following Winter's (2003) definition, every capability that might serve the altering of other capabilities, is identifiable as a dynamic capability, but might also be hard to imitate. Routines underlie capabilities. They evolved over a long time-span with frequent and intense social interactions, giving every capability its unique gestalt (Jacobides, Winter, & Kassberger, 2012; Schreyögg & Kliesch-Eberl, 2007; Winter, 2003). Routines are idiosyncratic to firms and can never be fully imitated as its micro-facets remain intangible (Jacobides & Winter, 2012). To provide an example: Toyota's successful production routines have been the subject of various articles and books in the 1980s and 1990s. However, other automobile companies appeared to have difficulties to imitate this *best-practice* as they can only capture the broad idea, but not all individual actions (Gibbons & Henderson, 2012; Pil & MacDuffie, 1996). Actually, the capability possessing firms might not even be able to transfer their capabilities into different settings due to specificity and embeddedness (Madhok, 1997). The devil is in the detail, and even ubiquitous, homogeneous, equifinal, and substitutable best practices cannot fully be captured (Peteraf et al., 2013). A combination of the ability to identify dynamic capabilities upfront and the sustainability of competitive advantage may thus rely on a separation of the two on a

micro and a macro level. The microfoundations must remain intangible, whereas on the macro-level they should be identifiable (Jacobides & Winter, 2012). I regard the distinction between the macro and micro-level as the most suitable solution to the dilemma of idiosyncrasy, identifiability, and sustained competitive advantage. Similarly, Eisenhardt and Martin (2000) explicitly argue in their conceptualization, that dynamic capabilities are identifiable best practices, but idiosyncratic in their details. The underlying logic of a separated identifiable macro-level and an idiosyncratic micro-level might thus be applicable for this stream of dynamic capability research as well.

### **2.3.2 Dynamic capabilities, performance, and the object of action**

The tautology allegation led to a diverging discussion on the relationship between dynamic capabilities and performance. Somewhat obviously, conceptualizations that regard dynamic capabilities as sources of sustainable competitive advantage in dynamic environments also regard dynamic capabilities as positively related to performance (e.g. Griffith & Harvey, 2001; Lee, Lee, & Rho, 2002; Teece et al., 1997; Wang & Ahmed, 2007). Others however have claimed that the constructs become inseparable and accused the concept of being tautological (e.g. Ambrosini & Bowman, 2009; Arend & Bromiley, 2009; Williamson, 1999). As Cepeda and Vera (2007: 427) put it: “if the firm has a dynamic capability, it must perform well, and if the firm is performing well, it should have a dynamic capability”.

Following an understanding of dynamic capabilities as a process, rather than an ability, Winter (2003) claimed that dynamic capabilities and performance are not necessarily related. They bind resources and are only useful in dynamic environments. In support of Winter (2003), Drnevich and Kriauciunas (2011) found a linearly moderated relationship of dynamic capabilities and performance through environmental dynamism. I follow Winter’s (2003) argumentation that dynamic capabilities are a process to create firm-internal change or address environmental change. When firm-internal change is not necessary and environmental change is not present, the construct has no positive impact on performance.



Conceptualizations that are more recent also emphasized the importance of combining dynamic capabilities with other constructs when examining its impact on performance. Teece (forthcoming) claimed that they need to be tied to the appropriate strategy and to valuable resources in order to work effectively. Others argued that the object of change also plays a crucial role. In an empirical investigation, Protogerou, Caloghirou, and Lioukas (2012) found that dynamic capabilities only have an indirect effect on performance that is mediated by specific operational capabilities. The argumentation for an indirect effect is useful, when regarding dynamic capabilities as an adjustment instruments to make the operational level fit to (changed) environmental conditions. The object of change has arguably received less attention in the field of dynamic capabilities (see Di Stefano, Peteraf, et al., forthcoming for an overview). I hold the view that a more thorough focus on the object of change might be required when analyzing the effect of dynamic capabilities on performance.

Similarly, the object of change and its characteristics might also affect the ability to exercise dynamic capabilities on them. Some internal capabilities/resources are more difficult to adjust than others are. The time-span that these objects of change have existed within the firm is for example a decisive contingency for the success of change (Arend, 2013). Simple procedures are also easier to change than complex processes (Eisenhardt, Furr, & Bingham, 2010). Thus, dynamic capabilities might not be able to adjust all internal processes. Weick (1979, 1982) argued that even a generally flexible structure must entail some stable elements that create a sense of continuity and identity to maintain the organization and give direction to employees. This might for example be a shared purpose or vision that influences behaviors and preferences (Ghoshal & Moran, 1996). Trying to adjust this common ground risks the organization's survival by jeopardizing the shared identity of the organizational actors. Thus, even the strongest dynamic capabilities might fail here.

In summary, dynamic capabilities might positively affect performance, I regard dynamic capabilities and performance as clearly separable constructs though, particularly when considering the object of change as another influential factor.

### **2.3.3 Impact of routines and managers**

Following Jacobides and Winter's (2012) solution to the trade-off between the identification of capabilities and the sustainability of competitive advantage, complex routines might be the source of competitive advantage and non-routinized behavior might not. In line with Winter's (2003) conceptualization, routines might thus be microfoundations of dynamic capabilities.

Somewhat contrary, Eisenhardt and Martin (2000) describe dynamic capabilities as a primarily managerial concern in dynamic environments and regard simple rules and a reduced structure as the suitable option. At first glance, this appears to oppose Winter's (2003) conceptualization. However, while ad-hoc actions and simple rules are identifiable on a macro-level, they might not be imitable. Spontaneous actions are not patterned and can never be applied as a blueprint. It appears that the routine embedded literature, as well as the more entrepreneurial oriented literature on managerial impact provide valuable paths to explore the microfoundations of dynamic capabilities. Teece (forthcoming, 2012) argued that both might be needed for dynamic capabilities to function. At this stage, taking a closer look at heterogeneous actions of actors and organizational routines seems viable therefore. I would not consider one of the options as superior.

### 3 Microfoundations of dynamic capabilities

A thorough analysis of microfoundations underlying dynamic capabilities might provide insights on how organizations can achieve a sustainable, but identifiable competitive advantage. Among others, a key criticism raised in the dynamic capability literature is therefore the underdeveloped conceptual and empirical evidence of its microfoundations (Ambrosini & Bowman, 2009; Felin, Foss, Heimeriks, & Madsen, 2012). A basic idea is that we should not only postulate or point out collective macros. Instead, their origins should be explained as the results of the interaction of individuals (Barney & Felin, 2013; Coleman, 1990).

Teece (2007) attempted to explore microfoundations of dynamic capabilities. He defined three clusters of processes, namely sensing, seizing, and transforming (also termed reconfiguration for maintaining competitiveness). Sensing involves the identification and assessment of opportunities for the organization. Seizing is concerned with the mobilization of resources, e.g. investment decisions, to address an opportunity. Transformation is the maintenance of competitiveness through permanent renewal. Teece (2007) did not focus on the individual actors and their coordinated relationships in his microfoundation conceptualization, but was rather focused on processes. The microfoundations therefore appear as homogenous throughout the organization. However, organizations consist of sub-cultures and sub-units, with pluralistic interests (Pfeffer & Salancik, 1978). How divergent individual interests, beliefs, learning processes, performances and rationalities might aggregate to group level outcomes needs to be revealed (Felin & Foss, 2009).

The monolithic description of processes might be based on Teece's postulation that dynamic capabilities are primarily a top-management task, with limited involvement of subordinates (Augier & Teece, 2009; Teece, forthcoming, 2012). While I do not completely agree, managers might still be an appropriate first starting point for exploring individuals as microfoundation of dynamic capabilities. To explore the role of managers within the dynamic capability framework, a specific research stream concerned with *dynamic managerial capabilities* (e.g. Adner & Helfat, 2003; Helfat & Peteraf, forthcoming; Martin, 2011) has emerged. Human capital might contribute to competitive advantage based on inimitability. However, simply aggregating

valuable individuals misses out on the contributions of firm-specific, intangible, and complex social interactions (Hatch & Dyer, 2004). The regulation of social interactions through managers is thus a possible microfoundation within the managerial impact stream of the dynamic capability literature. Other instruments that organize the social interaction of individuals are organizational-level routines. Similar to managers, complex routines can coordinate the actions and interactions of individuals within firms. They can also align pursued goals and interest (Felin & Foss, 2009). Routines might therefore be a further relational microfoundation of dynamic capabilities.

### **3.1 Management-based microfoundations of dynamic capabilities**

#### **3.1.1 Dynamic managerial capabilities**

Dynamic managerial capabilities are defined as “the capabilities with which managers build, integrate, and reconfigure organizational resources and competences” (Adner & Helfat, 2003: 1012). The literature attributes a strong influence on firm performance and dynamic capabilities to top-managers (see Helfat & Peteraf, forthcoming for an overview). Making, but also breaking commitments by leaders can be an enabler for dynamic capabilities (Rosenbloom, 2000). This includes goal setting, planning, strategic decision making, allocation and orchestration of resources, as well as control (Martin, 2011; Sirmon & Hitt, 2009).

Dynamic managerial capabilities rely mainly on three underlying pillars. These are managerial human capital, managerial social capital, and managerial cognition (Adner & Helfat, 2003). Managerial human capital refers to the acquired skills of the managers on all levels in the organization. These include firm specific as well as industry specific skills. Managerial social capital results from the social relationships of the managers. These can be internal or external to the firm. External ties are a well-researched area, whereas internal social capital has received less attention (Adner & Helfat, 2003). Managerial cognition involves the managerial beliefs and mental models that underlie the decision making process. The values and beliefs of the managers will affect the preferential ordering of decision alternatives due to

bounded rationality (Cyert & March, 1963; March & Simon, 1958). Helfat and Peteraf (forthcoming) further developed this pillar to the distinctive concept managerial cognitive capabilities.

It might have been the intertwined nature of dynamic managerial capabilities and entrepreneurial capabilities (e.g. Arthurs & Busenitz, 2006; Augier & Teece, 2008; Newey & Zahra, 2009; Pitelis & Teece, 2010; Woldesenbet, Ram, & Jones, 2012), that has given the literature a certain emphasis on managerial human capital, thus the individual skills of the manager. However, as conceptualized by Adner and Helfat (2003) there are more components of dynamic managerial capabilities that have not yet been captured in depth. The focus on skills of the manager has led to an under-emphasis of the relationship between management and subordinates as a core function of management, captured by the internal social capital pillar of Adner and Helfat's (2003) conceptualization. This is surprising, as the debate about the source of initiatives inside the hierarchy to adjust the strategy is quite old. Some researchers argue for the impact of top-management (e.g. Ansoff, 1991), whereas others argue that lower-level employees can be the origin of innovation (e.g. Bower, 1970; Burgelman, 2002a; Mezias & Starbuck, 2003; Mintzberg, 1990).

Popular management textbooks sometimes define management as *the art of getting things done through people*. Whilst this statement, attributed to Mary Parker Follett, might be too reductive for an academic discussion, it still covers an important aspect of management, namely enabling subordinates to perform. It appears, nonetheless, that the recent literature on dynamic managerial capabilities is still guided by the Taylorian (1911) principle of separating mental work from manual work, whereby the lower ranked employee is only executing what is suggested by the supervisor.

An unnecessarily strong emphasize on non-leadership related skills of managers might thus misguide practitioners. Sprafke et al. (2012) therefore proposed that in search of microfoundations, the concept of *dynamic managerial capabilities* should be extended to *individual dynamic capabilities* to include actions that provide impetus for change by staff without managerial responsibilities. Indeed, the posited relevant skills that are not directly related to managerial functions or leadership might also be attributable to employees without managerial responsibilities. To

provide an example, Bhattacharya and Gibson (2005) found that the flexibility of the employees' skills and the flexibility of the employees' behavior are microfoundations of dynamic capabilities. These characteristics can be attributed to managers and subordinates. However, Bhattacharya and Gibson (2005) also emphasized that they need to be combined with the superior's ability to deploy the various attributes of the subordinates according to environmental conditions. This ability is clearly leadership related and cannot be attributed to subordinates.

Microfoundation research on dynamic capabilities that is specifically concerned with managers should therefore focus on how managers enable subordinates and interact with them. This might also be one reason why some managers seem to be more creative than others. Managers engaging in high-involvement relationships with their subordinates exercise control over more rewarding opportunities, they are aware earlier than their peers, and they exercise more influence over the substance of their work (Burt, 1992; Volberda, 1998).

In contrast to other conceptualizations (e.g. Helfat & Peteraf, 2009; Teece, 2007), Burgelman (2002b) argues that the heterogeneity of actors leads to a simultaneous rather than a gradual process of innovation. Thus, while the manager is still in a sensing stage, the subordinate might already have found a solution. The supervisor must of course be open to sense and absorb the subordinate's ideas. Burgelman (1983) defines the function of the manager here as a retroactive legitimizer. Burt (1992) refers to that information system as *tertius' monitoring*, whereby the manager as the *laughing third party* receives information without monitoring itself, but obtaining a competitive advantage from *selling* the valuable input. Thus, enabling employees links back to the perceived individual managerial skills.

### **3.1.2 Employee involvement through managers and dynamic capabilities**

It is hard to imagine that a single manager or a management team is able to sense, seize and transform more effectively than all the other human resources that are available to the firm (Grant, 1996; Leonard-Barton, 1992). Hallin et al. (2009) for example found support that front-line employees are able to sense the firm's

medium-term performance as accurately as managers. Moreover, the employees have been able to explain the errors in the financial forecast of their managers ex ante based on their sensing ability. A manager should therefore rely on subordinates as valuable sources of information input (Teece, 2012), which is considered as most effective in promoting and developing strategic actions by some researchers (e.g. Bower & Gilbert, 2005; Bower, 1970; Burgelman, 1983, 2002b; Mintzberg, 1990; Quinn, 1985; Volberda, 1998). It also prevents managerial misperceptions of the organization and its environment (see Mezias & Starbuck, 2003 for an overview). Managers should therefore not do everything on their own, but enable subordinates to act on their behalf.

Going one step further, it was claimed that all actors must be involved in implementing reflected change (Burt, 1992; Schreyögg & Kliesch-Eberl, 2007; Schreyögg & Steinmann, 1987). It cannot be predicted where signals for change can be recognized first within the organization. Due to rigidities and inertia, management might not be in a position to recognize everything. Furthermore the complexity of a dynamic environment might overstress the resilience of managers (Burt, 1992; Schreyögg & Steinmann, 1987; Spreitzer & Mishra, 1999).

Purposeful leadership and the interaction with employees does however not only support what Teece (2007) refers to as sensing, but also the seizing and transformation process. It is likely that some of the affected actors implement manoeuvres to conserve the status quo due to dullness and path-dependence (Sydow, Schreyögg, & Koch, 2009). They might also reduce signals that may provoke change-decisions (Schreyögg & Kliesch-Eberl, 2007). Motivating employees for the renewal process is therefore a necessity.

Motivation by self-initiative is stronger than motivation through extrinsic incentives (Herzberg, 1968). The subordinates' efforts increase with their active involvement as the belief that the individual can make a difference leads to intrinsic motivation (Gibbons & Henderson, 2012). To provide an example, Hodson et al. (2013) found, that employee empowerment leads to proactive actions and higher task proficiency, whereas directive leadership cannot enhance proactive actions. Having a say in the introduction of new work processes also creates the motivation to do what is required

to make them work (Spreitzer & Mishra, 1999). Motivation through involvement can therefore overcome defensive forces, such as emotional resistance, political pressures, and cultural bias (Lewin, 1947; Salvato, 2009).

Moreover, employee involvement has a positive cognitive effect (Spreitzer & Mishra, 1999). A delegation of tasks towards employees provides slack to increase a manager's mindfulness, by simultaneously supporting increased strategic awareness in lower-level employees' daily activities (Levinthal & Rerup, 2006; Salvato & Rerup, 2011; Weick & Sutcliffe, 2006). Managers often fail to implement changes, because of missing relational capital (Gibbons & Henderson, 2012). Quicker sensing through employee input and increased motivation of employees at the implementation stage might generally accelerate and support the change-processes.

*Hypothesis 1: Employee Involvement in strategic renewal is positively related to dynamic capabilities.*

### **3.1.3 Trust and control as microfoundations of dynamic capabilities**

#### ***3.1.3.1 Trust and control as managerial coordination-mechanisms in dynamic environments***

A challenge in dynamic environments is the design of coordination-mechanisms that lead and guide employees and their involvement in strategic decisions. Most coordination-mechanisms require stability or even aim to preserve stability. Bureaucratic structures are a prime example here (Volberda, 1998). Failures in the design of organizational coordination structures, lead to weaknesses in reporting, inflexible authority structures, a failure to adapt to the environment, and limited leverage of a firm's operational capabilities (Greenwood & Miller, 2010). Volberda (1998) even claims that dynamic capabilities have to assert themselves against the opposing force of organizational structure. He regards structural or technical coordination mechanisms as ordinary capabilities that need adaption, but are not supportive in an adaption process. From a managerial standpoint, more flexible concepts of coordination, leadership, and human resource management are therefore needed in dynamic environments as opposed to static environments (Vogel & Güttel,



2013). A raised criticism is hence that the governance of the adaption-processes has not been addressed thoroughly thus far (Williamson, 1999) and the organizational aspect in dynamic capability research has been over-simplified (Arend & Bromiley, 2009).

An active management of more abstract coordination and communication mechanisms may provide a solution to the organizational challenges of dynamic capabilities. Dynamic environments can be characterized as highly complex for the actors involved as they are uncertain and unpredictable (Duncan, 1972). Luhmann (1979) described complexity has one of the main challenges in social interaction and proposed that power and trust might be appropriate means to reduce it. Power and trust can also remain stable and be independent from changes in rigid formal mechanisms (Luhmann, 1979). Similarly, Adler (2001), Parsons (1977), and Habermas (1984) regard power and trust as appropriate forms of social interaction in this setting.

Power is a multi-faceted construct and only some forms of power can be supported or controlled by actions of actors inside the firm (Dahl, 1957; French & Raven, 1959; Salancik & Pfeffer, 1974). Dependency on resources as a form of power for example is hardly avoidable (Pfeffer & Salancik, 1978). I hold the view that management research should primarily focus on implementable, suppressible, or supportable phenomena. They might provide more leverage for practical implications than phenomena that are out of reach for involved actors and can only be managed to a limited extent. Although, I consider alternative forms of power as equally relevant and influential, I therefore focus on managerial control of subordinates as one form of power within the interaction process of managers and subordinates. Managerial control can be implemented, suppressed, and supported by managers. Thus, it is a function of managerial intent and less influenced by environmental circumstances that are out of reach for the involved actors.

As I already pointed out in Chapter 2.3.1 (Sustained competitive advantage and idiosyncratic capabilities), dynamic capabilities and its microfoundations need to be idiosyncratic to provide a sustainable competitive advantage for organizations. While competitors might imitate a formal structure, this might not be the case for more

abstract concepts. Trust and control are embedded in the relationships of people (Bachmann, 2001) and cannot be transferred completely as their micro-facets remain intangible. They might be identifiable *ex ante* on a macro-level, though. The mechanisms that support achieving a relationship of mutual trust or control might be implementable in various organizations, however trust or control-relationships cannot simply be *build-up*. A firm can only create supporting conditions, due to different individual characteristics (Mayer, Davis, & Schoorman, 1995), propensities to trust (Kramer, 2001), environmental constraints (Koller, 1988), and an irrational *leap of faith* (Möllering, 2001).

Here, the focus is on the organization's internal effects of trust and control by the manager on the subordinates. A broad literature base analyses the effects of institutions outside of an organization that might be a reason for trusting or controlling others (e.g. Barney & Hansen, 1994; Huff & Kelley, 2003; Nooteboom, 2007; Zucker, 1986). However, those institutions can be of use for all organizations in that country/industry and might not improve the situation of one specific organization, hence provide a competitive advantage. I therefore do not include these forms of trust and control in this study.

Furthermore, the focus is on trust in employees by their managers and the control of employees by their managers. The chosen direction appears to be of value for several reasons. Somewhat obviously, control of the manager by the subordinate is less common in real-life organizations, whereas control of subordinates is common. Trust of the managers in subordinates is relevant here, because this paper aims to analyze what type of leadership behavior supports dynamic capabilities. The opposite direction, although highly relevant, is considered an outcome rather than an antecedent of coordinating behavior (Searle et al., 2011).

Besides trust and control, there are certain alternative forms to govern social relationships. One that is mentioned particularly often is price mechanisms (e.g. Adler, 2001; Bradach & Eccles, 1989). However, they are attributed to markets rather than organizations (Williamson, 1975). Other alternatives can be reputation, bargaining power, and contracts (Alvarez, Barney, & Bosse, 2003). However, they

appear to interact, to be based on, or to be reflected in either trust or control. Applying them simultaneously is thus likely to lead to similar effects.

### ***3.1.3.2 Trust***

Several alternative conceptualizations of trust exist (e.g. Barney & Hansen, 1994; Kramer & Tyler, 1996; Möllering, Bachmann, & Lee, 2004). In fact, the embeddedness of trust in multiple existing theories of organizational research and the fragmentation of the literature has created a substantial diversity on its definition and its operationalization (Fulmer & Gelfand, 2012; McEvily & Tortoriello, 2011). Here, trust is defined as “a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviors of another” (Rousseau, Sitkin, Burt, & Camerer, 1998: 395). This definition involves two key notions that can also be found in various alternative definitions: firstly, the conscious acceptance of vulnerability (e.g. Bachmann, 2001; Currall & Inkpen, 2002; Fulmer & Gelfand, 2012; Malhotra & Lumineau, 2011; Mayer et al., 1995; Möllering et al., 2004; Sitkin & Pablo, 1992) and secondly, the positive expectations of another’s behavior (e.g. Colquitt, Lepine, Zapata, & Wild, 2011; Koller, 1997; McAllister, 1995; Ring & Van De Ven, 1992). The willingness to accept vulnerability should however not be understood as a desire to be hurt. It is connected to the highly optimistic expectation that vulnerability might not be problematic as no harm will be done (Möllering, 2006). Positive expectations and acceptance of vulnerability are thus interlinked.

Actions of the trustee can create more harm to the trustor than the benefits gained without the opportunity to deploy any sanctions (Currall & Inkpen, 2002; Luhmann, 1988; Sitkin & Pablo, 1992). Therefore, trust is not randomly distributed, but a matter of environmental risk and complexity (Koller, 1988; Luhmann, 1979), institutions that might influence the trustee (Barney & Hansen, 1994; Zaheer & Venkatraman, 1995; Zucker, 1986), experience (Colquitt et al., 2011; Gulati, 1995), general propensity of paranoia (Kramer, 2001), and the trustworthiness of the trustee (Mayer et al., 1995).

However, in case trust would only be based on rational reasons as mentioned above, one would not refer to the term trust, but to *assurance* (Gibbons & Henderson, 2012) or *justice* (Colquitt & Rodell, 2011) as this would violate or at least reduce the assumption of expected vulnerability. Möllering (2001, 2006) argues, based on Georg Simmel's considerations that rational reasons need to be combined with a *leap of faith* to speak of trust. Rational reasons can only be indicators, but do not create certainty.

Trust can therefore solely be based on emotions (Dunn & Schweitzer, 2005; Eberl, 2004), but rational reasons must be accomplished by positive affection towards the trustee (Lewis & Weigert, 1985; Möllering, 2006). To avoid confusion, affection towards the trustee is different to the signaling of affection by the trustee, e.g. as covered in the affection-based trust dimension (McAllister, 1995) or the benevolence and the integrity dimension of trustworthiness (Mayer et al., 1995). This distinction is crucial, as reasoning based on signaling is also a rational choice.

As trust is difficult to build, it might be a key source of competitive advantage (Gibbons & Henderson, 2012). Barney and Hansen (1994) analyzed situations in which trust can lead to competitive advantage. They classified trust into the categories weak trust, semi-strong trust and strong trust. A situation of weak trust is a discrete market transaction without preliminary interaction in the sense of Macneil (1978) and Williamson (1975). There is not much trust between partners, but there is also less need for it as the situation does not allow for much opportunism. Such a form of trust can therefore only lead to competitive advantage in case the competitors have unnecessarily extensive and expensive governance mechanisms in place.

Semi-strong trust is created by governance mechanisms. This form of trust is not trust in the partner, but trust in the governance mechanisms. The concept is also referred to as calculative trust by Barney and Hansen (1994) themselves, deterrence-based trust (Rousseau et al., 1998), or institution-based trust (Zaheer & Venkatraman, 1995; Zucker, 1986). As the object of trust is not directly an individual, some even categorize semi-strong trust as a form of assurance, rather than trust (Gibbons & Henderson, 2012). Partners are expected to behave virtuously as institutions, for instance governance mechanism (Barney & Hansen, 1994) or *the*

*shadow of the future* (Gibbons & Henderson, 2012), will push them to do so. Semi-strong trust can lead to competitive advantage, when the governance mechanisms are difficult to imitate (Barney & Hansen, 1994). Managerial control, for example, can be such a governance mechanism (see Chapter 3.1.3.6 Complementary nature of trust and control). Similar to Barney and Hansen's (1994) conceptualization of semi-strong trust is the concept of systems trust. Here trust is not directed towards specific individuals, but abstract systems that might open up the opportunity to interact with individuals guided by, or belonging to that particular system. Examples can be institutions, technologies, or specific professions (Luhmann, 1979).

Strong trust is independent of vulnerabilities and governance modes. It is the very strong reliance on positive expectations without any government mechanisms. Strong trust can lead to competitive advantage. The operationalizations, effects, and argumentations for semi-strong trust and strong trust differ (Fulmer & Gelfand, 2012). In this research, I only focus on strong interpersonal trust and do not consider semi-strong or institutional trust.

### ***3.1.3.3 Trust, dynamic capabilities, and employee involvement in strategic renewal***

Employee involvement in strategic renewal requires a certain degree of trust. Involving employees in strategic activities necessarily means making the manager vulnerable to their actions. Thus, a willingness to accept vulnerability is required. Moreover, the involvement is also based on positive expectations. Negative expectations would mean that the manager would not involve employees. The underlying pillars of the deployed trust definition, namely acceptance of vulnerability and positive expectations, seem thus to support employee involvement (Spreitzer & Mishra, 1999). This positive effect of trust in the supervisor-subordinate relationship has also been argued by Mayer et al. (1995).

Furthermore, Gómez and Rosen (2001) argued that trust by managers results in a more extensive exchange between employees and supervisors and a higher quality of the relationship. This high-quality relationship leads to greater employee

responsibility and autonomy, thus a higher involvement in strategic decisions. Information sharing is only likely to occur when there is trust between actors (Swift & Hwang, 2013). Luhmann (1979) argues that trust can become a self-fulfilling prophecy of positive participation. Being trusted creates advantages. In this case, these are greater responsibility and autonomy. Accordingly, trustees try not to betray the trustor, as they do not want to risk a loss of advantages. Thus, the trust in positive participation becomes self-fulfilled. Moreover, trust also creates an openness to sense and absorb ideas of employees and legitimize their activities in retrospect (Burgelman, 1983; Burt, 1992).

*Hypothesis 2: Managerial trust in employees is positively related to employee involvement in strategic renewal.*

As I already proposed a positive relationship of employee involvement in strategic renewal and dynamic capabilities, I hypothesize moreover that employee involvement is a mediator in the relation of managerial trust in employees and dynamic capabilities

*Hypothesis 3: The positive indirect relationship of managerial trust in employees and dynamic capabilities is mediated by employee involvement in strategic renewal.*

#### **3.1.3.4 Control**

Control has been regarded as a key aspect of management at least since Taylor (1911). It is an effective instrument in regulating the behavior of organizational members in order to achieve organizational goals (Bradach & Eccles, 1989; Costa & Bijlsma-Frankema, 2007; Das & Teng, 2001). Formal control mechanisms are defined as regulations that involve the setting and supervision of standards; incentives and punishment based on the achievement of standards; and the formal tightness of standards, monitoring, and feedback (Shields, Deng, & Kato, 2000; Weibel, 2007). Standards do not only involve set goals, norms, or behavior; but a comparison between employees (Eberl, 2012). Furthermore, control might not only be a formalized, but also a social phenomenon that can be exerted by supervisors and

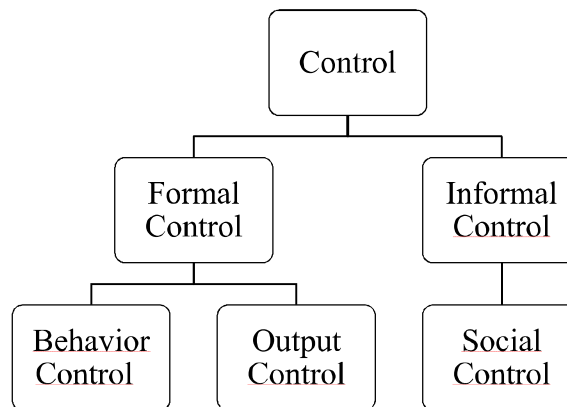
peers (Ouchi, 1980). At the operational level, control is commonly seen as the provision of feedback, exercised at the very completion of a task or process. It involves comparing planned and actual data to give feedback for further planning, organization, and the implementation of instruments that allow for it. At the strategic level, control can alternatively also be regarded as a permanent secondary function at all stages of the management process. Thus, it might not only be a feedback instrument, but may also serve as a *feed forward* by controlling the premises, implementation, and general strategy surveillance at all times (Schreyögg & Steinmann, 1987). The setting of milestones is an operational instrument to achieve a more frequent picture of the firm's situation. Control can thus be considered as an effect, but also as a function of giving direction to subordinates and coordinating their behavior (Eberl, 2002). Control therefore not only has an information function, but also a coordinating function. Broader definitions of control, that also include governance structures such as hierarchies and formalization (Eberl, 2002) are not considered here.

An initial conceptualization separated control into the two distinctive forms *behavior control* and *output control* (Ouchi & Maguire, 1975). Behavior control is the surveillance of the process that is considered *best practice* in achieving a desired outcome. It is most successfully exerted when means-ends relations are known and appropriate instruction is possible. Output control is the assessment of the achieved results. It occurs in response to a manager's need to provide legitimate evidence of performance (Das & Teng, 2001; Ouchi & Maguire, 1975). Both forms are independent of each other and should generally not be regarded as two ends of a continuum. Thus, more behavior control does not necessarily mean less outcome control. While output control can be transferred across multiple hierarchical levels, behavior control is highly influenced by local circumstances and might therefore not be implemented by top-management throughout all hierarchical levels (Eisenhardt, 1985; Ouchi, 1978).

The third type *social control* (also termed clan control) was later introduced by Ouchi (1979). It is the supervision of norms and values by peers and managers and is considered an informal form of control. The compliance with norms legitimates the

employee inside the firm. The concept of social control is closely linked to organizational culture. Firms with a strong culture tend to have strong social control (Ouchi, 1980). It should be noted that a culture can be strong and heterogeneous at once, whereby strong subcultures exist that may share some integrating elements. This combination is particularly strong in highly diversified companies (Burgelman, 1983; Volberda, 1998). Social control appears as an alternative, particularly when ambiguity of the task is high and the possibility to measure an output is low. However, this form of control is again independent and can coexist with the other forms (Eisenhardt, 1985; Ouchi, 1979). The following Figure 2 provides an overview of control classifications.

Figure 2. Classification of control-types following Ouchi (1979)



#### ***3.1.3.5 Control and dynamic capabilities***

The question arises, whether it is possible to control for dynamic adjustments of employees. Control always requires a reference point that the behavior, outcome, or social norm can be matched against. This is difficult in highly dynamic environments. Previously defined reference points can be irrelevant when applied in changed environments or to upcoming opportunities (Davis, Eisenhardt, & Bingham, 2009). Controlling adjustments might even be more complicated. A quantity of changes might be measurable and specified in advance. Nevertheless, simply



controlling the quantity of changes might not be useful, as the quality of the adjustments matter. As the type of change is unforeseeable, the quality of an adjustment can hardly be defined *ex ante*, though. In his conceptualization of contractual relationships Macneil (1978) referred to this as the *presentation* problem. A contract treats future events, as if they would happen in the present. However, future events are not foreseeable, thus a contract will always involve gaps one cannot refer to. Dynamic capabilities are supposed to fill those gaps once events become certain, however a specification *ex ante* is unlikely. At first glance, controlling for adjustment at the strategic level appears to be complicated or even impossible. However, at the strategic level control might be feasible for the processes that underlie a standardized adjustment process. In case certain routines exist that guide the adjustment process, control might be exercised on them, and this makes adjustment procedures controllable (discussed in more depth in Chapter 3.3.2 Control and routinization). This investigation focuses therefore on the effects of control at the operational level on dynamic capabilities and on routinized processes that underlie strategic adjustments. Strategic control (Schreyögg & Steinmann, 1987) for successful adjustment is not investigated here.

#### 3.1.3.5.1 Behavior control and dynamic capabilities

The absence of behavioral control by the supervisor creates a certain amount of slack. This applies to managers and employees. Managers that do not need to spend their time and resources on directly supervising the processes of employees can devote additional time to innovative actions and endeavors (Molina-Morales & Martínez-Fernández, 2009). The subordinates are able to work beyond the formal rules of their operational tasks. The lower the rewards and sanctions, the higher is the perceived autonomy (Weibel, 2007). The absence of behavioral control creates diversity in the behavior and outcomes of individuals inside a firm, as no standardized procedures are enforced. Bower (1970) and Burgelman (2002a, 2002b) argued that the multitude of small diverse decisions of numerous people at all organizational levels, independent of the indoctrinated standard procedures of the firm, allows for a quick strategic adjustment. They argue that individuals in the firm

sense, seize, and transform their actions at different points in time as they might catch signals of the environment earlier than others, provided the condition that this is not suppressed, e.g. by behavior control. The diverse actions can provide a set of decision options that management can later choose from as a blueprint for a firm wide adaptation and then be the *laughing third party* by implementing this valuable input (Burt, 1992). However, the rollout should be limited and not enforced too strongly by control mechanisms, as this would limit the possibilities for future adaptations. While behavior control might increase short-term performance by enforcing certain procedures, it limits the ability to adapt. The firm must thus avoid the *lock-in* (Sydow et al., 2009) into one common practice that is considered most efficient at a given point in time. As Schumpeter (1942) mentioned, a full utilization of possibilities to the best advantage at one given point in time might in the long run be inferior to not doing so. Instead, not utilizing all resources for one purpose might be a condition for long term performance. Nevertheless, the reduction of behavior control devices might provide some financial slack that can offset some of the reduced efficiency (Arthur, 1994; Becker & Gerhart, 1996). Reliance on behavior control might also make less sense in adaptive organizations. Permanent adaptations lead to task ambiguity on the operational level, as they involve adapted processes. The manager might thus not even be able to control processes, as they might be in a state of constant change. Therefore, behavior control is not recommended in situations of task ambiguity (Eisenhardt, 1985; Ouchi, 1979)

*Hypothesis 4: Behavior control is negatively related to dynamic capabilities.*

#### 3.1.3.5.2 Outcome control and dynamic capabilities

While I argued against behavior control, I do not intend to signal that there should be no control in place at all. Little control also leads to a decreased stability of the firm. Some stability is however desirable to give the firm a certain direction and a common purpose. This also applies to organizations in dynamic environments (Weick, 1979, 1982). Thus, a certain degree of control might still be required and too much slack is not desirable (Nohria & Gulati, 1996). However, the appropriate form

of control needs to be selected and control should still be simpler than in stable environments (Davis et al., 2009). Outcome control is less invasive than behavior control in this regard (Eisenhardt, 1985), but might provide the required level of stability. Firstly, outcome control assures the necessary information flow. Managers that avoid control of employees might receive fewer signals about necessary adaptations, as they become detached from everyday operations. Information must however flow from employees to managers to allow for meaningful adaptation processes. Regular attention and a discussion of performances face-to-face as a result of outcome control appear to be helpful (Simons, 1991, 1994).

Secondly, outcome control coordinates behavior in broad directions, without being deterministic. Goal-setting procedures that are part of outcome control can direct employees in a flexibility that accounts for dynamic changes (Simons, 1991, 1994). Moreover, goal-setting and the control of the outcomes are known to enable quicker decision making, that is related to better market responsiveness in turbulent environments (Kownatzki, Walter, Floyd, & Lechner, 2013). In situations of ambiguity, e.g. in dynamic environments, output control generally appears to be dominant as more specific instructions can only be provided to a limited degree (Eisenhardt, 1985).

*Hypothesis 5: Outcome control is positively related to dynamic capabilities.*

#### 3.1.3.5.3 Social control and dynamic capabilities

Social control involves the matching of an actor's behavior to developed norms within the organization. Hence, strong social control means strongly shared norms among members of the organization (Ouchi, 1979). Shared goals and a common understanding of the direction the organization wants to pursue reflect a similar mindset. Thus, there appears to be a stronger clarity about directions and paths to take in turbulent environments. Decision-making might hence be quicker and may not be accompanied by strong resistance. The same applies for a later implementation stage (Thomas, Sargent, & Hardy, 2011). Increased socialization among organizational members might also enhance the coordination of the adaptation

processes. It allows for more liaison devices that facilitate decision making on the spot rather than within hierarchies (Volberda, 1998). Commonly agreed adaptations necessarily face less resistance. It was argued that a simplification of coordination processes and a reduction of formal structures support a firm's ability to balance efficiency and flexibility (Davis et al., 2009). Social control therefore appears to be a superior mechanism to guide employees through the adaptive processes. Ouchi (1979) already pointed out that social control is particularly useful when task programmability is low and the measurability of an outcome is low, as is the case during permanent adaptation stages.

*Hypothesis 6: Social control is positively related to dynamic capabilities.*

### **3.1.3.6 Complementary nature of trust and control**

The academic conversation on trust and control is concerned with the suitability of both in specific contexts, their positive and negative effects, as well as their interaction effects. Scholars have already applied various theories to explain this relationship. Examples are transaction cost economics (e.g. Adler, 2001; Williamson, 1993), game theory (e.g. Eberl, 2004), systems theory (e.g. Bachmann, 2001; Luhmann, 1979), social network theory (e.g. Rowley, Behrens, & Krackhardt, 2000), self-determination theory (Weibel, 2007) and institutional theory (e.g. Sitkin & George, 2005).

Trust and control can be complementary, as well as opposing components of social interaction. Deploying both wisely can hence, be crucial in achieving desired outcomes. From a substitution perspective, trust can replace control and control can replace trust in a zero-sum game (Argyris, 1964; McGregor, 1960). They are considered to be alternative routes to orient an individual's behavior and create predictability. However, deploying one or the other involves trade-offs (Gulati, 1995; Woolthuis, Hillebrand, & Nooteboom, 2005). To provide examples, trust is a fragile construct. It can break down easily and is difficult to restore (Poppo & Zenger, 2002). In many situations it is also costly or even impossible to establish (Bachmann, 2006). Relying on control might be helpful in such cases. While it is considered to be

more robust than trust, control is not something that is invincible and it might break down if seriously challenged (Bachmann, 2001). The legitimacy of controllers might be questioned and they have to justify their superiority through sources of domination (Clegg, Courpasson, & Phillips, 2006; Weber, 1978). In cases of restrained domination, trust would be the superior choice to direct employees.

Due to differences in types and definitions, trust and control are also approachable as co-existing complements. Weibel (2007) argues that formal control can increase the internalization of firm values into individuals. The more aligned the values of the individuals in a firm, the more likely is the intention to produce. According to Deutsch's (1960) trustworthiness dimensions, this would further increase trust. To provide other examples, systems trust (Giddens, 1990; Luhmann, 1979), institutional trust (Zaheer & Venkatraman, 1995), or semi-strong trust (Barney & Hansen, 1994) can actually be based on control mechanisms. In these types of trust, the trustee is not directly trusted as such. Instead, a trustworthy institution/system, such as a control mechanism, is in place that pushes the trustee to act in a predictable manner. Thus, only the control mechanism creates trust here. While these forms of trust are not the object of this investigation, they can still provide a starting point for the development of interpersonal trust between manager and employees. The control mechanism would provide a reason for disclosure. The more someone discloses the more reasons exist to trust, as more information and experience are present. This can set off a reinforcing spiral of strong trust, that would however gradually minimize the application of control (Inkpen & Currall, 2004; Lane & Bachmann, 1996; Luhmann, 1979; Möllering, 2006; Zand, 1972).

Nevertheless, the spiral could also be set off in the opposite direction, whereby initial control creates a culture of suspiciousness (Kramer, 2001; Kruglanski, 1970). This leads to an urge to control the control-mechanisms, hence an infinite regress of control and distrust (Shapiro, 1987). In a critique of the transaction cost theory, it was argued that the assumed opportunistic behavior, thus recommended distrust, might become a self-fulfilling prophecy as it sets off this exact spiral (Ghoshal & Moran, 1996).

To differentiate between complementing and opposing effects of trust and control, it is crucial whether the information or reinforcement aspect of control is emphasized. Information aspects of control might enforce perceived interest and fairness, thus trust. Reinforcement aspects of control signal distrust (Eberl, 2012; Zand, 1972). To provide examples, Das and Teng (1998) found in their analysis of equity and non-equity alliances, that trust and control can be complementary. They defined control as regular meetings or written reports. Thus, they emphasized the information aspect of control (Eberl, 2002). This makes sense for alliances with an equal amount of shares distributed among partners, as it might be complicated to implement reinforcement without superiority. Similarly, Poppo and Zenger (2002) also found a complimentary relationship of relational governance based on trust and contractual governance based on control due to information aspects.

Das and Teng (2001) also argued based on reinforcement considerations, that some types of control might have a negative effect on trust in an alliance context. This was empirically supported by Inkpen and Currall (2004). Moreover, the negative effect on goodwill-based trust appears to be particularly strong (Ghoshal & Moran, 1996; Osterloh & Frey, 2000).

A key challenge is that trust and control are in all cases defined differently and operationalized in a different manner. Depending on which form of control is deployed, the argumentation should be very different and no general statement about the substitutive or complementary nature should be made as the when, why and how of control mechanisms makes the difference (Eberl, 2002; Möllering, 2006; Woolthuis et al., 2005). Nevertheless, their different effects might make it attractive to somehow integrate both and make them coexist (Vlaar, Van den Bosch, & Volberda, 2007)

In the investigation of formal employee control by the supervisor, a distinction between the information aspect and the reinforcement aspect cannot be made. Unlike alliances, underlying control and power structures in an reinforcement form as well as an information form are always present in relationships of hierarchical superiority and cannot be separated (Clegg et al., 2006). The line of reasoning that has been used for alliances among equals (Das & Teng, 1998, 2001) is therefore not applicable for

a supervisor-subordinate relationship. Social control as an informal form might be an exception here, as it represents not only the control by supervisors, but also the control by peers. Thus, it is also control among equals.

Trust by the supervisor might also mean less resistance by the supervisor when employees develop norms among each other. Employees are relatively free to develop processes and targets they regard as appropriate. The superior power of the manager is therefore not used to enforce the personal mindset when trust is present, but allows for a general common ground of all organizational members. The avoidance of disruptions by a superior actor might also harmonize the relationships. The developed norms are the result of a common agreement and not an indoctrinated *must do*. A common agreement necessarily faces less resistance by the actors and is more strongly shared (Thomas et al., 2011). A lack of managerial trust on the other hand would mean that the competences, motives, norms, or simply the interactions of employees would be questionable or at least not aligned with the organizational goals (Das & Teng, 2001; Deutsch, 1960). Frequent interactions based on trust provided however, lead to cultural blending and socialization (Luhmann, 1979). Ouchi (1979) therefore argued in a comparison of his control modes, that social control is most appropriate when high trust is present.

*Hypothesis 7: Managerial trust in employees is positively related to social control.*

As I already proposed a positive relationship of social control and dynamic capabilities, I hypothesize furthermore that social control is a mediator in the relation of managerial trust in employees and dynamic capabilities. Although social control is primarily a control by peers, managers can influence it through trust.

*Hypothesis 8: The positive indirect relationship of managerial trust in employees and dynamic capabilities is mediated by social control.*

## 3.2 Routinization as a microfoundation of dynamic capabilities

### 3.2.1 Routines

To explain dynamic capabilities it is moreover necessary to shed light on additional microfoundations, namely routines. Similar to dynamic capabilities, routines have been discussed and defined controversially among researchers (see Cohen et al., 1996 for an overview). Here, routines are defined as “repetitive, recognizable patterns of interdependent actions, carried out by multiple actors” (Feldman & Pentland, 2003: 95). The notion of *multiple actors* is important, although the term *routine* is sometimes also deployed at the individual level. The concept of routines in management research originates from behavioral theory (e.g. Cyert & March, 1963; March & Simon, 1958) as an individual level construct. It was extended later to the collective level by Nelson and Winter (1982). While Nelson and Winter (1982) initially acknowledged that routines can be found at the individual level as well as at the organizational level, later conceptualizations refer to the organizational level only (Dosi, Nelson, & Winter, 2000). This historical drift has not gone unchallenged and has led to an interest in a course correction (Felin & Foss, 2009). However, as the routine and capability literature draws on evolutionary economics (Nelson & Winter, 1982), routines are defined as a collective construct here. To avoid confusion, Dosi, Nelson and Winter (2000) recommended to refer to *skills* for individual level patterns and *routines* solely at the organizational level.

The repetitive nature of routines requires recurrent processes without much change. This excludes spontaneous ad hoc actions and interactions (Cohen et al., 1996). A certain degree of commonality among the actors is also required (Becker, 2005). The literature is divided regarding the intentionality of routines. Some regard routines as non-reflected mindlessness, while others characterize them as deliberate effortful accomplishments (for an overview see Becker, 2004; Felin & Foss, 2009).

Several effects on organizations have been attributed to routines. Depending on the organization’s goal, these effects are either desirable or undesirable. The literature review by Becker (2004) summarizes the known effects on coordination and control (discussed in more depth in Chapter 3.3.2 Control and routinization), uncertainty,



truce, cognitive resources, knowledge storage, and stability. The latter is maybe the most important in the context of dynamic capabilities.

The effect of routines on uncertainty is described by Becker (2004) as follows, drawing on the conceptualization by Nelson and Winter (1982). Members are unlikely to be surprised by other's behavior, as routinization makes their behavior predictable. Even in ambiguous situations, the interpretation of information becomes predictable, as the behavior of routine-ruled actors exhibits interpretable regularities. Thus, the complexity of behavioral uncertainty is reduced.

Predictable behavior among multiple actors also creates truce. The standardized processes lead to less divergent interest and behavior. Bargaining is hence reduced and communication is smoothed out. Routines therefore create a truce among leaders and subordinates as the usual processes and demands are not questioned (Becker, 2004; Nelson & Winter, 1982). While destructive conflict is avoided, constructive conflict (Deutsch, 1977) might be suppressed as well. Becker (2004) did not point out that the psychological conflicts still exist. However, Nelson and Winter (1982) put an emphasize on this. Creating truce might be a strong underlying motivation for the actors. Conflicting positions are therefore not expressed or observable, however they still exist in a latent form.

Furthermore, routines economize cognitive resources. Executing known processes requires less attention. Routines therefore create cognitive slack (Nohria & Gulati, 1996) and reduce complexity for the actors involved (Luhmann, 1995). Non-routine events can hence be treated with increased mindfulness (Becker, 2004; Cyert & March, 1963; March & Simon, 1958).

Routines also store knowledge as they represent solutions to specific problems (Becker, 2004; Nelson & Winter, 1982). Adjustments by the actors that are not involved in the execution of the routine anymore, for example because they might have left the organizational unit, might still be in place as they have been passed along to newly involved actors as stored knowledge. Routines therefore "remember by doing" (Nelson & Winter, 1982: 99). An advantage here is that tacit knowledge can be preserved which distinguishes routines from other knowledge storing devices

such as databases (Zollo & Winter, 2002). This consideration therefore moves beyond aggregating the knowledge of the actors that are currently involved (March, 1991; Nelson & Winter, 1982; Teece & Pisano, 1994; Winter, 2012). It also integrates the aspect of *time* in the microfoundations of routines and capabilities (Winter, 2012).

Maybe the most important effect of routines in the context of dynamic capabilities is increased stability. By definition, routines are repetitive patterns (Feldman & Pentland, 2003). Becker (2004) points out that the effects of routines on stability have been argued differently, although the result remains similar. The Carnegie school (e.g. Cyert & March, 1963; March & Simon, 1958) argued increased stability through routines with reduced cognitive efforts to change processes. Conscious cognitive problem solving, and thus adaptations, do not occur as long as satisficing results are achieved through routines. Evolutionary theorists (Nelson & Winter, 1982) however, argued stability with decreased costs. Whenever routines are changed, this involves costs, such as the identification of suitable actors and their training. Thus, routines are preserved to avoid costs. The stability of routines can also be argued based on other effects of routines. The existing truce, leads to an avoidance of constructive destabilizing conflicts. The economization of cognitive resources and the storage of knowledge lead to a competency trap (Levitt & March, 1988) and path dependency (Sydow et al., 2009). Schreyögg and Kliesch-Eberl (2007) argue that the stable nature of routines leads to inertia, because of a tendency to overlook feedback and signals (Miller & Nelson, 2002). Group-think would be one example of that tendency (Esser, 1998). Another example would be escalating commitment, the tendency to reinvest in sunk cost to avoid admitting that the prior investment was a bad decision. In other words, to throw good money after bad (Schreyögg & Kliesch-Eberl, 2007; Staw, 1976).

### **3.2.2 Capabilities and routines**

While there is little agreement on an exact definition of capabilities, three main aspects seem to stand out. These are: their ability to solve complex occurring problems effectively, their practicing patterned nature that leads to repeated success,

and their high degree of reliability as they have evolved over a certain timespan (Schreyögg & Kliesch-Eberl, 2007).

Sometimes the terms capabilities and routines appear proximate and are deployed as synonyms. Capabilities are therefore defined as a construct that strongly overlaps with routines (Dosi et al., 2000). However, they are linked differently in the literature. To provide examples, it has been claimed that some routines might be capabilities (Felin & Foss, 2009), that capabilities are high level routines (Nelson & Winter, 1982; Winter, 2003), that routines can partly or fully constitute a capability (Zollo & Winter, 2002), and even that routines are an executable capability (Cohen et al., 1996). While this highlights the importance of routines for the conversation on capabilities and explains the reliance on the routine literature, it also exposes inconsistencies regarding the relationship of the two constructs (for an overview see e.g. Felin & Foss, 2009). These inconsistencies have been transferred to the dynamic capability literature. Different conceptualizations regarding the relationship of dynamic capabilities and routines exist. This is not a minor point, but it does have major implications for the provision of a sustainable competitive advantage. Routinized behavior can lead to competitive advantage, simple rules cannot (Di Stefano, Peteraf, et al., forthcoming). Specifically the routinization in dynamic capability possessing organizations is described differently. Routinization refers to the degree to which the organization's internal processes can be characterized as being *routine*, as per the definition by Feldman and Pentland (2003).

The arguably most distinctive dynamic capability conceptualizations regarding routinization are the concepts introduced by Eisenhardt and Martin (2000) and Winter (2003). Another very distinctive concept regarding routinization is Schreyögg and Kliesch-Eberl's (2007) *capability monitoring*. The authors derived their concept from the dynamic capability literature. However, based on their understanding of capabilities, the authors argue that capabilities involve the application of routines by definition. Therefore, they refrain from using the term *dynamic capabilities* and suggest the term *capability monitoring*.

The conceptualizations are explained in more depth below. I differentiate between the proposed effects of routinization at the operational level and the strategic level.

The operational level refers to “the basic functional activities of the firm” (Collis, 1994: 145) that earn the firm its current living (Winter, 2003). The strategic level on the other hand is concerned with monitoring and adjusting the operational level (Makadok, 2001). As Teece (forthcoming) put it, the operational level is about technological fitness and doing things right. The strategic level is about evolutionary fitness and doing the right things. Nelson and Winter (1982) already highlighted the importance of routines at the operational and strategic level.

Some researchers argue, that dynamic capabilities are only a concern of the strategic level (e.g. Zollo & Winter, 2002). However, “the firm’s ability to integrate build and reconfigure internal and external competences to address rapidly changing environments” (Teece et al., 1997: 516)” also depends on the characteristics of the object of change (see Chapter 2.3.2 Dynamic capabilities, performance, and the object of action). The efficiency and usefulness of adjusting mechanism is thus heavily influenced by the operational level. In a contrasting juxtaposition Eisenhardt and Schreyögg argued for the influence of the operational level, although for contrary reasons (for the full discussion see Eisenhardt et al., 2010; Schreyögg & Sydow, 2010). I therefore explain the proposed effects of routinization at the operational, as well as at the strategic level on dynamic capabilities.

### ***3.2.2.1 Dynamic capabilities and routinization following Eisenhardt and Martin (2000)***

Eisenhardt and Martin (2000) regard dynamic capabilities as ad hoc adjustment in dynamic environments. Accordingly, there should generally be less stable patterns, such as routinized operations. Instead, simple rules and relatively unstable processes should be the modus operandi as they enable quick adjustment. Organizations should apply constant prototyping and early testing to receive quick feedback in an iterative manner. Stored existing knowledge can be disadvantageous as managers might overgeneralize from past experiences. The operational level is thus rather flexible than stable. Eisenhardt and Martin (2000) cite a former IBM manager who describes

the successful operations of his current company as doing everything *on the fly* and lacking structure.

The strategic level in dynamic markets should also be simple, experiential, iterative, and primarily a managerial concern, thus opposing to the here deployed definition of routines. Simple processes might keep the managers focused on broadly important subjects without locking them into specific behavior or the application of past experiences. Rules should only be used to set broad boundaries. Using the examples of Intel and Yahoo, Eisenhardt and Martin (2000) describe successful strategic procedures that rely on a few simple rules.

*Hypothesis 9a: Following Eisenhardt and Martin (2000), routinization at the operational level has a negative effect on the organization's dynamic capabilities in dynamic environments.*

*Hypothesis 10a: Following Eisenhardt and Martin (2000), routinization at the strategic level has a negative effect on the organization's dynamic capabilities in dynamic environments.*

To be clear, the conceptualization of dynamic capabilities and dynamic capability possessing organizations by Eisenhardt and Martin (2000) explicitly differs depending on environmental turbulence. In moderately dynamic environments, the authors do not argue for reduced routinization. The argumentation only applies for dynamic environments. Eisenhardt and Martin (2000) apply the term *high-velocity* instead of *dynamic*. High-velocity refers to dynamic environments with sharp discontinuous change (Bourgeois III & Eisenhardt, 1988; Dess & Beard, 1984; Eisenhardt, 1989). In the here deployed operationalization of dynamic environments by Tan and Litschert (1994), discontinuous change is considered and the terms can be used synonymously (see Chapter 4.2.2.6 Environmental dynamism).

To avoid further confusion, Eisenhardt and Martin (2000) also mention that some routines underlie dynamic capabilities, such as knowledge transfer routines, or new product development routines. They even define dynamic capabilities as "...organizational and strategic routines by which firms achieve new resource

configurations...” (p. 1107). However, their definition of routines appears to refer to *organizational processes* rather than routines as conceptualized by Feldman and Pentland (2003). They state themselves that their definition is “a richer conception of routines that goes beyond the usual view of efficient and robust processes [...] to include these more fragile ‘semistructured’ ones” (p. 1117). For example, they refer to routines as collective and individual processes by using them on a single managerial as well as on an organizational level. The commonality of actions is also not clear, e.g. by stating that routines can be “managers combin[ing] their varied skills and functional backgrounds to create revenue producing products” (p. 1107), which would not be a common action but an interaction. Moreover, they do not regard routines as stable patterns, as they should be “adaptive to changing circumstances” (p. 1117). As the understanding of routines by Eisenhardt and Martin (2000) substantially differs from the deployed definition by Feldman and Pentland (2003), as well as the understanding of routines by Winter (2003) and Schreyögg and Kliesch-Eberl (2007), no comparative hypotheses for moderately dynamic environments can be derived. The absence of routines in the definition deployed here by Feldman and Pentland (2003) is clearly identifiable in their conceptualization, the existence of routines is regarded differently however.

The conceptualization by Eisenhardt and Martin (2000) involves a lot of flexibility. It does however miss-out on the positive effects of routines at the operational level. Schreyögg and Kliesch-Eberl (2007) criticized Eisenhardt and Martin (2000) based on the logic of transaction costs economics (Coase, 1937; Williamson, 1975). If total flexibility is sought, why do I rely on a hierarchy rather than market transactions? The positive effects of internalization cannot be achieved in case the firm avoids any routinization. According to Schreyögg and Kliesch-Eberl (2007), Eisenhardt und Martin’s (2000) conceptualization, thus fails to explain why an organization exists at all.

### ***3.2.2.2 Dynamic capabilities and routinization following Winter (2003)***

A very different conceptualization of dynamic capabilities in regard to organizational routinization is Winter's (2003) higher-order model. Main thoughts of this conceptualization can also be found in Zollo and Winter (2002). Drawing on Collis (1994), dynamic capabilities are described as routines to monitor and change routines. Different to Eisenhardt and Martin (2000), the operational level should be routinized to effectively exploit what the firm currently knows or is able to create. This zero-order capability is what leads to current firm performance. As Winter (2003) draws on evolutionary economics, he regards routines as a key aspect for efficient economic actions. Routinization at the operational level therefore allows the organization to create revenues that can be used to access further inputs and repeat the process. Those revenues are also necessary to uphold the strategic level.

An underlying assumption is that routines require external change. Thus, the operational level is unable to adjust itself, due to inertia. Routinization leads to a situation, where "nobody is trying to steer the organizational ship into a sharp turn" (Nelson & Winter, 1982: 110). Therefore, Winter (2003) conceptualized further routines at the strategic level that monitor the zero-level capability and implement the necessary adjustments. He describes product development routines and market selection routines as prototypical examples. It is "beyond question, that they are highly patterned and 'routine' in many respects" (p.992). Thus, dynamic capabilities are somewhat routines to change routines. As this routine might need change as well, an infinite amount of higher-order levels exist to change routines. Accordingly, there might also be a routine that changes the routine to change routines.

*Hypothesis 9b: Following Winter (2003) routinization at the operational level has a positive effect on the organization's dynamic capabilities.*

*Hypothesis 10b: Following Winter (2003) routinization at the strategic level has a positive effect on the organization's dynamic capabilities.*

Winter's (2003) conceptualization integrates the stable characteristics of routines and explains how they can be used to enable change. Different to Eisenhardt and Martin's (2000) conceptualization, it therefore balances stable and flexible elements and explains why a firm should be preferred over market-transactions. Recent conceptualizations mostly agree that dynamic capabilities must therefore be layered on top of operational capabilities (Teece, 2012). However, the particular definition appears to suffer from an infinite amount of necessary levels to change the capabilities at the next lower level, thus it is an infinite regress. As routines need to evolve over a long period of time, it is unlikely that there can be an infinite amount of levels. Winter (2003) also acknowledges that routinized dynamic capabilities create costs and require long-term commitment. The less they are needed, the less efficient their preservation would be. Ad hoc adjustments as described by Eisenhardt and Martin (2000) are seen as a suitable alternative in those cases.

### ***3.2.2.3 Dynamic capabilities and routinization following Schreyögg and Kliesch-Eberl (2007)***

Schreyögg and Kliesch-Eberl's (2007) provide a third conceptualization of dynamic capabilities related to routines. They categorize the adjustment of capabilities into the dual processes capability evolvement and capability dynamization. The operational level that *earns the living now* is conceptualized as routinized similar to Winter's (2003) conceptualization. Like Winter (2003), the authors doubt that the operational level might be in position to change itself as its routinized behavior leads to a *competency trap* (Levitt & March, 1988). Therefore, the strategic level should be concerned with adjusting operational capabilities. The dual process model thus involves capabilities at the organizational level and a capability monitoring at the strategic level. Both should be kept separate. Although the processes are countervailing, performing both simultaneously allows for exploiting the advantages of routinized behavior and for exploring new opportunities. Compared to Winter (2003), the major difference is non-routinized behavior at the strategic level. Schreyögg and Kliesch-Eberl (2007) emphasize that their capability monitoring must



not be routinized to avoid suffering from the same inertia as the routinized ordinary capabilities.

*Hypothesis 9c: Following Schreyögg and Kliesch-Eberl (2007), routinization at the operational level has a positive effect on the organization's dynamic capabilities.*

*Hypothesis 10c: Following Schreyögg and Kliesch-Eberl (2007) routinization at the strategic level has a negative effect on the organization's dynamic capabilities.*

Winter's (2003) higher-order conceptualization tried to solve the assumed inability of routines at the operational level to adjust with separate higher-order routines at the strategic level. Schreyögg and Kliesch-Eberl (2007) argue for a non-routinized strategic level to avoid the need for multiple higher levels. The conceptualization does not explain in depth how a non-routine can be organized. The authors mention that capability monitoring must span the whole firm with all its actors to capture signals. Environmental signals evolve with increasing strength until they manifest themselves in form of a crisis. While it might therefore not be necessary to capture every signal, it is still recommended to catch them early through employee involvement (Schreyögg & Kliesch-Eberl, 2007). Involving all aspects and actors, does however require coordinating mechanisms, which may then lead to routinization again.

A differentiation between the conceptualizations of dynamic capabilities can thus be made along the lines of routinization at the strategic and operational level (see Table 1. Rival hypothesized effects of routinization on dynamic capabilities). In empirical measurement, this distinction is however found seldomly. To my knowledge, the impact of routinization on both levels has not yet been tested.

Table 1. Rival hypothesized effects of routinization on dynamic capabilities

	<b>Eisenhardt and Martin (2000)</b>	<b>Winter (2003)</b>	<b>Schreyögg and Kliesch-Eberl (2007)</b>
Routinization at the operational level	H9a: negatively related	H9b: positively related	H9c: positively related
Routinization at the strategic level	H10a: negatively related	H10b: positively related	H10c: negatively related

### 3.2.2.4 *Further conceptualizations*

The diversity of definitions and conceptualization of dynamic capabilities has led to multiple alternative concepts of the relationship between routines and dynamic capabilities. They are however arguably less specific. An example of such an undetermined conceptualization of dynamic capabilities regarding routinization is Teece's (2012) eclectic attempt to combine routine-based and management-based perspectives. He regards routinized as well as non-routinized behaviors as suitable options.

All of the described conceptualizations above assume that routinization creates inflexibility and that the routinized operational level hardly changes itself. Eisenhardt and Martin (2000) therefore argue for a reduction, while Winter (2003), as well as Schreyögg and Kliesch-Eberl (2007) argue for the necessity of change through the external strategic level. Different opinions on the inability of routines to change themselves can also be found (e.g. Pentland, Feldman, Becker, & Liu, 2012; Turner & Fern, 2012).

Following Feldman and Pentland (2003), a distinction between ostensive and performative aspects of routines might explain these stances. The ostensive aspect is what is typically thought of as an abstract structural concept, while the performative aspect is the specific action, in a specific situation, by specific individuals (Becker, Lazaric, Nelson, & Winter, 2005; Feldman & Pentland, 2003). Ostensive routines are the general manner to accomplish tasks in the organization. They cannot however

encompass all details as contextual circumstances may differ. The performative aspect is the concrete action of an actor, which is not always a plain reproduction of a formerly performed routine, but might be an amendment. The specific performance of a routine is hence a deliberate choice of the actor (Becker, 2004; Feldman & Pentland, 2003).

The choice of the actor is often overlooked in the routine and dynamic capability literature (Becker, 2005; Feldman, 2000; Felin & Foss, 2009). Nelson and Winter (1982: 116) even doubted the existence of choice and claimed that routines “resist mutation, even ones that present themselves as desirable innovations [...] successors ‘naïve’ aspirations towards innovative change will be disabused”. Nevertheless, in more recent research this microfoundation is seen as a reason for variation, selection, and retention and thus organizational change and development in an evolutionary manner (Feldman & Pentland, 2003). It was argued that the deliberate amendments by the actor avoids the lock-in, inertia, and rigidities that might hamper dynamic capabilities (Pentland et al., 2012). They can be seen as a feedback process regarding the suitability of the routine. However, this feedback must be encouraged and heard. Ignoring that feedback leads as suggested to inertia (Schreyögg & Kliesch-Eberl, 2007) in the form of routine rigidities (Gilbert, 2005). Hence, under conditions of moderate turbulence, routines and capabilities can change themselves over time (Pentland et al., 2012) and do not necessarily need to be changed by higher-order dynamic capabilities. Turner and Fern (2012) have empirically shown, that an operational routine can adapt to contextual change itself without higher-order influence. This flexibility within routines is nevertheless limited to organic gradual development and cannot account for revolutionary ad hoc change (Feldman, 2000). It therefore complements, but does not replace, the argumentation of changing routines through external forces (e.g. Schreyögg & Kliesch-Eberl, 2007; Winter, 2003).

Moreover, it also only applies in moderately dynamic environments. This underlying logic might be one reason, why Eisenhardt and Martin (2000) have only argued for reduced routinization in dynamic environments, but not in moderately dynamic environments. It is therefore also not a concern for this research, as the developed rival hypotheses need to be tested in dynamic environments to be comparable.

### **3.3 Interrelation of managerial and routine-based microfoundations and their effects on dynamic capabilities**

As I already argued in the previous chapters, managerial and routine-based microfoundations might affect dynamic capabilities. However, regarding them as separate paths appears to be incomplete. In a recent attempt, Di Stefano et al. (forthcoming) tried to explain the interrelation of both using the drivetrain of a bike as an illustrative metaphor. Thereby, managerial actions represent the front gears that the rider uses to transmit power to the freewheel. Here the gears of the freewheel represent numerous routines to manage change. Using that metaphor, the applied routines in the freewheel influence the power that can be exercised through the rider, thus in the case of dynamic capabilities the manager. Di Stefano et al. (forthcoming) wanted to show, that managerial actions and routines are not separate paths to achieve dynamic capabilities, but depend on each other.

While the direct effects of routinization on dynamic capabilities are not described with consistency in the literature and positive as well as negative effects are proposed, the various sub-streams concerned with dynamic capabilities still acknowledge a certain importance of routines and routinization. Research on managerial microfoundations should therefore also consider routines as a possible influential factor. The direct effects of routinization are not clear, however, routinization might also indirectly affect dynamic capabilities through mediating managerial actions such as employee involvement in strategic renewal and control.

It can be argued that trust might be an additional mediator. It has for example been argued that routinization can be the basis for trust as predictability of future actions is enhanced (Grey & Garsten, 2001; Möllering, 2006). However, in this case, we are speaking of semi-strong trust and not interpersonal trust (Barney & Hansen, 1994). It is not the employees that are the object of trust, but the routinized process that directs the employees. This is different to strong interpersonal trust. Argumentations and operationalizations for both forms of trust are very different (see Chapter 3.1.3.2 Trust). As I focus on interpersonal trust in this dissertation, no hypotheses are derived for the trust and routinization relationship here. However, for further reading, an intensive discussion about their interrelation is provided by Möllering (2006).

### 3.3.1 Employee involvement in strategic renewal and routinization

Routines have been defined as “carried out by multiple actors” (Feldman & Pentland, 2003: 95). Somewhat obviously, at the operational level, several employees must thus be involved to speak of routines. However, involving employees through routinization at the operational level does not necessarily mean, that they also participate in strategic renewal activities. Routinization leads to stability in day-to-day activities. The stimulation of repetition increases the mindlessness of an employee’s actions (Starbuck, 1983). The more often a task is repeated, the more experienced and specialized is the actor and lesser cognitive effort is invested. Thus, it gets easier to perform the task. On the other hand, employees might be captured in a competency trap (Levitt & March, 1988) and path dependency might occur (Sydow et al., 2009). An employee’s interest in adjustments is also reduced, as this would mean that the specialization might become redundant and diminish the experience effect. An adjusted routine thus creates costs for the employee (Nelson & Winter, 1982) and reduces motivation to participate.

Furthermore, the existing truce through operational routinization leads to an avoidance of constructive destabilizing conflicts as input from the employee’s side is reduced. Group-think (Esser, 1998) occurs and the input of employees does not differ essentially. Involving many employees is therefore less necessary for managers to make informed decisions.

*Hypothesis 11: Routinization at the operational level is negatively related to employee involvement in strategic renewal.*

Based on the already hypothesized relationship of employee involvement in strategic renewal and dynamic capabilities I further hypothesize a mediating effect.

*Hypothesis 12: The negative indirect relationship of routinization at the operational level and dynamic capabilities is mediated by employee involvement in strategic renewal.*

A strategic routine must also be carried out by multiple actors. This can for example be a team of managers. Alternatively, the multiple actors may also consist of the subordinates that are involved. Routinization at the strategic level leads to reduced behavioral uncertainty (Becker, 2004). Thus, routinized processes make the involvement of employees less risky for managers compared to non-routinized processes. Furthermore, as routines store knowledge and represent suitable solutions to specific problems (Becker, 2004; Nelson & Winter, 1982), subordinates can access this knowledge and are not as disadvantaged as compared to managers, which might have superior strategic knowledge. The complexity of decision making is also reduced (Luhmann, 1995), which might open up strategic processes to actors, that are otherwise less exposed to strategic complexity. Finally, the truce that is created through routinization, leads to less conflict among supervisors and subordinates (Becker, 2004; Nelson & Winter, 1982). Those conflicts would make employee participation unlikely.

*Hypothesis 13: Routinization at the strategic level is positively related to employee involvement in strategic renewal.*

As I already proposed a positive relationship of employee involvement in strategic renewal and dynamic capabilities, I hypothesize furthermore that employee involvement is a mediator in the relation of routinization at the strategic level and dynamic capabilities.

*Hypothesis 14: The positive indirect relationship of routinization at the strategic level and dynamic capabilities is mediated by employee involvement in strategic renewal.*

### **3.3.2 Control and routinization**

Routinization and control mechanisms are related in various ways. Both serve to coordinate activities within an organization (Dosi et al., 2000). Similar to the relationship of trust and control, complementary as well as substitutive effects have been proposed for routinization and control as coordination mechanisms. It has for example been argued, that routines reduce the need for control as behavioral

uncertainty is already reduced through standardized behavior (Heiner, 1983; Langlois & Robertson, 1995; Zollo, Reuer, & Singh, 2002). The somewhat contrary argument that has been brought up is that routinization is supportive of control mechanisms. It creates a predictable systematic regularity that can be measured, monitored, and compared (Becker, 2004; Nelson & Winter, 1982; Segelod, 1997). The more formal and stable a process, the easier it is to compare and control (Eisenhardt, 1985; Ouchi, 1979). Non-routinized behavior is therefore more complicated to control (Langlois, 1992; Perrow, 1967).

Both argumentation-streams appear valid. The question remains in which situation one or the other dominates inside organizations. When comparing operational and strategic processes in organizations, the operational processes that *earn the living now* (Winter, 2003) need to be primarily efficient, whereas the strategic level is rather driven by effectivity concerns (Porter, 1996; Teece, forthcoming). Moreover, a larger number of resources is generally allocated to operational units rather than strategic units, as they earn the current living and represent the majority of the organization's endeavors. Hence, cost concerns appear to dominate at the operational level as it has the larger direct impact on the organization's contemporary performance. Knowledge gathering to seize informed decisions appears to be the primary concern at the strategic level. The costs of making a strategic choice seem to be outweighed by the values created through the most effective decisions (Teece, forthcoming).

The substitution argument might thus be reasonable at the operational level when keeping cost aspects in mind. Routinization at the operational level reduces behavioral uncertainty (Heiner, 1983, 1989). Moreover, the predictability of actions leads to greater competence in transacting with each. This does amplify the reduced need for other coordinating mechanisms (Gulati & Singh, 1998; Powell, 1990). A routine can therefore become a coordination mechanism on its own and make additional mechanisms such as control unnecessary, due to clarified boundaries on decisions and activities, increased simultaneity, consistency, regularity, and the truce created (Becker, 2004). This reasoning also underlies the proposed increase of managerial mindfulness through the cognitive slack created (Becker, 2004).

Control can be costly and requires high resource commitment (Gatignon & Anderson, 1988; Sanchez-Peinado & Pla-Barber, 2006; Woodcock, Beamish, & Makino, 1994). Even the neo-institutional economics literature, that has a high affinity to control, assumes that complete control is not feasible for cost reasons (Jensen & Meckling, 1976). As routinized behavior at the operational level already reduces behavioral uncertainty, a reduction of control mechanisms might thus be a suitable option to reduce cost. However, routinization cannot replace all functions of control. While both serve as coordinating mechanisms (Dosi et al., 2000), control also entails a signaling information aspect (Eberl, 2002). The signaling is not so dominant in routines. Control keeps managers informed about everyday operations and possible deviations in the processes (Simons, 1991, 1994). Information gathered through control of a non-routinized operational level might be valuable as behavioral uncertainty is high. The information gathered through control of a routinized operational level might however be less valuable, as procedures are standardized. Thus, the information aspect might not be sufficient to justify upholding a costly second coordination mechanism, regardless of being behavior or outcome related.

Some might argue that the cost argument does not apply for social control. However, while norms and values might not create direct administrative costs, they need time and effort to mature as they are historically determined and difficult to change (Hofstede, Neuijen, Ohayv, & Sanders, 1990). The social structure of a firm is therefore as crucial as the task-related structure (Perrow, 1967). Regular meetings, social events, the communication of visions, and further measures need to be undertaken to create a strong corporate culture and thus strong social control. Social control might hence create costs with a certain time lag before its effects are observable.

*Hypothesis 15: Routinization at the operational level is negatively related to all types of control.*



In line with the hypothesized effects of control on dynamic capabilities, I further hypothesize an indirect relationship.

*Hypothesis 16: The indirect relationship of routinization at the operational level and dynamic capabilities is mediated by all forms of control.*

The complementary perspective on the relationship of routinization and control might apply for the strategic level. As already argued, cost concerns are not as dominant as at the operational level, instead strategic decision-makers primarily require sufficient information to make informed choices. The information aspect of control thus seems to dominate over the cost aspect. Teece (2007) emphasized the strategic importance of information in his sensing and seizing dimensions of dynamic capabilities. Routinization at the strategic level can standardize information processes, it is however more likely to detach decision-makers from everyday operations than direct control. Nevertheless, routinization at the strategic level supports control as it creates systematic regularity. Control needs a repetitive, recognizable pattern that serves as a basis for set-actual comparison (Cohen et al., 1996), regardless of being behaviorally or socially. Non-routinized behavior on the other hand cannot be controlled behaviorally as spontaneous ad hoc actions and interaction cannot be planned or predicted.

At first glance, this does not seem to apply for outcome control. However, outcome control might not require certain recognizable patterns, it requires comparability among multiple actors though. Controlling for outcomes needs reference values. In order to set and evaluate the achievement of goals, one must compare those either to other actors in the same field, or to the achievements in a past period. Repetition of actions and equifinality among actors thus requires a certain degree of routinization as well in order to create reference values. Therefore, quantification does require decreased flexibility (Lenz & Lyles, 1985).

*Hypothesis 17: Routinization at the strategic level is positively related to all types of control.*

In line with the positive hypothesized effects of control on dynamic capabilities, I further hypothesize an indirect relationship.

*Hypothesis 18: The indirect relationship of routinization at the strategic level and dynamic capabilities is mediated by all forms of control.*

While some researchers argue that the direct effects of routinization on dynamic capabilities might differ depending on the dynamism of the environment (e.g. Eisenhardt & Martin, 2000), I do not see any reason, why the indirect effects of routinization should differ with the control forms outlined as mediators.

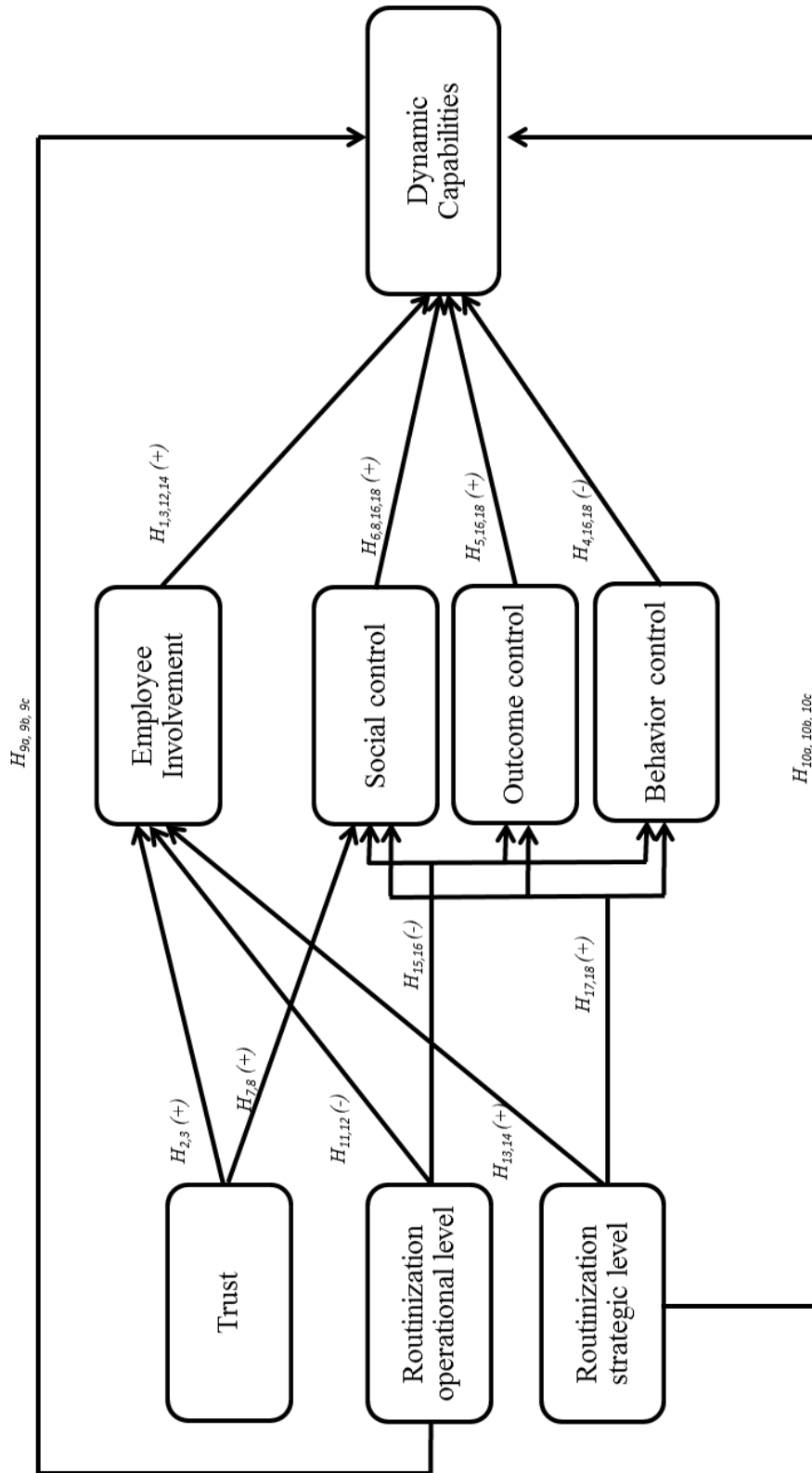
### 3.4 Summary of hypotheses

The following Table 2 provides an overview of the derived hypotheses. To better visualize the mediating effect Figure 3 provides a graphical overview.

Table 2. Overview of hypotheses

H <sub>1</sub> (+)	Employee Involvement in strategic renewal is positively related to dynamic capabilities
H <sub>2</sub> (+)	Managerial trust in employees is positively related to employee involvement in strategic renewal
H <sub>3</sub> (+)	The positive indirect relationship of managerial trust in employees and dynamic capabilities is mediated by employee involvement in strategic renewal
H <sub>4</sub> (-)	Behavior control is negatively related to dynamic capabilities
H <sub>5</sub> (+)	Outcome control is positively related to dynamic capabilities
H <sub>6</sub> (+)	Social control is positively related to dynamic capabilities
H <sub>7</sub> (+)	Managerial trust in employees is positively related to social control
H <sub>8</sub> (+)	The positive indirect relationship of managerial trust in employees and dynamic capabilities is mediated by social control
H <sub>9</sub>	a) Following Eisenhardt and Martin (2000), routinization at the operational level has a negative effect on the organization's dynamic capabilities in dynamic environments (-)
	b) Following Winter (2003), routinization at the operational level has a positive effect on the organization's dynamic capabilities (+)
	c) Following Schreyögg and Kliesch-Eberl (2007), routinization at the operational level has a positive effect on the organization's dynamic capabilities (+)
H <sub>10</sub>	a) Following Eisenhardt and Martin (2000), routinization at the strategic level has a negative effect on the organization's dynamic capabilities in dynamic environments (-)
	b) Following Winter (2003), routinization at the strategic level has a positive effect on the organization's dynamic capabilities (+)
	c) Following Schreyögg and Kliesch-Eberl (2007) routinization at the strategic level has a negative effect on the organization's dynamic capabilities (-)
H <sub>11</sub> (-)	Routinization at the operational level is negatively related to employee involvement in strategic renewal
H <sub>12</sub> (-)	The negative indirect relationship of routinization at the operational level and dynamic capabilities is mediated by employee involvement in strategic renewal
H <sub>13</sub> (+)	Routinization at the strategic level is positively related to employee involvement in strategic renewal
H <sub>14</sub> (+)	The positive indirect relationship of routinization at the strategic level and dynamic capabilities is mediated by employee involvement in strategic renewal
H <sub>15</sub> (-)	Routinization at the operational level is negatively related to all types of control
H <sub>16</sub>	The indirect relationship of routinization at the operational level and dynamic capabilities is mediated by all forms of control
H <sub>17</sub> (+)	Routinization at the strategic level is positively related to all types of control
H <sub>18</sub>	The indirect relationship of routinization at the strategic level and dynamic capabilities is mediated by all forms of control

Figure 3. Visualization of hypotheses



## **4 Method**

### **4.1 Sample and data collection**

#### **4.1.1 Sample selection and level of analysis**

A key challenge in researching the microfoundations of dynamic capabilities is collecting data at the appropriate level of analysis. Dynamic capabilities are an organizational level construct (Eisenhardt & Martin, 2000; Helfat et al., 2007; Teece et al., 1997) and should be measured accordingly. Most of the additional constructs in the model are organizational level constructs as well. Control in its different forms is measurable at various levels. Trust however is a relational construct and its measurement must meet certain requirements.

In the academic conversation on trust in organizational research, the arguably predominant view is that the trustor must be a single individual, whereas the trustee can be a single person, a group, or an organization (see e.g. Dietz & Den Hartog, 2006; Gillespie, 2012; McEvily & Tortoriello, 2011; Zaheer, McEvily, & Perrone, 1998). This perspective is derived from the deployed definition by Rousseau et al. (1998) that characterizes trust as a psychological state and therefore inherently an individual level phenomenon (McEvily & Tortoriello, 2011; Zaheer et al., 1998). Thus, an organization or other collective entities cannot trust, as individual psychological states among the members might differ. Instead, collective entities can only be the object of trust, as long as they are specific, identifiable, and perceived to act with volition (Mayer & Davis, 1999).

Some diverging opinions have been articulated in more recent research (Fulmer & Gelfand, 2012). Survey-measures using key informants exist that are supposed to capture trust by collective entities (e.g. Huff & Kelley, 2003, 2005; Molina-Morales & Martínez-Fernández, 2009). There are also some qualitative studies using key informants (e.g. Sonpar, Handelman, & Dastmalchian, 2009). However, to my knowledge no further study has applied these scales. Based on the extensive critique (see Dietz & Den Hartog, 2006; McEvily & Tortoriello, 2011 for an overview), relying on these conceptualizations seems to be less viable. Moreover, the

operationalizations do not appear to fit the deployed definition. They rather capture a climate of trust, or a culture of trust, which are sociological, but not psychological phenomena.

As an alternative, some researchers capture archival records of past actions at the organizational level that might indicate trust (e.g. Currall & Inkpen, 2002; Malhotra & Lumineau, 2011). This type of research is more accepted as the firm's actions are not biased by individual propensities to trust, such as in key informant research (McEvily & Tortoriello, 2011; Seppänen, Blomqvist, & Sundqvist, 2007). Archival data is supposed to expose routines as reflective indicators of trust. These can be for example: open sharing of knowledge, disclosure of performance data, shared decision making, as well as differences between performed regulatory actions and formal rules (Currall & Inkpen, 2002). Whilst this measurement appears to be generally viable, it might not be an appropriate option for this particular research question as it captures collective, routinized processes only. I measure routines and employee involvement in strategic renewal as separate constructs in this investigation. Applying those archival measures for trust would thus risk an overlap of the constructs. I therefore refrain from measuring trust using reflective indicators that capture routines and employee involvement in strategic renewal.

Other alternatives also have shortcomings. Aggregating individual level data is generally not accepted as a suitable practice in the conversation on trust (Fulmer & Gelfand, 2012; Lyon, Möllering, & Saunders, 2012; McEvily & Tortoriello, 2011). Although, applying multilevel approaches, such as hierarchical-linear modelling, is generally desirable (Costa & Bijlsma-Frankema, 2007; Das & Teng, 2001; Rousseau et al., 1998), it is not feasible here. Hierarchical-linear-modeling requires the dependent variable to be the construct at the lowest level (Hofmann, 1997; Hox & Maas, 2005; Singer, 1998), which is not the case here. Instead, the dependent variable *dynamic capabilities* is at the highest level.

The most suitable way of addressing the gap between a firm-level phenomenon and an individual's psychological state, might be the identification of conditions where they are not separable. A single manager is often the head of small firms. Therefore, how management treats employees is a single person's decision, based on an

individual's psychological state. The individual manager's trust in employees therefore equals the trust of the firm's management in employees. Considering firms with a single manager as head of the firm, and the absence of any hierarchical level between the lowest level employees and the manager, thus seems viable.

At first glance, this might also apply when considering units/departments of organizations, with the head being a single person. Departments of large companies have their own profit and loss responsibility as well as separate budgets. Sometimes, they even consist of separate legal entities and therefore act like independent firms that differ in organization and performance (Rouse & Daellenbach, 1999). However, control mechanisms are often implemented on a firm-wide level. Moreover, the immediate supervisor might trust the subordinates, the next higher hierarchical level may not though. Using departments as the research unit might not allow for controlling these influences. Similarly, sampling only the top two hierarchical levels of larger firms would expose the research project to uncontrollable influences by lower level employees. An example is the impact of lower level employees in the implementation sub-dimension of dynamic capabilities. Thus, the units that are not part of the study might create a bias. Relying on small firms with one manager on top and only one echelon below appears appropriate to avoid challenges related to multi-level analysis.

#### **4.1.2 Sample characteristics**

For the above-mentioned reasons, the study focuses on small firms. In particular, the sample has been drawn from small firms in the German manufacturing industry (SIC 3000-3999), identified through the Hoppenstedt company database in 2009. The Hoppenstedt company database is one of the most popular databases for German firms. It belongs to the Swedish Bisnode group, one of the largest European business data providers. Reports on more than 850.000 German firms are available. I obtained information about the firms' names, profiles, contact information, industry classification, numbers of employees, names of the CEOs, and turnover.

To minimize influential institutional variation, the trust and control literature (e.g. Möllering, 2003; Şengün & Wasti, 2007; Seppänen et al., 2007) as well as the dynamic capability literature (e.g. Danneels & Sethi, 2011) recommend a restriction to one country and one industry. Moreover, this sampling frame avoids multi-country response biases and translation biases that are common in survey research (Harzing, 2006). I selected manufacturing firms only as trust, control, routinization, employee involvement in strategic renewal, environmental dynamism, and adaption have different propensities to occur in service and manufacturing firms. In addition, their effects differ. To provide some examples, service firms as opposed to manufacturing firms require less financial investment and are thus likely to adapt quicker in situations of environmental uncertainty. A further characteristic is the higher staff to capital ratio and the inseparability of production and consumption. This leads to a different sensitivity regarding behavioral uncertainty, thus also different propensities to trust, different propensities of employee involvement in strategic renewal, and different perceived necessary levels of control (Brouthers & Brouthers, 2003; Erramilli & Rao, 1993).

A further advantage of selecting small firms is that trust and control relationships can be particularly influential in case employees personally know each other. Small firms also tend to change and adapt more frequently as both growth and learning effects are quicker and the firm is more flexible (Arend, 2013). For the course of this research, I define small firms through the existence of only two hierarchical levels, with a single manager as head of the firm, and the absence of any hierarchical level between the lowest level employees and the manager (see Chapter 4.1.1 Sample selection and level of analysis). A pretest revealed that firms with a reported number of 5 to 20 employees are very likely to fit that definition. Thus, I initially chose the sampling frame accordingly. Firms with less than five employees often had structures and cultures that are not prevailingly power-based supervisor-subordinate relationships. Some of these firms for example claimed in phone interviews to be teams of equals with formal leaders on paper only. Other firms with less than five employees were dummy firms within larger firms for tax or legal reasons. This would not match the desired target-group, as these firms are actually larger than



reported. Firms with more than 20 employees were often, but not always, characterized by more than one upper echelon.

#### **4.1.3 Data collection procedures**

Data was collected using surveys with managers as key-informants. Aside from case studies, surveys are the standard way of obtaining empirical data in the dynamic capability literature (Arend & Bromiley, 2009; Barreto, 2010; Wang & Ahmed, 2007). A reason for relying on the perceptions of managers and subordinates in the dynamic capability literature is the complex, organizationally embedded nature of dynamic capabilities (Helfat et al., 2007). The ability to adjust an organization to various environmental opportunities and threats requires a holistic understanding, rather than indicative proxies constructed through alternative firm-external references. Moreover, in the trust and control literature surveys are ideal, as trust is a psychological construct based on individual perceptions (Rousseau et al., 1998). A primary focus on managers as key informants is appropriate as the theoretical framework is based on the managers' willingness to trust, control, and involve employees (Spreitzer & Mishra, 1999). In fact, other respondents might only be able to respond on their perception of the supervisor's trust, but not the supervisor's trust as such.

A pre-notification of potential participants by phone initiated the data collection. This pre-notification procedure increases response rates (Diamantopoulos & Schlegelmilch, 1996; Mitchell & Nugent, 1991), particularly when small firms are the object of investigation (Forsgren, 1989). Student assistants supported me during the pre-notification process. We identified the head of the firm and asked for participation in the study. With the initial contact, we also confirmed that the participating firms had just one hierarchical level below top-management, and that top-management as such is a single individual. Furthermore, we validated data from the Hoppenstedt company database in those calls. In case the head of the firm was not available, another contact person, often in an administrative position, confirmed the amount of hierarchical levels and the single top-manager. In case no phone

contact could be made, I relied on the information provided by the Hoppenstedt company database.

Moreover, during the pre-notification procedure we asked whether we could also survey one subordinate of the firm. These surveys served common-method bias tests. Following Gómez and Rosen (2001), the managers were allowed to pick a subordinate, but to avoid bias, half of them were asked for a highly innovative employee and the other half was asked to choose a non-innovative employee. Criteria for an innovative employee have been a frequent articulation of possible improvements for products, services, and processes, as well as the implementation of new ideas. Furthermore, the managers could either forward the survey-link to the employees themselves, or provide the contact details, allowing for a direct communication. The student assistants were mainly instructed according to the recommendations by Dillman (2007). His *tailored design method for phone, mail, and internet surveys* is considered state of the art in survey research and with 12,151 citations (by 20.03.2013) of the current edition, and 10,662 citations (by 20.03.2013) of the prevailing edition one of the most cited survey guidelines according to the Google Scholar based citation analysis software *Publish or Perish* (Harzing, 2013). Instructions included advice regarding cold call strategies. In addition, the calling process with student assistants has been pre-tested using behavior coding (Visser, Krosnick, & Lavrakas, 2000). I monitored the assistants during calls with respondents from the sample to identify upcoming difficulties, and deviations from script. Formerly unexpected responses did not occur and the script appeared to account for the possible response options. I further supported the assistants during later stages. Dillman (2007) also recommends monetary incentives for all participants. This has not been applied for financial reasons, but also because of articulated doubts regarding the effect on the response rate (Baruch & Holtom, 2008). However, as a compromise I set up a draw for one of the participants to win a tablet-computer. Another incentive was the provision of the results in executive summary form, including practical implications and recommendations.

The participants received a personalized email directly after the telephone call, comprising of a link to the online survey and further explanations, such as an assurance of confidentiality. This procedure also assured that the participants received the emails without a time delay after the call. We sent the emails individually from multiple university email accounts to ensure that the recipient's spam blocker does not prevent the delivery. In case no telephone contact could be made, the managers received a personalized email based on the information provided by the Hoppenstedt database. All recipients received a reminder email two weeks after the first email. After another two weeks, a second reminder was send (Dillman, 2007). We collected data from March 2013 to October 2013.

The survey was web-based. Advantages of this decision are considerably decreased costs, fewer steps for respondents, a quicker data availability, and an increased feeling of anonymity (Dillman, 2007). Particularly, the last point is relevant here as pre-tests and expert interviews revealed a widespread paranoia to report on control and trust inside firms. It has been shown that electronic data collection, such as web-surveying, yields similar response rates as traditional mail surveys (Baruch & Holtom, 2008). Typically mentioned shortcomings of internet surveys in the literature, such as the participants inability to access or operate a computer (Dillman, 2007), appear to be less applicable nowadays and to managers of firms in particular. However, to maximize possible access, the survey-design allowed for a completion by computer, tablet-computer, and smartphone. Moreover, in case participants still articulated a preference for paper surveys, they received fax or mail surveys. This only applied to 19 cases.

The online survey was programmed using Limesurvey 1.92. Back then, this version was the latest stably running release. An initial test with the latest version 2.0+ revealed some bugs when programming in hypertext preprocessor script, which lead to a refrain from that version. Limesurvey is an open-source software ([www.limesurvey.org](http://www.limesurvey.org)) and hosting is available online. However, a graduate school server hosted the survey to guarantee full control over the collected data. Using this software has several advantages, such as automatic coding, numerous statistical reports, graphical displays, track-and-trace options for responses, and simplified

data-export. A crucial feature for this research was the possibility of matching the surveys of supervisors and subordinates, for some cases with anonymous responses. Anonymous answers complicate the matching of dyads, as respondents are hard to identify. However, the links sent to firms with a previous direct phone contact were marked involving an allocation of specific tokens. These tokens enabled the matching of supervisor and subordinate without revealing their identity. In case the firms were not available by phone, we could not assure the correct allocation of matching tokens and did not apply the procedure.

The design of the survey mainly followed the recommendations by Dillman (2007). Individualized links limited the access to the survey and assured that participants could not complete the survey a second time. The format and visual appearance were similar in each question with a restrained use of colors. With the exception of the key informant's personal information and questions regarding firm size and firm age, all questions were assessed on a 7 point Likert-type scale. As recommended, the survey did not involve drop-down boxes. Questions were arranged in a way that the first questions are impersonal and easy (questions about environmental dynamism). Participants received instructions upfront. Answering all of the questions was not required, however a *not applicable* button did not exist either. Instead, participants were able to leave their answer boxes unchecked, or uncheck them again. Moreover, respondents could go back and change their answers. The amount of remaining questions was indicated using a progress bar (Dillman, 2007). The surveys for supervisors and subordinates had an identical design and involved the same measures, but partly with a different wording. To provide examples: supervisors reported on their own level of trust in employees and control of employees. The subordinates reported on their perception of the supervisors trust in employees and control of employees to confirm the statements. In case an adjustment was not necessary, I kept the wording identical.

The initial list of contacts extracted from the Hoppenstedt database consisted of 7,821 firms. We called all of them. 1,229 firms agreed preliminary on the phone to participate and received a personalized email with a link to the survey. The other firms also received an email where we again requested their participation. The

surveys of the second group were completely anonymous without the ability to track the firm. 420 participants clicked on the survey link. However, only 282 participants filled it out with less than 40% of the data missing. Cases where more than 40% of the information was incomplete are regarded as not usable. Arguments against list-wise deletion, such as standard errors further away from the truth (Myers, 2011), might apply, however a value of 40% is generally considered as a nonresponse, rather than an incomplete response (Byrne, 2010). I conducted a sensitivity analysis, which compares the results for datasets with and without deletion (see Table 20 in Chapter 4.4.6 Sensitivity analysis). The results remained essentially similar.

Of the 282 respondents, 75 firms responded anonymously whereas 207 firms responded traceably. The overall response rate is 3.61%. A closer investigation of the surveys revealed that some participants reported firm sizes that make the existence of one echelon below the top-manager very unlikely. To avoid risks, by including these cases all surveys that reported firm sizes above 40 employees have been dropped from the sample. This applied to 33 firms, leaving a sample size of 249 firms. Nonetheless, the results remained essentially similar, when the cases were included in the analysis (see Table 20 in Chapter 4.4.6 Sensitivity analysis). See Table 5 (in Chapter 4.3.6 Descriptive statistics) for an overview of firm sizes in the sample measured by the amount of employees.

Furthermore, we contacted employees to validate the answers of the key informants. Thirty-eight employees clicked on the survey link, however only 21 filled out the survey. In four cases, the responding manager did not respond or responded anonymously, leading to a discard of the cases. Overall, 17 surveys were usable for a dyadic triangulation.

With the exception of preferring paper surveys over internet surveys, all means to increase the response rate mentioned in the meta-analysis by Anseel et al. (2010) have been applied. This included advance notice, follow-ups, material incentives, explanations of personal relevance, personalization, preserving anonymity, university sponsorship, and personal contacting. However, the response rate is still not very high. A reason might be that surveys addressed at organizational representatives generally have low response rates, with top-management participants yielding the

lowest response rates in organization research (Anseel et al., 2010; Baruch, 1999; Rogelberg & Stanton, 2007). Moreover, surveys that are not conducted in the US are expected to have lower response rates (Baruch & Holtom, 2008). The low response rate for the confirmation through employees can also be expected, as employees are reluctant to participate when another firm-member has already taken part (Homburg, Klarmann, Reimann, & Schilke, 2012). Nevertheless, while the sample is not large, it exceeds the recommendations for regression analysis (MacCallum, Widaman, Zhang, & Hong, 1999). Moreover, it also exceeds the averagely reported number of 175 cases for primary data research in the leading Strategic Management Journal between 1980 and 2000 (Phelan, Ferreira, & Salvador, 2002).

## **4.2 Measures**

### **4.2.1 Dependent variables**

#### **4.2.1.1 *Dynamic capabilities***

Dynamic capabilities are a relatively young concept with a limited amount of quantitative measures (Ambrosini & Bowman, 2009; Vogel & Güttel, 2013). Moreover, the fragmentation of the field and the various theoretical conceptualizations of dynamic capabilities led to a situation in which no operationalization is commonly accepted (Barreto, 2010).

Here, dynamic capabilities are measured with a relatively new scale by Li and Liu (2014). The scale divides dynamic capabilities into the sub-dimensions: reflexivity (also termed strategic sense-making capacity), (re-)action speed (also termed timely decision-making capacity), and change implementation capacity. To my knowledge, no further scale involves a time-component, although a quick adjustment is obviously required to succeed in situations of ever changing demands (Eisenhardt, 1989; Kownatzki et al., 2013; Siggelkow & Rivkin, 2005).

At first glance, the scale might appear proximate to Teece's (2007) conceptualization as it involves a sensing process, as well as some kind of reconfiguration process. There are however major differences. Firstly, the scale characterises dynamic

capabilities as firm spanning, rather than an individual process (Schreyögg & Kliesch-Eberl, 2007). This applies particularly to sensing, where the existence of heterogeneous individual knowledge is captured by asking for intra-firm information systems and knowledge transfer. Secondly, the seizing dimension is not considered. This appears to be useful, as seizing, in my opinion, is somehow the result of a sensing process, rather than a process of its own. Thirdly, as already argued, a time-component is included.

One item of the change implementation capacity construct, namely ‘we have a proper awarding and controlling system’, was not used. It refers directly to control systems that I already measure separately. Another item of strategic sense-making capacity was excluded as five items are considered sufficient to measure a construct (Homburg, 2000).

#### ***4.2.1.2 Performance***

There is a persistent concern in strategic management research about the operationalization of firm performance (Meyer, 2005; Starbuck, 2005). In the dynamic capability context, financial data (e.g. Shamsie, Martin, & Miller, 2009), indexes on sales (e.g. Bhattacharya et al., 2005), firm growth (e.g. Danis, Chiaburu, & Lyles, 2010), or perceptive measures (e.g. Malik & Kotabe, 2009) are common.

Firm growth, measured by the amount of employees (e.g. Danis et al., 2010) is not appropriate here as the sample is restricted to small firms. Moreover, some successful firms might not be interested in growth, but rather in distributing profits to shareholders. The possibility of disinvestment makes measures based on growth generally less suitable.

Here, I measured firm performance according to the perceptive scale by Drnevich and Kriauciunas (2011). Subjective measures are common in strategy research when financial statements are not accessible or a sample of multiple industries does not allow for an accurate comparison (Protogerou et al., 2012; Spanos & Lioukas, 2001). Firms in the sample are not publicly listed and their financial statements do not need

to be exposed. Thus, they are mostly not accessible and a reliance on financial data is not feasible. Moreover, performance is a multi-dimensional construct and not all aspects can be covered by financial data (Day & Wensley, 1988). The sample involves firms from the manufacturing industry. This industry is highly diversified and financial measures might not even be comparable.

The deployed scale captures performance in the dimensions quality of products and services, productivity, business process performance, and profitability. It therefore captures process performance as well as outcome performance. The scale has already been applied in a dynamic capability context. In addition, the scale is useful, as employees that are contacted to confirm the manager's responses might be aware of this information. This might not apply for more detailed quotas and figures.

The scale was initially developed for firms in the IT industry. I adjusted it by deleting all IT associations. Furthermore, the scale initially had a backwards direction, capturing the development of performance during the last years. I asked for a comparison to competitors however, rather than a backwards perspective, which is considered to be better known by the informants (Day & Wensley, 1988; Spanos & Lioukas, 2001; Zahra, Neubaum, & El-Hagrassey, 2002) and common in dynamic capability research (Arend, 2013; Protogerou et al., 2012).

## **4.2.2 Independent variables**

### ***4.2.2.1 Employee involvement in strategic renewal***

The scale for employee involvement in strategic renewal was taken from Uhlaner et al. (2013). They developed the scale for a small firm innovation context to conduct joint test with process innovation and product innovation. It therefore seems to fit well with the sample, the deployed dynamic capability scale, as well as the performance scale. I slightly adjusted the items to match the dynamic capability dimensions. I explicitly ask for employee impact on reflexivity as well as implementation capacity.



#### 4.2.2.2 *Managerial trust in employees*

A vast amount of measures is available in the field of trust research. In a recent review, McEvily and Tortoriello (2011) identified 129 measures of which only 13 have been replicated in further studies that do not involve one of the initial authors. The field appears thus to be highly fragmented and recommendations by existing reviews differ (e.g. Dietz & Den Hartog, 2006; Gillespie, 2012; Lyon et al., 2012; McEvily & Tortoriello, 2011; Seppänen et al., 2007). A reason for the fragmentation could be the reliance on differing definitions in the past. However, the literature seems to increasingly converge regarding definitions nowadays (McEvily & Tortoriello, 2011). Another reason might be the required conceptual difference depending on the analysis-level of the trustor and the characteristics and nature of the trustee (Fulmer & Gelfand, 2012).

The scale most often deployed in measuring trust in the relationship of subordinates and managers is the scale by Mayer and Davis (1999), building on theoretical considerations of Mayer, et al. (1995). McEvily and Tortoriello (2011) describe it as particularly outstanding. At first glance, the scale seems to be suitable here as it measures trust at the appropriate level. However, major shortcomings are the deployed sub-dimensions. The scale is with 29 items extensive and as a consequence not all dimensions are applied in other studies using that scale. This makes their measures partly incomplete (Schoorman, Mayer, & Davis, 2007).

Three of the five dimensions capture the perceived trustworthiness of employees by the manager, namely ability, benevolence, integrity. The reliance on the trustworthiness dimensions is debatable. Firstly, the perceived trustworthiness is likely to differ across employees and a general perception is misleading. Secondly, as argued in Chapter 3.1.3.2 (Trust) trustworthiness does not necessarily mean that there is also trust (Dietz & Den Hartog, 2006; Nooteboom, Berger, & Noorderhaven, 1997). Thirdly, the involvement of trustworthiness violates the assumption of vulnerability in the definition of trust (Möllering, 2001, 2006). This makes it hard to distinguish trust from other concepts such as *confidence*, *cooperation* (Gillespie, 2012), or *assurance* (Gibbons & Henderson, 2012). To capture the irrational *leap of faith* (Möllering, 2001) a different measure should be deployed. The described

weaknesses of involving trustworthiness in the operationalization does also apply to the scale by Spreitzer and Mishra's (1999). The latter scale is otherwise noteworthy in the supervisor-subordinate relationship (Dietz & Den Hartog, 2006).

Measuring trust using actions could be a feasible option. However, this is again a point of contention in the literature. Actions are a likely, but not a certain consequence (Dietz & Den Hartog, 2006). Measuring the willingness to act appears to be a viable alternative. Accordingly, trust is going to be measured by applying the *behavioral trust inventory* (Gillespie, 2003, 2012). The scale captures willingness in the dimensions reliance and disclosure following Zand (1972). Reliance for example, is the surrendering of valuable resources or decisions to subordinates, whereas disclosure involves sharing incriminating information with another party (Dietz & Den Hartog, 2006). The scale provides several advantages. It does not suffer from an involvement of reasons to trust or a measurement of specific actions. The instrument adopts Rousseau et al.'s (1998) definition of trust, incorporating both the willingness of vulnerability and positive expectations. The willingness to be vulnerable is emphasized. While this is common in definitions, it is rare in operationalizations (McEvily & Tortoriello, 2011). The emphasis on the willingness to be vulnerable seems to be particularly useful here, as it is regarded as the main difference to control (Hardy, Phillips, & Lawrence, 1998), whereas positive expectations are regarded as the main similarity (Luhmann, 1979). While trust is explicitly not conceptualized as the absence of control (Gillespie, 2003, 2012), this emphasis makes it clearly distinguishable in an operationalization. Moreover, the scale has been developed and validated with exceptional care. This involved more than 96 qualitative interviews (Gillespie, 2003, 2012; McEvily & Tortoriello, 2011).

So far, the scale has been used to measure a subordinate's trust in the respective leader, and the team as a whole (e.g. Lee, Gillespie, Mann, & Wearing, 2010). Its use with multiple subordinates as trustees is thus viable. To my knowledge, it has not been applied with the leader as a trustor. This is however still viable, as the scale was developed as generalizable to various interpersonal organizational settings (Dietz & Den Hartog, 2006; Fulmer & Gelfand, 2012; McEvily & Tortoriello, 2011). It does

not require a certain context and can capture this relationship as well (Gillespie, 2003, 2012)

#### ***4.2.2.3 Social control, outcome control, and behavior control***

The different types of control are measured with a scale developed by Jaworski et al. (1993), building on theoretical considerations by Jaworski (1988). Drawing on Ouchi (1979), Jaworski (1988) classified control into the dimensions formal control, including what Ouchi (1979) refers to as behavior and output control, and informal control, which was referred to by Ouchi (1979) as social control. Different to Ouchi (1979), social control was further divided into departmental level social control (termed professional control by Jaworski) and firm level control (termed cultural control by Jaworski). In an extension to Ouchi (1979), he regarded the levels as different. However, in context of small firms with the absence of departments, such a distinction is not applicable. In this research, I therefore merged the items again to capture social control as a whole and excluded all distinctions between department and firm accordingly. The scale does therefore capture the dimensions of control as conceptualized by Ouchi (1979).

Jaworski et al. (1993) designed the scale for a marketing context. I adjusted it by abandoning all marketing associations. An alternative could have been the reliance on other scales that originate from the management literature. However, the scale is widely used. This also includes the management context (e.g. Cravens, Lask, Low, Marshall, & Moncrief, 2004). It is furthermore one of the few recognized scales that capture all of Ouchi's (1979) dimensions at once. More recently developed scales mostly capture the dimensions in isolated forms only such as Goodale et al. (2011) for behavior control (termed process control formality), Shields et al. (2000) for outcome control with the involvement of several subcategories, and El Akremi, Mignonac, and Perrigot (2010) for social control.

#### ***4.2.2.4 Routinization at the operational level***

Routinization at the operational level is measured according to Becker's (2005) recommended adjustment of Withey et al.'s (1983) scale. The scale itself was an adjustment of the earliest prominent measure of routinization by Perrow (1967). It mainly captures routinization as frequent reoccurring interaction patterns. In line with the advancing trend to reduce items in that scale, Becker (2005) recommended a further adjustment. Of the original 10 items, he recommended dropping an item that captures the participant's ability to categorize certain tasks as a routine or non-routine process. This item systematically produced opposing outcomes, as definitions of routines differ, particularly among practitioners (Pentland, 2003). Becker (2005) dropped five further items, because they capture effortlessness of tasks. Effortlessness is however, rather an outcome of routinization and should thus not be captured (Becker, 2005). The adjusted scale consists of four items.

#### ***4.2.2.5 Routinization at the strategic level***

The scale for routinization at the strategic level was taken from Arend (2013). He developed it particularly for a small firm dynamic capability context. Hence, the scale appears to fit perfectly here. It captures the degree of routinization within changes of ordinary capabilities at the strategic level. Therefore it also follows the assumption of separated ordinary and dynamic capabilities (e.g. Winter, 2003) and is clearly distinguishable from routinization at the operational level. To my knowledge, no further scale explicitly measures routinization in this context.

#### ***4.2.2.6 Environmental dynamism***

Environmental dynamism (also termed environmental turbulence) is measured using a scale developed by Tan and Litschert (1994) that captures dynamism in the form of uncertainty and frequency of change. The scale has recently been deployed in a dynamic capability context (Barrales-Molina, Bustinza, & Gutiérrez-Gutiérrez, 2013). I adopted all adjustments by Barrales-Molina et al. (2013). Several alternative

measures of environmental dynamism exist however, they are focused on one or more specific sub-parts of the environment such as customers, technological developments, or competition (e.g. Danneels & Sethi, 2011; Drnevich & Kriauciunas, 2011; Jansen, Van Den Bosch, & Volberda, 2005; Jaworski & Kohli, 1993; Pavlou & El Sawy, 2011; Protogerou et al., 2012; Wu, 2010). This scale captures the environment as a whole. It does for example also account for regulatory changes.

Scales that are similar to the one deployed here have faced criticism. It has for example been recommended that environmental dynamism measures should also include a magnitude/scope dimension in addition to uncertainty and frequency of change (Child, 1972; Hauschild, zu Knyphausen-Aufseß, & Rahmel, 2011). However, a magnitude can only be defined regarding specific changes, or at least a specific sub-part of the environment. General statements about the magnitude of environmental change, particularly regarding a longer timeframe as with dynamic capabilities are difficult to capture.

Moreover, there are also researchers that recommend the use of objective measures only and refrain from perceptual measures (see Hauschild et al., 2011 for an overview). While subjective and objective measures might indeed yield different empirical results, they may both still be real and relevant (Bourgeois III., 1980; Tan & Litschert, 1994). Objective measures are suitable for primary decision making regarding domain selection. They are also most suitable regarding industry level research. For secondary decision making such as navigating through and adapting to certain domains, subjective measures seem appropriate in empirical research on organizations. Only perceived dynamism, independent of actual environmental dynamism, leads to strategic adjustments (Bourgeois III., 1980; Duncan, 1972; Tan & Litschert, 1994). As dynamic capabilities and the internal organization through trust and control belong to the second group, perceptual measures appear appropriate here.

The scale by Tan and Litschert (1994) has been slightly adjusted to account for a collective perception rather than managerial perceptions. I changed 'requires

managers to react' to 'requires us to react'. Similarly, I changed the item regarding advanced knowledge from managers, to the collective entity.

#### **4.2.2.7 Control-variables**

It is controlled for firm size, measured by the number of employees (Arend, 2013; Gellatly & Withey, 2012; Searle et al., 2011). Larger firms are less flexible and do not tend to adapt as frequently as small firms (Arend, 2013). Moreover, trust and control relationships can be less intense as the amount of personal interaction is reduced and trust has a reduced chance to gradually develop (Zand, 1972). On the other hand, larger firms might rely on a broader individual knowledge base, that allows for more extensive environmental monitoring (Schreyögg & Steinmann, 1987). Some might argue that the sample only includes small firms, and a control for firm size is not necessary. Although, all firms in the sample are small, the exchange among members is very different in firms with 40 employees compared to firms with five employees, as interactions occur more frequently. This can particularly affect trust, but also control, routinization, quick decision-making, as well as the implementation capacity. Moreover, all firms are small, a firm with 40 employees is still eight times bigger than a firm with five employees though.

Firm age is also deployed as a control variable, defined by years since the foundation of the organization (Arend, 2013; Protojerou et al., 2012). Older firms might already have reached a higher degree of routinization, formalization, and trust among actors. They also developed a different extent of patterned behavior underlying dynamic capabilities (Helfat & Peteraf, 2003). Younger firms on the other hand tend to change more frequently, due to the application of lessons learned (Arend, 2013).

I captured respondent's characteristics to measure their competence. This involves their experience in the firm and industry, measured in years (Danneels, 2008). Particularly for knowledge on routines and employee involvement in strategic renewal this appears relevant (Turner & Fern, 2012). The subordinates that responded were moreover asked to report on their function (Danneels, 2008). As the function of the organizations' managers is clear, I did not ask them to report on this.

Some papers further asked for the respondent's sex. There are some differences between males and females regarding the propensity for trust and control. However, on the individual, as well as on the group level they disappear in repeated interactions (Chaudhuri, Paichayontvijit, & Shen, 2013). Subordinates and managers are in a relationship with frequent interaction here. Gender differences might therefore not be influential here and have not been considered.

#### **4.2.3 Treatment and general characteristics of deployed measures**

For the course of this research, variables have mainly been measured using multi-item scales. Only the control variables *firm age*, *firm size*, and the respondent's characteristics *experience in the firm* and *experience in the industry* are exceptions here, as multi-item scales are uncommon for those constructs in the management literature. In some fields of business research, e.g. marketing, strong arguments about the folly of using multiple item measures have been articulated (e.g. Bergkvist & Rossiter, 2007). Nevertheless, the common mode in the quantitative dynamic capability, as well as the quantitative trust literature is still the application of multi-item scales (see Dietz & Den Hartog, 2006; Wilden et al., 2013 for an overview). There are only very few exceptions in the trust literature (e.g. Uslander, 2012), but they are not measuring trust inside organizations. To my knowledge, no publication on dynamic capabilities in a leading journal applied single item scales.

The selected scales for first-order constructs rely on reflective indicators, rather than formative indicators. Only the second-order construct *dynamic capabilities* is formative. A factor relies on formative indicators in case it is a function of its indicators. This would also imply that all existing indicators are captured without measurement error. Factors that rely on reflective indicators consist of items that only reflect the theoretical construct, rather than form it. Hence, the measurement items are also expected to co-vary (Homburg, 2000; Jarvis, MacKenzie, & Podsakoff, 2003).

To reduce the likelihood of measurement errors, all scales originate from published papers of the trust and control, routine, or the dynamic capability literature.

However, the leading journals are in the English language and I had to translate the scales into German to suit the sample of small German manufacturing firms. The translation was evaluated using the back-translation method. I initially translated all scales into German. A German native speaker experienced in teaching English language, but with no experience in research or questionnaire design, back-translated the scales into English. This ensures the understandability by uninitiated potential respondents (Brislin, 1970; Harzing, 2006). I compared the original scales and the back-translation to check for differences. Some differences occurred. To provide an example *established procedures* was back-translated into *pre-determined procedures*. I adjusted the German translation according to the original scales. In this case, from *etabliert* to *bewährt* as the back-translation indicated a rule, rather than a habit.

The validation of the translated survey included several steps. Five academics and twelve practitioners reviewed the scales to ensure face validity. I conducted the practitioner-tests in different ways to capture a broader amount of possible challenges. Four practitioners were used for a cognitive interviewing pre-test (Visser et al., 2000) to ensure an equal understanding of the concepts' meanings and the items' phrasings. I asked them to think aloud while answering the survey questions to capture considerations that come to mind. Tests involving German native speakers without knowledge of the English language or business science revealed that some German loanwords might not be understandable for all Germans, although they are a proximate translation. Furthermore, some respondents might not understand common business science terms in its intended meaning. This is relevant for the sample group as managers and employees of small German firms might possess various proficiencies in loanword use and business science knowledge. Examples here are *Produktivität* (English: productivity) that was transposed into *Leistungsfähigkeit* and *akkurat* (English: accurate), that was one time transposed into *richtig* and deleted without substitution another time.

Another test involved what is referred to as conventional pre-testing (Visser et al., 2000). I surveyed supervisors and subordinates from a large aviation company for this pre-test. The debriefing and the analysis of the questions revealed an



accumulation of non-responses regarding trust and control items as they are considered sensitive information. The cognitive interviewing yielded similar results. I thus slightly reworded sensitive items for a more euphemistic appearance. The headline *Soziale Kontrolle* (English: social control) has for example been renamed into *Soziale Interaktion* (English: social interaction). Overall, the scales have been left the most proximate to the English original as possible. An overview is provided in Table 3.

Table 3. Measurement scales

English	German as in the questionnaire	Source	$\alpha$	CR	AVE
<b>Environmental dynamism</b> The legal, technological, economic etc. demands imposed on the organization by its environment are changing constantly The main agents in our organization's environment (government, providers, customers etc.) change their demands unpredictably Our firm's environment requires to react rapidly to the changes that occur Normally, we have advance knowledge of the changes that will occur in the environment	<b>Umweltdynamik</b> Die Anforderungen der Umwelt (juristisch, technisch, wirtschaftlich, usw.) an unser Unternehmen ändern sich ständig Die wesentlichen Partner unseres Unternehmens (Behörden, Zulieferer, Kunden, usw.) ändern ihre Anforderungen auf unvorhersagbare Weise Unser Unternehmensumfeld erfordert es, schnell auf Änderungen zu reagieren Normalerweise wissen wir im Voraus, dass Änderungen eintreten werden	Tan and Litschert, 1994	0.74	0.74	0.49
<b>Dynamic capabilities</b> <b>Reflexivity</b> We can perceive environmental change before competitors We often have meetings to discuss the market demand We can feel the major potential opportunities and threats We have a perfect information management system We have a good observation and judgment ability	<b>Dynamische Fähigkeiten</b> <b>Wissens- und Wahrnehmungsmanagement</b> Wir nehmen Änderungen in unserem Geschäftsumfeld schneller wahr als unsere Wettbewerber Wir haben häufig Besprechungen, um die Marktanforderungen zu diskutieren Wir nehmen wesentliche Möglichkeiten und Bedrohungen in unserem Umfeld wahr Wir haben ein perfektes Informationsmanagementsystem Wir haben die Fähigkeit, den Markt gut zu beobachten und zu beurteilen	Li and Liu, 2012	0.78	0.79	0.43
<b>(Re-)action speed</b> We can quickly deal with conflicts in the strategic decision-making process Under many circumstances we can make timely decisions to deal with strategic problems We can remedy quickly to unsatisfied customers We can reconfigure resources in time to address environmental change.	<b>Zeitnahe Entscheidungsfindung</b> Bei Konflikten in der Entscheidungsfindung kommen wir schnell zu Lösungen Unter den meisten Umständen können wir schnelle Entscheidungen zu strategischen Problemen treffen Bei unzufriedenen Kunden können wir schnell Abhilfe leisten Wir können unsere Prozesse und Ressourcen schnell an Umweltänderungen anpassen		0.71	0.74	0.43
<b>Implementation capacity</b> Our strategic changes can be efficiently carried out Good cooperation exists among different functions We help each other with strategic change implementation We can efficiently improve strategic change implementation	<b>Veränderungsfähigkeit</b> Interne strategische Änderungen können effizient umgesetzt werden Unter den Mitarbeitern gibt es eine gute fachübergreifende Zusammenarbeit Wir helfen einander bei der Umsetzung von Veränderungen Wir verbessern uns ständig bei der Einführung von Änderungen		0.86	0.87	0.64

Table 3 (continued)

English	German as in the questionnaire	Source	$\alpha$	CR	AVE
<b>Employee involvement in strategic renewal</b>	<b>Mitarbeiterbeteiligung bei Veränderungen</b>	Uhlauer et al., 2013	0.85	0.85	0.66
My subordinates have originated these developments	Meine Mitarbeiter geben oft Anregungen zu Veränderungen				
My subordinates have been involved in these developments	Meine Mitarbeiter sind maßgeblich am Beschluss, Änderungen einzuführen, beteiligt				
My subordinates have been involved in the implementation of these developments	Meine Mitarbeiter sind maßgeblich an der Umsetzung von Veränderungen beteiligt				
<b>Routinization of the operational level</b>	<b>Formalisierung der operativen Tätigkeiten</b>	Withey et al., 1983; adjusted according to Becker, 2005	0.80	0.85	0.53
Tasks in this department are the same from day to day	Unsere Aufgaben sind tagtäglich gleich				
We do the same job in the same way most of the time	Wir erledigen meistens die gleichen Arbeiten auf die gleiche Art und Weise				
We perform repetitive activities	Wir führen sich wiederholende Tätigkeiten aus				
<b>Routinization of the strategic level</b>	<b>Formalisierung des Wandels operativer Tätigkeiten</b>	Arend, 2013	0.87	0.87	0.77
My firm has had a routine method for changing the main operating capability	In unserem Unternehmen gibt es eine routinierte Methode für die Anpassung unserer alltäglichen Aufgaben an neue Anforderungen				
My firm had a repeatable method it used that produced intended results regarding the changing of the main operating capability	Wir haben eine wiederholbare Methode die angewendet werden kann, um die operativen Fertigkeiten erfolgreich anzupassen				
<b>Social control</b>	<b>Soziale Interaktion</b>	Jaworski et al., 1993	0.91	0.92	0.60
The firm encourages cooperation between employees	In unserem Unternehmen wird die Kooperation von Mitarbeitern gefördert				
Most of the employees in my firm are familiar with each other's productivity	Die meisten Mitarbeiter in meinem Unternehmen sind mit der Leistungsfähigkeit ihrer Kollegen vertraut				
The firm fosters an environment where employees respect each other's work	Das Unternehmen fördert ein Umfeld, in dem Mitarbeiter die Leistungen der Anderen respektieren				
The firm encourages job-related discussions between employees	Das Unternehmen ermuntert Mitarbeiter zu arbeitsbezogenen Diskussionen untereinander				
Most employees in my firm are able to provide accurate appraisals of each other's work	Die meisten Mitarbeiter sind in der Lage, die Arbeit von Kollegen richtig einzuschätzen				
The work environment encourages employees to feel as part of the firm	Das Arbeitsumfeld ermuntert Mitarbeiter, sich als Teil des Unternehmens zu verstehen				
The work environment encourages employees to feel a sense of pride in their work	Das Arbeitsumfeld ermuntert Mitarbeiter, stolz auf Ihre Arbeit zu sein				

Table 3 (continued)

English	German as in the questionnaire	Source	$\alpha$	CR	AVE
<b>Outcome control</b>	<b>Ergebniskontrolle</b>	Jaworski et al., 1993	0.85	0.80	0.58
Specific performance goals are established for my subordinates' jobs	Spezifische Leistungsziele werden für die Tätigkeiten meiner Mitarbeiter erstellt				
I monitor the extent to which my subordinates attain their performance goals	Ich überwache den Grad der Zielerreichung meiner Mitarbeiter				
If the performance goals were not met, subordinates would be required to explain why	Wenn Ziele nicht erreicht wurden, müssen die Mitarbeiter erklären warum				
Subordinates receive feedback from me concerning the extent to which they achieve their goals	Meine Mitarbeiter erhalten ein Feedback über den Grad Ihrer Zielerreichung von mir				
Pay increases are based upon how performance compares with their goals	Gehaltssteigerungen von Mitarbeitern basieren auf der jeweiligen Leistung in Bezug zu den Zielvorgaben				
<b>Behavior control</b>	<b>Verhaltenskontrolle</b>	Jaworski et al., 1993	0.79	0.76	0.45
I monitor the extent to which subordinates follow established procedures	Ich überwache, wie sehr meine Mitarbeiter bewährten Abläufen folgen				
I evaluate the procedures my subordinates use to accomplish a given task	Ich bewerte die Vorgehensweise meiner Mitarbeiter bei der Erfüllung von Aufgaben				
I modify a subordinates procedures when desired results are not obtained	Ich verändere die Arbeitsabläufe von Mitarbeitern, wenn gewünschte Ergebnisse nicht erzielt werden				
Subordinates receive feedback on how they accomplish performance goals	Die Mitarbeiter erhalten ein Feedback über die Erreichung ihrer Leistungsziele				
<b>Trust</b>	<b>Vertrauen</b>	Gillespie, 2003, 2012	0.86	0.85	0.53
<b>Reliance</b>	<b>Bereitschaft sich auf andere zu verlassen</b>				
How willing are you to...	Ich bin gewillt:				
Rely on your subordinates' work-related judgments.	Mich auf die arbeitsbezogenen Urteile meiner Mitarbeiter zu verlassen				
Rely on your subordinates' task-related skills and abilities.	Mich auf die aufgabenbezogenen Fähig- und Fertigkeiten meiner Mitarbeiter zu verlassen				
Depend on your subordinates to handle an important issue on your behalf.	Mich auf meine Mitarbeiter zu verlassen, um eine für mich wichtige Angelegenheit zu erledigen				
Rely on your subordinates to represent your work accurately to others.	Mich auf meine Mitarbeiter zu verlassen, um meine Leistungen anderen zu präsentieren				
Depend on your subordinates to back you up in difficult situations.	Mich darauf zu verlassen, dass meine Mitarbeiter mir in schwierigen Situationen den Rücken stärken				

Table 3 (continued)

English	German as in the questionnaire	Source	$\alpha$	CR	AVE
<b>Disclosure</b>	<b>Offenheit</b>		0.89	0.89	0.62
How willing are you to...	Ich bin gewillt:				
Share your personal feelings with your subordinates.	Persönliche Gefühle mit meinen Mitarbeitern zu teilen				
Confide in your subordinates about personal issues that are affecting your work.	Mit meinen Mitarbeitern über persönliche Dinge zu sprechen, die meine Arbeit beeinflussen				
Discuss how you honestly feel about your work, even negative feelings and frustration.	Offen und ehrlich darüber zu sprechen, was ich über meine Arbeit denke (einschließlich negativer Gefühle und Frust)				
Discuss work-related problems or difficulties that could potentially be used to disadvantage you.	Über Probleme bei der Arbeit zu sprechen, die möglicherweise zu meinem Nachteil verwendet werden könnten				
Share your personal beliefs with your subordinates.	Persönliche Überzeugungen mit meinen Mitarbeitern zu teilen				
<b>Performance</b>	<b>Leistung</b>		0.82	0.83	0.66
Compared to the industry, we have a high	Im Vergleich zum Branchendurchschnitt, haben wir:	Drnevich and Kriauciunas, 2011			
Quality of products or services	Eine hohe Qualität der Produkte und Dienstleistungen				
Productivity	Eine hohe Produktivität				
Business process performance	Eine hohe Optimierung betrieblicher Abläufe				
Profitability	Eine hohe Profitabilität				
<b>Control variables</b>	<b>Weitere Eigenschaften</b>		n/a	n/a	n/a
How many employees work in your organization	Wie viele Mitarbeiter arbeiten in Ihrem Unternehmen	Arend, 2013			
How long has your organization existed (in years)	Wie viele Jahre existiert Ihr Unternehmen schon	Arend, 2013			
How long have you worked in your organization (in years)	Seit wie vielen Jahren arbeiten Sie schon in diesem Unternehmen	Danneels, 2008			
How long have you worked in the industry (in years)	Wie viele Jahre arbeiten Sie schon in der Branche	Danneels, 2008			
With the exception of the controls (open questions with numbers to fill in), all questions were assessed on a 7 point Likert-type scale ranging from strongly disagree (1) to strongly agree (7).					

### **4.3 Measurement properties and descriptive statistics**

#### **4.3.1 Missing data**

Of the deployed 249 cases, some entailed missing data. According to Rubin (1976) and Little and Rubin (1989), the character of missing data needs to be revealed. It therefore needs to be analyzed whether the data is *missing completely at random*, *missing at random*, or *missing not at random* (Byrne, 2010; Myers, 2011). The questions most often non-answered are those related to performance (at least one item missing in 9 out of 249 cases, 3.61%). There might be reasons that respondents with a certain performance are less likely to answer. They might for example be ashamed of performing poorly, or they want to keep their superior performance a secret. The non-response might thus not be missing completely at random. However, there seems to be no relation between the degree of dynamic capabilities and the willingness to report on performance. The data might thus be missing at random and a separate treatment is not required (Byrne, 2010).

Hence, I imputed the missing data with maximum likelihood estimation using the Amos software package. Different to a deletion of cases, a bias for data missing at random is unlikely here. Moreover, in contrast to an imputation of means, the reported statistics and standard errors are not biased (see Arbuckle, 1996 for an overview). Although several valid alternatives for the treatment of missing data exist, such as hot deck imputation (Myers, 2011), maximum likelihood estimation has been recommended as state of the art in treating missing data (Byrne, 2010; Little & Rubin, 1989; Schafer & Graham, 2002). Overall, I imputed 1.87% of the items in the responses. A sensitivity analysis (see Table 20 in Chapter 4.4.6 Sensitivity analysis) reported essentially similar results for datasets with and without imputation.

#### **4.3.2 Factor analyses**

I extracted the factors for the multi-item constructs with varimax rotation using the SPSS software package. Some constructs contained meaningful sub-dimensions, that are however of minor relevance for this research project as they are not analyzed separately. The trust measure for example consists of a reliance and a disclosure

dimension, which have not been part of distinctive hypotheses on their own. Obviously, the sub-dimensions' items load on separate factors and do not yield one common factor for the overall construct. In those cases, I extracted the factor-scores of the sub-dimensions first. Afterwards, I extracted the second-order factor-score for the construct as a whole from the scores of the sub-dimensions.

Recently, the use of the item's arithmetic means instead of extracted factor scores has gained popularity. I conducted a sensitivity test to compare the deployment of the arithmetic means instead of rotated factor scores. The results for the regression analysis remained essentially similar (see Table 20 in Chapter 4.4.6 Sensitivity analysis).

### **4.3.3 Reliability**

I tested the reliability of the applied multi-item scales. First, I calculated Cronbach's (1951) alpha ( $\alpha$ ) to assess the internal consistency of the scales. With the exception of the environmental dynamism scale, all scales yielded results above the required minimum value of 0.7 (Nunnally, 1978) (see Table 3). The environmental dynamism scale however, only reported a Cronbach's alpha of 0.515 initially. A subsequent exploratory factor analysis based on the Kaiser-criterion extracted two factors. The fourth item (*Normally, we have advance knowledge of the changes that will occur in the environment*) had a factor loading of 0.178 on the first factor, whereby the others loaded 0.845 (item 1), 0.775 (item 2), and 0.796 (item 3) respectively. Item 4 however had a loading of 0.959 on factor 2 whereby the others loaded with 0.027 (item 1), 0.309 (item 2), and 0.115 (item 3). Following Homburg (2000), items with a loading of less than 0.4 should be dropped. I thus eliminated item 4, as it has shown no consistency with the other items. A subsequent confirmatory factor analysis of the remaining three items yielded a Cronbach alpha of 0.735 and an increased explained variance of 65.526% (before 49.539%) indicating internal consistency. Although the environmental dynamism scale has been deployed multiple times before, it appears that the fourth item does also not fit on a theoretical basis. It measures the awareness of changing demands, but not environmental change itself. To assess the reliability of the constructs further, I also calculated the composite reliability (CR). All constructs

exceed the common cutoff of 0.7 (Nunnally, 1978), providing a further indication of reliable operationalizations (see Table 3).

#### **4.3.4 Validity**

Convergent validity has been assessed using the average variance extracted (AVE) and a comparison of AVE and CR (Hair, Black, Babin, Anderson, & Tatham, 2010). The AVE for all constructs exceeds the cutoff-value of 0.4 (Diamantopoulos & Sigauw, 2000). Moreover, all AVE are smaller than the CR of the respective constructs (see Table 3). This indicates convergent validity.

I assessed discriminant validity based on the procedure outlined by Fornell and Larcker (1981). Precisely, I calculated the square roots of the AVE and compared the value to the absolute values of the correlations with the additional measures in the model. The square root of the average variance extracted always exceeds the correlations with the further variables, indicating discriminant validity (see Table 4 in Chapter 4.3.6 Descriptive statistics).

#### **4.3.5 Goodness of fit**

After the individual assessments of the constructs, I conducted a confirmatory factor analysis for all first-order constructs with the maximum likelihood procedure of the structural equation modelling Amos software package (Byrne, 2010). The amount of available fit indices is extensive, and there is no common agreement on the appropriateness of every one of them. To avoid the possible allegation of *cheery-picking* (Kenny, 2014), all indices reported here, follow the reported indices in Schilke (2014). At the time of the analysis, the latest published article (online first) on dynamic capabilities in an A-ranked (VHB-ranking) journal that relied on structural equation modelling for confirmatory factor analysis.

The measures of goodness of fit provide partially satisfactory values. The  $\chi^2$ /d.f. is with 1.605 ( $\chi^2=2208.494$ ; d.f.= 1367) satisfactory and below the most rigorous recommended cutoff of 2 (Byrne, 2010). It is therefore also below the more common



and more liberal cutoffs between 3 and 5 (Hair et al., 2010). The root mean square error of approximation (RMSEA) is 0.049 indicating a very good fit (<0.05) according to MacCallum, Browne, and Sugawara (1996). The Tucker-Lewis-index (TLI) of 0.874 is close to, but not above the recommended cutoff value of 0.9. However, the TLI tends to over-reject true-population models in smaller samples, and is generally less meaningful for small samples (Hu & Bentler, 1999). A TLI below 0.9 has been proclaimed to be acceptable for models with many variables and a small sample size (Sharma, Mukherjee, Kumar, & Dillon, 2005). Thus, the TLI still appears to be appropriate for this model. Similarly, the comparative fit index (CFI) is 0.887 and close to, but below the commonly recommended cutoff of 0.9, although cutoffs above 0.8 can be found as well (Hair et al., 2010). The CFI and the TLI are highly correlated, whereby the CFI is always greater than the TLI in case the CFI does not exceed one (Kenny & McCoach, 2003; Kenny, 2014). Thus, the argumentation for the TLI also applies for the CFI. The goodness-of-fit index (GFI) is 0.765 and clearly below the recommended cutoff of 0.95. However, this fit index is commonly reported, it is highly affected by sample size though. It should not be used further, particularly not in small samples (Sharma et al., 2005). As the sample size is small, this applies here.

Fit indices should generally not be overvalued. It has been argued, that fit indices, except the  $\chi^2$  add nothing to the analysis (e.g. Barrett, 2007). In a less extreme positioning, some argue that at least the cutoffs are misleading and are subject to misuse (e.g. Hayduk, Cummings, Boadu, Pazderka-Robinson, & Boulianne, 2007). For a more extensive overview on the debate of the value of fit indices in structural equation modelling, see the special issue of *Personality and Individual Differences* Volume 42, Issue 5, 2007.

#### **4.3.6 Descriptive statistics**

Table 4 provides the means, standard deviations, correlations, and the square roots of the AVE for the independent variables. As the deployed varimax-rotation affects the standard deviation and the means, I calculated those values based on the arithmetic means of the items underlying the factors.

Table 4. Descriptive statistics, correlations, discriminant validity

	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Firm size	14.87	8.354	n/a														
(2) Firm age	41.84	31.561	0.002	n/a													
(3) Env. dynamism	5.02	1.200	0.036	-0.024	0.699												
(4) Employee involv.	5.24	1.007	-0.077	-0.156	0.113	0.811											
(5) Rou. oper. lev.	3.87	1.303	0.012	0.093	-0.094	-0.218	0.760										
(6) Rou. stra. lev.	4.28	1.309	0.043	0.087	0.058	0.147	0.138	0.875									
(7) Social control	5.55	0.862	-0.015	-0.073	0.075	0.586	-0.192	0.193	0.775								
(8) Outcome control	4.69	1.121	0.045	-0.048	0.096	0.364	-0.193	0.291	0.486	0.728							
(9) Behavior control	5.09	0.966	0.047	0.073	0.093	0.269	-0.079	0.307	0.383	0.597	0.668						
(10) Reliance	5.44	0.876	0.063	-0.114	0.110	0.500	-0.120	0.191	0.613	0.343	0.257	0.730					
(11) Disclosure	4.64	1.298	0.005	-0.074	0.023	0.282	-0.126	-0.041	0.384	0.140	0.128	0.368	0.788				
(12) Reflexivity	4.39	0.958	0.057	-0.032	0.193	0.471	-0.174	0.238	0.475	0.427	0.260	0.346	0.150	0.657			
(13) (Re-)action speed	5.59	0.745	0.063	-0.056	0.080	0.378	-0.051	0.199	0.409	0.322	0.269	0.278	0.103	0.355	0.655		
(14) Impl. capacity	5.54	0.858	-0.067	-0.056	0.055	0.598	-0.123	0.253	0.662	0.474	0.368	0.388	0.178	0.487	0.549	0.799	
(15) Performance	5.17	0.965	0.009	0.023	0.000	0.292	-0.077	0.283	0.499	0.395	0.395	0.424	0.182	0.425	0.404	0.538	0.740

n=249; numbers in the diagonal show square roots of AVE; numbers below the diagonal show correlations; AVE not available for single item constructs;  $|r| > 0.106 - p < 0.10$ ;  $|r| > 0.130 - p < 0.05$ ;  $|r| > 0.156 - p < 0.01$ ;  $|r| > 0.218 - p < 0.001$

Further characteristics of the firms in the sample are presented in Table 5. As already mentioned, some firms have grown and reported a higher amount of employees than expected. On average 14.87 employees worked in the firms that have been included in the sample. Although the firms are small, characteristics of start-ups, which are often associated with a higher degree of dynamic capabilities (Arend, 2013), thus a biased sample, cannot be concluded, as only very few firms are young. On average, the firms are 41.84 years old.

Table 5. Sample composition

	Absolute values	%
<b>Firm size (employees)</b>		
5-10	102	40.96
11-15	62	24.90
16-20	32	12.85
21-25	24	9.64
26-30	17	6.83
31-35	5	2.01
36-40	7	2.81
<b>Firm age (years)</b>		
≤10	7	2.81
11-20	49	19.68
21-30	69	27.71
31-50	59	23.69
51-100	49	19.68
≥101	16	6.43

#### 4.3.7 Non-response bias

The response rate is somewhat low, which suggests the possibility of non-response bias (Baruch & Holtom, 2008; Zaheer et al., 1998). To test for non-response bias, early (the quickest third by days between first contact and response) and late respondents (the slowest third by days between first contact and response) have been compared (Armstrong & Overton, 1977).

Of the submitted questionnaires, I could use 181 for a non-response bias test. In the online submission system, some participants saved their questionnaires, but forgot to press the *submit*-button, which is required to be able to identify a submission date. As this does prevent the identification of the exact submission date, I had to exclude them from the analysis. This applies to seven cases. Nineteen respondents filled out the paper version. Unlike the online submissions, the date and time for completion and submission differs and only the submission date is known. I excluded those cases, as they are not comparable. There are also 75 anonymous submissions. As they cannot be matched to a specific firm, the time-span between initial contact and response cannot be estimated. While this might be a shortcoming as those cases cannot be included in the non-response analysis, it offered the invaluable advantage of an increased response rate. The cases of 60 early respondents and 60 late respondents could be used for the analysis of systematic differences between the sample and the population by comparing means. As the Levene-test reported differences in variances, I relied on a Welch-test for the variables behavior control and managerial trust in employees. The means of all other variables were compared with a t-test. I revealed no significant differences between early and late respondents (see Table 6).

Table 6. Comparison of means for early and late respondents

Variables	Mean		t	p
	Early resp.	Late resp.		
Firm size	19.092	24.950	-0.797	0.427
Firm age	45.567	46.172	-0.920	0.926
Env. dynamism	0.056	0.105	-0.287	0.774
Employee involvement	0.044	0.058	-0.075	0.940
Rou. oper. lev.	0.042	0.104	0.804	0.423
Rou. stra. lev.	0.004	-0.005	0.530	0.957
Social control	0.156	0.184	-0.155	0.877
Outcome control	0.020	-0.042	0.312	0.755
Behavior control <sup>a</sup>	0.086	0.147	-0.332	0.740
Trust <sup>a</sup>	0.224	-0.005	1.288	0.200
Dynamic capabilities	0.068	0.202	-0.734	0.464
Performance	0.113	0.058	0.287	0.775

<sup>a</sup> Welch-test has been applied; all other variables tested with a t-test; the reported means are except firm size and firm age based on varimax-rotated factors

Furthermore, following Patzelt and Shepard (2008), I deployed data accessed through the Hoppenstedt database to test for differences in turnover of responding and non-responding organizations with a t-test. Again, only non-anonymous answers were included in the analysis. There appears to be no significant difference regarding the means of turnover (in million €) in the years 2006 ( $t=0.184$ ;  $p=0.854$ ) and 2007 ( $t=0.200$ ;  $p=0.841$ ). The data on turnover, is quite old, however no additional information on turnover was available for the firms back in 2009, when the firm information have been accessed.

#### **4.3.8 Informant qualification and common method bias**

The data collection relied on key informants as the primary information source. Key informant research is often criticized (Kumar, Stern, & Anderson, 1993). The application of a common method for the collection of data on the dependent and independent variables can also cause biases (Homburg et al., 2012). However, many studies on dynamic capabilities collect data for independent and dependent variables through one source, particularly when surveys are deployed as the collection method (e.g. Arend, 2013; Capron & Mitchell, 2009; Danis et al., 2010; Luo, 2002; Malik & Kotabe, 2009; Marcus & Anderson, 2006). As already argued in section 4.1 (Sample and data collection), there are many particular reasons for the reliance on managers as key informants in this research project.

##### ***4.3.8.1 Informant qualification***

Common method bias is generally less of a concern, when top-managers of small organizations are targeted (Gerhart, Wright, & McMahan, 2000). They are the single respondents that can offer the most information (Arend, 2013; Clark, 2000). To provide a first indication of the appropriateness of the selected informant, some questionnaire items asked about the experience of the respondent in both, the firm and the industry. The supervising respondents had

on average 21.1 years of experience in the firm and 26.8 years of experience in the industry. They therefore seem to be highly experienced and possess relevant knowledge of their firm's characteristics as well as the industry's volatility and developments (see Table 7).

Table 7. Respondents' characteristics

	Absolute values	%
<b>Experience in firm (years)</b>		
≤5	19	7.63
6-10	17	6.83
11-15	40	16.06
16-20	45	18.07
21-25	61	24.50
25-30	23	9.24
≥31	44	17.67
<b>Experience in industry (years)</b>		
≤5	10	4.02
6-10	13	5.22
11-15	27	10.84
16-20	26	10.44
21-25	42	16.87
26-30	39	15.66
31-35	35	14.06
≥36	57	22.89

#### 4.3.8.2 Procedural methods for common method bias

Following Arend (2013), I applied several procedural methods to minimize the existence of common method bias upfront. First, the online platform intermediary guaranteed anonymity, reducing the participants' tendency to answer in a socially desirable way. Second, careful attention to wording and translation as well as intensive pre-testing procedures reduced survey item ambiguity. Third, I placed independent and dependent variables apart to avoid drawing conclusions about the proposed relationships between variables.

Conscious matching of responses to relationships appears unlikely (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

#### 4.3.8.3 *Dyadic validation*

To validate the data further, a second informant was contacted. Overall, 21 employees provided a usable second questionnaire. However, some surveys had to be excluded due to non-response or anonymous response of the matching manager. Seventeen validating surveys could be deployed. To determine inter-rater reliability the intraclass correlation (1) [ICC(1)] was calculated for several variables (Bliese, 1998; Shrout & Fleiss, 1979). Performance, dynamic capabilities, social control, and routinization of ordinary capabilities are beyond the 0.7 cutoff indicating strong reliability. With the exception of outcome control, all other variables exceed Bliese's (1998) 0.1 cutoff. See Table 8 for the exact values.

Table 8. Intraclass correlation of informants

Variable	ICC(1)
Environmental dynamism	0.160
Employee involvement	0.632
Routinization operational level	0.840
Routinization strategic level	0.510
Social control	0.775
Outcome control	-0.020
Behavior control	0.422
Trust	0.485
Dynamic capabilities	0.735
Performance	0.735

Hence, there only appear to be discrepancies for one variable. Discrepancies for outcome control are theoretically understandable, as the perception of what

constitutes the evaluation of outcomes might differ between supervisor and subordinate (Challagalla & Shervani, 1997). Moreover, it is a very sensitive issue and the socially desirable values for supervisors and subordinates are opposing (Crowne & Marlowe, 1960; Edwards, 1957).

#### ***4.3.8.4 Statistical tests for common method bias***

To further test for common method bias, Harman's (1976) single factor test has been conducted. All items have been loaded on one non-rotated factor in a confirmatory factor analysis using the SPSS software package. The single factor explained 26.059% of the variance. As the value is below 50%, this test indicates that common method bias is unlikely.

Following Podsakoff et al. (2003), I conducted another statistical test and added a common latent factor to the model using the Amos software package. The model fit remained essentially similar after the inclusion of the factor (model without common latent factor:  $\chi^2/d.f.=1.605$ , RMSEA=0.049, TLI=0.874, CFI=0.887, GFI=0.765; model with common latent factor:  $\chi^2/d.f.=1.575$ , RMSEA=0.048, TLI=0.880, CFI=0.893, GFI=0.770). With the exception of one item related to (re-)action speed ( $\Delta -0.354$ ), all items loaded more strongly on their respective factors than on the common latent factor ( $\Delta$  range between 0.014-0.678). Likewise, the estimates of the standardized regression weights remained essentially similar, when adding the common latent factor ( $\Delta$  range between 0.003-0.127). Only the one item related to (re-)action speed ( $\Delta 0.276$ ) reported a larger difference than 0.2. As only one item loaded strongly on the common latent factor, no adjustment measures have been undertaken.



## **4.4 Data analysis and results**

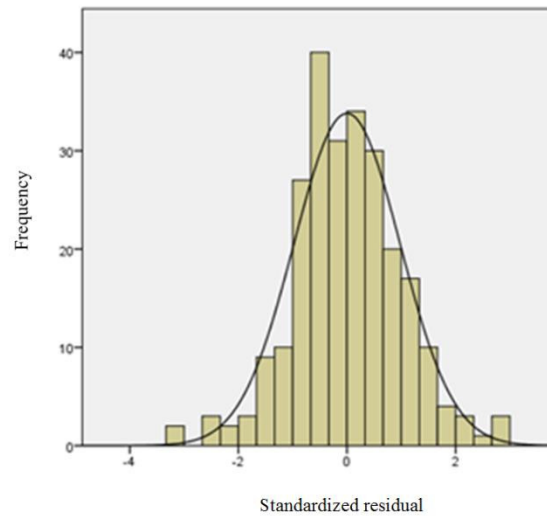
### **4.4.1 Tests for the assumptions of OLS regression**

I deployed ordinary least squares (OLS) regression to analyze the data. OLS regression calculates the best linear unbiased estimator based on a minimization of the squared error terms. In order for the results to be interpretable in a meaningful manner, the analysis must meet several assumptions. The distribution of residuals needs to be of independent and identical form. Independent distribution corresponds to the absence of autocorrelation and identical distribution to the absence of multicollinearity. Furthermore, the residuals should follow a normal distribution, their mean should be zero, and there should be no heteroskedasticity present. The model must also be correctly specified. This means the relationship should be linear, no main variable should be missing, and there should be no strong correlation between a variable and the residuals. Measurement error must be reduced, so that the results could be repeatedly obtained in other samplings. Somewhat obviously, the values of the independent variables must not all be the same and the number of observations should exceed the number of parameters to be estimated (Gujarati, 2004). The following chapters represent statistical tests of these assumptions. I tested some assumptions simultaneously.

#### ***4.4.1.1 Normal distribution of residuals***

I tested for the normal distribution of residuals in various ways. First, I graphically checked the distribution of residuals using a histogram (see Figure 4). The provided histogram shows the frequency of the standardized residuals in the full regression model with dynamic capabilities as the dependent variable. The graphical check provided a first indication that the residuals might be normally distributed.

Figure 4. Histogram of residuals



I further tested the distribution of the standardized residuals using the Kolmogorov-Smirnov test. The results were non-significant ( $d=0.050$ ;  $n=249$ ;  $p=0.200$ ), indicating a support for the null-hypothesis that the residuals are normally distributed. Although, the Kolmogorov-Smirnov-test is still widely used, it has been criticized for being less powerful (D'Agostino, Belanger, & D'Agostino Jr, 1990). I therefore also conducted the alternative Shapiro-Wilk-test. As within the Kolmogorov-Smirnov test, the results are non-significant ( $w=0.990$ ;  $n=249$ ;  $p=0.078$ ), indicating a support for the null-hypothesis that the residuals are normally distributed.

#### ***4.4.1.2 Autocorrelation of residuals***

Autocorrelation describes a systematic relation of the residuals in neighboring cases. The existence of autocorrelated residuals is less likely in this dataset, as no relation of the observations in the manner of a time-series is present. Autocorrelation most often occurs in time-series data. Furthermore, there is no underlying theoretic logic behind the order of observations (Wooldridge, 2011). However, for the sake of a complete test of the assumptions underlying

OLS regression I conducted a Durbin-Watson test for autocorrelation. The test yielded a value of 2.024. The values can range from 0 to 4. Values close to 2 indicate an absence of autocorrelation (Wooldridge, 2011), which seems to be the case here.

#### 4.4.1.3 Covariance between residuals and independent variables

Another assumption is the absence of a correlation between residuals and the independent variables (Gujarati, 2004). I regressed the residuals on all independent variables and found no significant relationship between any of the variables and the residuals (see Table 9).

Table 9. OLS regression results for residual model

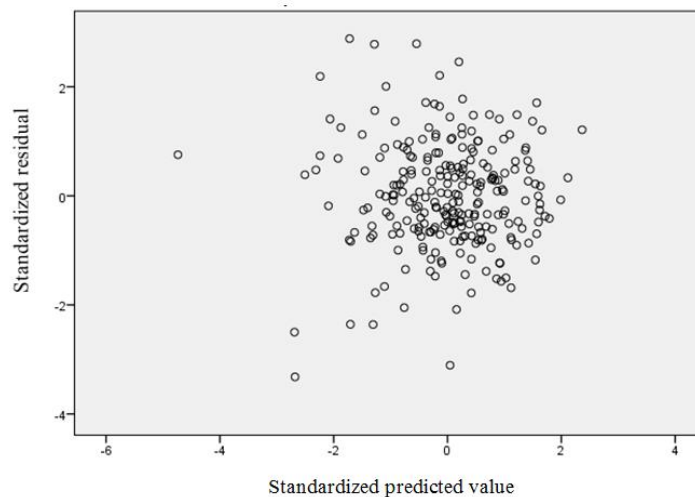
Variables	
Intercept	-0.119 (0.158)
Firm size	0.007 (0.008)
Firm age	0.000 (0.002)
Env. dynamism	-0.002 (0.064)
Employee involvement	0.010 (0.082)
Rou. oper. lev.	0.000 (0.068)
Rou. stra. lev.	-0.003 (0.070)
Social control	0.002 (0.094)
Outcome control	-0.002 (0.087)
Behavior control	-0.004 (0.082)
Trust	-0.005 (0.082)
R <sup>2</sup>	0.003
F	0.083

unstandardized coefficients and standard errors (in parentheses) are reported; + p < 0.10; \* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001; n=249

#### 4.4.1.4 Heteroskedasticity

Another assumption underlying OLS regression is a constant variance of the residuals in the regression, implying that the distribution is random. This is also termed homoscedasticity. The opposite is heteroskedasticity (Gujarati, 2004). A first indicator of heteroskedasticity is an observable structure in the scatterplot of standardized predicted values (x-axis) and standardized residuals (y-axis). The scatterplot for the regression model appears to show a centered grouping of residuals (see Figure 5).

Figure 5. Scatterplot for heteroskedasticity tests



To further test for heteroskedasticity, I applied the Breusch-Pagan test using the Stata software package. The null-hypothesis represents homoscedasticity (Gujarati, 2004). The test yielded a  $\chi^2$  of 32.59 with ten degrees of freedom. This refers to  $p=0.0003$  indicating the presence of heteroskedasticity. To confirm the indicated heteroskedasticity, I also applied the White test, which is considered more accurate for non-linear forms of heteroskedasticity. The results ( $\chi^2=115.92$ ; d.f.=65;  $p=0.0001$ ) further supported the findings of the Breusch-Pagan test and indicated heteroskedasticity.

The presence of heteroskedasticity violates the assumptions of OLS regression. OLS might thus not create the best linear unbiased estimators. Under certain conditions, weighted least squares regression or generalized least squares regression are feasible alternatives in the presence of heteroskedasticity. Generalized least squares regression confers a classical OLS regression, with the exception that the variables have been transformed by dividing the individual values with the square root of their known real individual error terms to satisfy the required assumption. Applying generalized least squares regression provides the best linear unbiased estimators in the presence of heteroskedasticity (Gujarati, 2004). However, neither the real error terms nor their variances are known. Thus, the application of generalized least squares regression is not an option. An alternative would be weighted least squares regression, whereby the individual cases are weighted. This option is useful for samples in which the error terms follow a functional form. Examples are linear increasing or decreasing error terms or non-linear forms (Gujarati, 2004). However, the scatterplot does not provide any indication of a functional form. Weighted least squares regression is also useful in case a singular offending independent variable can be identified. This offending variable could be used in further calculations as the weight for the variables (Berry & Feldman, 1985). Separate Breusch-Pagan tests, whereby the independent variables have been tested individually yielded heteroskedasticity not only for one offending variable, but for various variables in the model (see Table 10). I thus cannot use any of the variables as a singular weight.

Table 10. Breusch-Pagan-test for heteroskedasticity of individual independent variables against dynamic capabilities

Variables	$\chi^2 (1)$	$p > \chi^2$
Firm size	1.54	0.2147
Firm age	4.02	0.0449
Env. dynamism	0.11	0.7431
Employee involvement	11.81	0.0006
Rou. oper. lev.	0.04	0.8465
Rou. stra. lev.	2.62	0.1056
Social control	11.63	0.0006
Outcome control	14.03	0.0002
Behavior control	2.62	0.1056
Trust	1.67	0.1957

A further try to identify a singular offending independent variable, has been an adjusted Breusch-Pagan test. All independent variables have been regressed against an indicator of the case individual variances from the initial OLS regression, calculated as the squared individual errors divided by the quotient of the sum of squared errors and the number of cases (Gujarati, 2004). The test yielded significant relationships of more than one individual variable with the variance (see Table 11).

Table 11. OLS regression results for adjusted Breusch-Pagan test

Variables	
Intercept	1,467*** (0.247)
Firm size	-0.014 (0.012)
Firm age	-0.007* (0.003)
Env. dynamism	0.060 (0.101)
Employee involvement	-0,238+ (0.130)
Rou. oper. lev.	-0,072 (0.106)
Rou. stra. lev.	-0,017 (0.109)
Social control	-0.168 (0.148)
Outcome control	-0.296* (0.136)
Behavior control	0.158 (0.128)
Trust	0.114 (0.128)
R <sup>2</sup>	0.089
F	2.298*

unstandardized coefficients and standard errors (in parentheses) are reported; + p < 0.10; \* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001; n=249

As I could not identify a singular meaningful weight, it seems that the error variance is not a function of the predictors, or a linear combination of various predictors. White (1980) refers to this phenomenon as heteroskedasticity of unknown form (Hayes & Cai, 2007). The possibility of applying a meaningful weighted least squares regression or generalized least squares regression has thus been excluded (Berry & Feldman, 1985).

The presence of heteroscedasticity leads to a bias in tests of significance, the estimates however remain unbiased and strongly consistent (Hayes & Cai, 2007; White, 1980). The use of robust standard errors is therefore a feasible solution. Robust standard errors relax the assumptions of independent and consistently distributed residuals. Their application results in unchanged

estimates, but adjusted, reasonably more accurate p-values, confidence intervals, and additional indicators of significance (Allison, 1999). Robust standard errors are also termed Huber-White standard errors, although not all of the possible robust standard error methods still completely follow the conceptualizations by Huber (1967) and White (1980). Nevertheless, they are mostly further developments and still based on the seminal concepts. To avoid misspecifications related to heteroskedasticity, I will in further considerations rely on the robust standard error OLS estimation by Davidson and McKinnon (1993), which has been recommended as contemporary state of the art by Hayes and Cai (2007). A sensitivity analysis with the also popular robust method by Cribari-Neto (2004) yielded similar results (see Table 12).

Table 12. Comparison of errors for OLS regression with non-robust errors, robust errors following Cribari-Neto (2004), and robust errors following Davidson and McKinnon (1993)

Variables	$\beta$	Non-robust	Cribari-Neto (2004)		Davidson and McKinnon (1993)	
		SE	SE	$\Delta$ SE	SE	$\Delta$ SE
Intercept	-0.081	0.107	0.133	-0.026	0.132	-0.025
Firm size	0.005	0.005	0.006	-0.001	0.006	-0.001
Firm age	0.000	0.001	0.001	0.000	0.001	0.000
Env. dynamism	0.048	0.044	0.052	-0.008	0.050	-0.006
Employee involvement	0.337	0.056	0.075	-0.019	0.072	-0.016
Rou. oper. lev.	0.016	0.046	0.050	-0.004	0.050	-0.004
Rou. stra. lev.	0.107	0.047	0.054	-0.007	0.054	-0.007
Social control	0.400	0.064	0.072	-0.008	0.071	-0.007
Outcome control	0.184	0.059	0.071	-0.012	0.071	-0.012
Behavior control	0.007	0.056	0.069	-0.013	0.069	-0.013
Trust	-0.104	0.055	0.071	-0.016	0.069	-0.014

n=249; dependent variable is dynamic capabilities



#### *4.4.1.5 Misspecification of the model*

The found heteroskedasticity might be an indicator for another violation of assumptions, namely a model-misspecification. In case of misspecification, a re-specification of the model, an inclusion of further variables, or an exclusion of offending variables are alternatives that would allow for further use of OLS regression (Gujarati, 2004). No meaningful additional variable could be identified that might be added to solve the occurrence of heteroskedasticity. Tested variables have been the experience of the key informant in both the firm and the industry and the belonging of the case to either the anonymous or non-anonymous response group. I also tested a stepwise exclusion of variables. An exclusion of at least three independent variables is required to achieve homoscedastic results. However, the exclusion would make the regression analysis meaningless from a theoretical argumentation standpoint.

I also tested if some of the variables have a non-linear relationship with dynamic capabilities, which might affect the variance of the disturbances (Berry & Feldman, 1985). To test for u-shaped and inverted u-shaped relationships, I regressed dynamic capabilities on the squared independent variables. No significant u-shaped relationships could be identified in tests with robust errors. I also tested heteroskedasticity in case the log of dynamic capabilities is regressed on the independent variables (Allison, 1999). However, the results remained heteroskedastic. This supports the proposed linear relationship.

As for all empirical research in the social sciences, I could not completely exclude the possibility of misspecification. However, as pointed out by Hayes and Cai (2007) drawing on former insights of MacCallum (2003), all models are wrong to some extent. Mathematical models can only provide approximations of the process that lead to observed outcomes. Insisting on perfect specification of models before inferences are drawn would mean to stop hypotheses testing using models at all.

#### ***4.4.1.6 Multicollinearity***

Multicollinearity describes a situation whereby two or more independent variables are linearly related. Exact multicollinearity is a perfect correlation between one or more independent variables. In case of multicollinearity the effects of the collinear variables are not distinguishable, which would bias the estimation, by creating an extensively large variance of the parameters (Gujarati, 2004).

To test for multicollinearity, first indicators are the correlations among the independent variables (see Table 4 in Chapter 4.3.6 Descriptive statistics). At first glance, employee involvement in strategic renewal appears to have some correlation with both social control ( $r=0.586$ ) and trust ( $r=0.473$ ). Moreover, social control seems to have some correlation with outcome control ( $r=0.486$ ) and trust ( $r=0.603$ ). Outcome control also appears to have some correlation with behavioral control ( $r=0.597$ ). From a theoretical standpoint, this does not seem surprising as effects between those variables have been discussed and partly hypothesized (see Chapters 3.1 Management-based microfoundations of dynamic capabilities). From a statistical standpoint, this might however be problematic, although those variables are not very highly correlated. I could not identify a problematic correlation among other independent variables.

To further test for multicollinearity, I conducted a variance inflation analysis. The calculated variance inflation factor (VIF) is the inverse of the tolerance, which is based on the regression of each single independent variable against all other independent variables. This analysis is deemed superior to a correlation table as it cannot only detect variables as functions of another variable, but also variables as a function of a combination of two or more variables. A VIF close to one indicates no problematic multicollinearity. There are discrepancies in the literature regarding the acceptable cutoff. Henseler and Chin (2010), as an example of a very liberal perspective, regard values beyond 10 as problematic, whereas Diamantopolous and Siguaw (2006), as an example of a very rigorous perspective, regard values beyond 3.33 as critical. None of the independent variables in the models exceeds a VIF of 2.20 (see Table 13), thus

multicollinearity does not seem to be problematic here. The use or non-use of robust standard errors does not affect the analysis of the VIF.

Table 13. VIF of the independent variables

<b>Variables</b>	<b>VIF</b>
Firm size	2.20
Firm age	1.86
Env. dynamism	1.67
Employee involvement	1.65
Rou. oper. lev.	1.66
Rou. stra. lev.	1.19
Social control	1.13
Outcome control	1.06
Behavior control	1.03
Trust	1.02
Mean	1.45

#### 4.4.2 Direct effects

Table 14 summarizes the regression results for the hypothesized direct effects of all independent variables on dynamic capabilities. Model 1 shows the results for the hypothesized direct effects of employee involvement in strategic renewal (H<sub>1</sub>) and all forms of control on dynamic capabilities (H<sub>4</sub>-H<sub>6</sub>). Model 2 only includes cases that reported high environmental dynamism (average value of items  $\geq 5$  on a 7 point-Likert-type scale) to test the rival hypothesized effects of routinization at the operational (H<sub>9</sub>) and at the strategic level (H<sub>10</sub>) on dynamic capabilities in regimes of high environmental dynamism. As only high environmental dynamism cases are included, I dropped the corresponding control-variable here. The necessity of one echelon below the manager only applies for trust-related hypotheses. I hence selected the high environmental dynamism cases from all available responses and not from the reduced sample that only included firms with less than 40 employees. This procedure created a sample of 161 firms for model 2. Nevertheless, to account for size effects the analyses involves a corresponding control variable. Model 3 and Model 4 are

regression models with performance as the dependent variable for post-hoc analysis tests that show the independence of the constructs dynamic capabilities and performance. Model 4 includes dynamic capabilities as an independent variable, while model 3 does not. For a further post-hoc test, Table 14 also shows the results of regressions against all dimensions of dynamic capabilities separately, namely reflexivity, (re-)action speed, and implementation capacity.

Table 14. Results of regression analysis for the direct effects

Variables	Dynamic capabilities					Performance	
	Reflexivity	(Re-)action speed	Impl. capacity	Model 1	Model 2	Model 3	Model 4
Intercept	-0.1669 (0.1529)	-0.1037 (0.1617)	0.0605 (0.1306)	-0.0806 (0.1317)	0.0625 (0.0842)	-0.0267 (0.1391)	0.0106 (0.1249)
<i>Independent variables</i>							
Firm size	0.0081 (0.0070)	0.0089 (0.0071)	-0.0048 (0.0062)	0.0047 (0.0061)	0.0010 (0.007)	-0.0011 (0.0069)	-0.0033 (0.0062)
Firm age	0.0011 (0.0015)	-0.0007 (0.0019)	0.0002 (0.0014)	0.0003 (0.0012)	-0.0004 (0.0013)	0.0010 (0.0017)	0.0009 (0.0016)
Env. dynamism	0.1219* (0.0514)	-0.0261 (0.0640)	-0.0217 (0.0532)	0.0484 (0.0501)		-0.0597 (0.0562)	-0.0821 (0.0521)
Employee involvement	0.2646*** (0.0706)	0.2148* (0.0844)	0.3286*** (0.0865)	0.3373*** (0.0716)	0.3895*** (0.0730)	-0.0415 (0.0752)	-0.1978* (0.0825)
Rou. oper. lev.	-0.0495 (0.0609)	0.0491 (0.0623)	0.0336 (0.0477)	0.0158 (0.0502)	-0.0312+ (0.0528)	-0.0043 (0.0612)	-0.0117 (0.0538)
Rou. stra. lev.	0.1114 (0.0691)	0.0729 (0.0634)	0.0751 (0.0514)	0.1066* (0.0540)	0.1019 (0.0589)	0.1424* (0.0633)	0.0930 (0.0611)
Social control	0.2253** (0.0747)	0.2535** (0.0862)	0.4685*** (0.0768)	0.4002*** (0.0707)	0.2448** (0.0776)	0.3244*** (0.0913)	0.1390 (0.1017)
Outcome control	0.2230** (0.0757)	0.0903 (0.0829)	0.1362+ (0.0731)	0.1844** (0.0710)	0.1847* (0.0720)	0.0851 (0.0794)	-0.0003 (0.0691)
Behavior control	-0.0780 (0.0881)	0.0537 (0.0785)	0.0339 (0.0648)	0.0069 (0.0689)	0.0354 (0.0758)	0.1618* (0.0741)	0.1586* (0.0676)
Trust	-0.0335 (0.0719)	-0.0700 (0.0750)	-0.1407+ (0.0765)	-0.1044 (0.0694)	-0.0230 (0.0798)	0.1230+ (0.0718)	0.1714* (0.0707)
Dynamic capabilities							0.4633*** (0.0697)
R <sup>2</sup>	0.3580	0.2323	0.5515	0.5564	0.5525	0.3337	0.4290
F	14.6782***	3.7094***	23.8192***	20.0806***	16.6766***	8.0630***	15.8424***
n	249	249	249	249	161	249	249

OLS with robust standard errors; unstandardized coefficients and standard errors (in parentheses) are reported; + p < 0.10; \* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

The results in model 1 indicate that employee involvement in strategic renewal has a significant positive effect ( $\beta=0.3373$ ;  $SE=0.0716$ ;  $p\leq 0.001$ ) on dynamic capabilities, thus supporting Hypothesis 1. The direct effect of managerial trust in employees is negative and non-significant ( $\beta=-0.1044$ ;  $SE=0.0694$ ;  $p=n.s.$ ). Behavior control had no significant effect ( $\beta=0.0069$ ;  $SE=0.0689$ ;  $p=n.s.$ ), thus Hypothesis 4 is rejected. In line with Hypothesis 5, outcome control is reported as positive and significant ( $\beta=0.1844$ ;  $SE=0.0710$ ;  $p\leq 0.01$ ). Social control has a positive significant effect ( $\beta=0.4002$ ;  $SE=0.0707$ ;  $p\leq 0.001$ ) on dynamic capabilities as well. This provides empirical support for Hypothesis 6.

In model 1, routinization at the operational level is positively, but not significantly related to dynamic capabilities ( $\beta=0.0158$ ;  $SE=0.0502$ ;  $p=n.s.$ ). Routinization at the strategic level is positively and significantly related to dynamic capabilities ( $\beta=0.1066$ ;  $SE=0.0540$ ;  $p\leq 0.05$ ). In model 2 that only includes cases with high reported environmental dynamism, the relationship between routinization at the operational level and dynamic capabilities becomes negative and weakly significant ( $\beta=-0.0312$ ;  $SE=0.0528$ ;  $p\leq 0.1$ ). Routinization at the strategic level becomes non-significant ( $\beta=0.1019$ ;  $SE=0.0589$ ;  $p=n.s.$ ). The results indicate that the effects of routinization differ depending on environmental dynamism. This provides a first indication of weak support for Hypothesis 9a and a rejection of the rival Hypotheses 9b and 9c. It also appears that all of the rival Hypotheses 10a, 10b, and 10c should be rejected. Thus, at first glance, none of the concurring theoretical conceptualizations by Eisenhardt and Martin (2000), Winter (2003), or Schreyögg and Kliesch-Eberl (2007) could be completely supported in this setting. However, the indirect and total effects of routinization on dynamic capabilities differ. This makes the direct effects reported here less meaningful for interpretation of the proposed effects. I will therefore discuss Hypotheses 9 and 10 in more depth in Chapter 4.4.4 (Mediated effects).

#### 4.4.3 Post-hoc analyses of direct effects

In a post-hoc analysis following the argumentation by Schilke (2014), I also re-estimated the regression model using the sub-dimensions of dynamic capabilities as dependent variables to provide evidence of the different effects on the separate dimensions. These are reflexivity, (re-)action speed, and implementation capacity. No essential differences occurred.

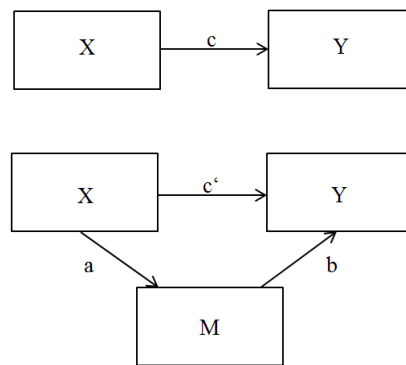
In a further post-hoc test (model 3), I regressed all independent variables on performance instead of dynamic capabilities to indicate the independence of the constructs dynamic capabilities and performance and avoid any tautology allegations in the operationalization. As argued in Chapter 2.1 [Origins of the concept and initial conceptualization by Teece et al. (1997)], the tautology of high performance and the possession of dynamic capabilities is a major concern in the literature. Model 4 differs from model 3 by including dynamic capabilities as an independent variable. The independence of performance and dynamic capabilities can for example be seen for the variable behavior control, which does not significantly affect dynamic capabilities ( $\beta=0.0069$ ;  $SE=0.0689$ ;  $p=n.s.$ ), but performance ( $\beta=0.1618$ ;  $SE=0.0741$ ;  $p\leq 0.05$ ). Similarly, trust does not seem to directly affect dynamic capabilities ( $\beta=-0.1044$ ;  $SE=0.0694$ ;  $p=n.s.$ ), but performance ( $\beta=0.1714$ ;  $SE=0.0707$ ;  $p\leq 0.05$ ). Somehow opposing, employee involvement in strategic renewal has a significant positive effect on dynamic capabilities ( $\beta=0.3373$ ;  $SE=0.0716$ ;  $p\leq 0.001$ ), but a non-significant negative effect on performance ( $\beta=0.0415$ ;  $SE=0.0752$ ;  $p=n.s.$ ). Although the constructs are independent, model 4 shows that dynamic capabilities still affect performance ( $\beta=0.4633$ ;  $SE=0.0697$ ;  $p\leq 0.001$ ) and therefore fulfill their purpose (see Chapter 2.3.2 Dynamic capabilities, performance, and the object of action).

#### 4.4.4 Mediated effects

In contemporary research, mediation is often examined based on Baron and Kenny's (1986) stepwise paths procedure whereby first, the dependent variable (Y) is regressed (c-path in Figure 6) on the independent variable (X). To support mediation, the relationship should be significant. Second, the mediator (M) is regressed on the independent variable (a-path in Figure 6) with a resulting significant effect. Third,

the dependent variable is regressed on both, the mediator (b-path in Figure 6) and the independent variable (c'-path in Figure 6). In this regression the mediator should affect the dependent variable significantly and the independent variable should affect the dependent variable with none (indicating *full* mediation), or at least less significance (indicating *partial* mediation) than within the regression model where the mediator was excluded (c-path). The Sobel z-test subsequently evaluates the joint significance of the indirect path combination (a-path and b-path).

Figure 6. Illustration of direct and indirect paths  
(adjusted from Preacher & Hayes, 2004)



Although Baron and Kenny's (1986) mediation test is used widely, several shortcomings have been identified and various authors recommended adjusted mediation tests. Zhao et al. (2010) for example criticize that the *full* mediating effect is proposed with a lack of a significant direct effect (path c'), when the mediating variable becomes involved. Instead, the strength of the indirect effect should make the difference, completely independent of the direct effect. A still existing significant direct effect could for example be based on another mediating variable not included in the study. Instead of regarding this as a flaw, this *partial* mediation is valuable as it can inform further research. As one alternative mediation procedure, Collins, Graham, and Flaherty (1998) developed a method, that does not assume a reduced significance between c' and c, but allows for the opposite and even no initial significance of c.

A second main criticism is the Sobel  $z$ -test applied for the analysis of the indirect path. It is considered to be low in power, when compared to bootstrapping tests (Preacher & Hayes, 2004, 2008). Third, the requirement of an initially significant relationship between the dependent and the independent variable in the first stage (path  $c$ ) is only valid in case of complementary mediation. This means that the direct and the indirect effect must both be positive or both be negative respectively. A competitive mediation on the other hand, whereby the coefficients of the indirect and the direct effect are of opposite sign, would offset the significance of the overall total effect (Zhao et al., 2010). In this paper, I therefore follow the adjusted procedures for mediation analysis by Preacher and Hayes (2004, 2008), as well as Zhao et al. (2010). This method recently gained popularity. According to the Web of Science database (by 02.04.2014), the 2008 article has been cited 3,104 times and the 2004 article has been cited 2,510 times. Therefore, the articles are among the most cited of the decade. The method has also been applied recently in leading management, strategy, and marketing journals, such as *Administrative Science Quarterly* (e.g. Bianchi, 2013), the *Academy of Management Journal* (e.g. Walker et al., 2013), the *Strategic Management Journal* (e.g. Di Stefano, King, & Verona, forthcoming), and the *Journal of Consumer Research* (e.g. McFerran & Argo, 2014). The macro provided by Preacher and Hayes (2004) has been deployed to estimate the bootstrapped indirect effects. However, I analyzed the individual paths with separate regressions and did not rely on the macro, as it does not allow for OLS regression with heteroskedasticity-consistent standard errors.

I hypothesized that employee involvement in strategic renewal and social control mediate the relationship between trust and dynamic capabilities. Somewhat surprisingly, comparative mediation tests to validate the mediating effects also revealed non-hypothesized significant relationships of trust with outcome control and behavior control. An analysis in a simultaneous mediation model is recommended to account for their partial mediating effects (Preacher & Hayes, 2004, 2008). Moreover, trust and routinization on both levels appear to share the same mediators. The subsequent analysis hence includes the mediating effects of employee involvement in strategic renewal, social control, outcome control, and behavior control in a simultaneous mediation model to correct for possible collinearity among



them. The highest VIF in any of the models is 2.203 (reported for social control in model 3). This indicates that no critical multicollinearity is likely to be present (see also Chapter 4.4.1.6 Multicollinearity).

Table 15 provides an overview of all a-paths from the independent variables managerial trust in employees, routinization at the operational level, and routinization at the strategic level to the proposed mediators employee involvement (H<sub>2</sub>, H<sub>11</sub>, H<sub>13</sub>), behavior control (H<sub>15</sub>, H<sub>17</sub>), outcome control (H<sub>15</sub>, H<sub>17</sub>), and social control (H<sub>7</sub>, H<sub>15</sub>, H<sub>17</sub>). Model 1 with dynamic capabilities as the dependent variable provides an overview of the total effects of the independent variables (c-paths). Model 2 differs from model 1 by only including cases that reported high environmental dynamism (average value of items  $\geq 5$  on a 7 point-Likert-type scale) to test the total effects of routinization at the operational and at the strategic level on dynamic capabilities in regimes of high environmental dynamism (H<sub>9</sub>, H<sub>10</sub>). As only high environmental dynamism cases are included, I dropped the corresponding control-variable here. Model 3 provides the b-paths and c'-paths that match with model 1 (H<sub>3</sub>, H<sub>8</sub>, H<sub>12</sub>, H<sub>14</sub>, H<sub>16</sub>, H<sub>18</sub>).

Table 15. Results of regression analysis for mediated effects

Variables	Mediators (a-paths)				Dynamic capabilities (b, c and c'-paths)		
	Employee involvement	Behavior control	Outcome control	Social control	Model 1 (c-path)	Model 2 (c-path)	Model 3 (b- and c'-paths)
Intercept	0.3155* (0.1421)	-0.1520 (0.1490)	-0.0053 (0.1511)	0.0916 (0.1367)	0.0605 (0.1536)	0.1662 <sup>+</sup> (0.0970)	-0.0806 (0.1317)
<i>Independent variables</i>							
Firm size	-0.0120 <sup>-</sup> (0.0068)	0.0031 (0.0067)	0.0029 (0.0079)	-0.0052 (0.0059)	-0.0009 (0.0078)	0.0010 (0.0010)	0.0047 (0.0061)
Firm age	-0.0033 <sup>-</sup> (0.0019)	0.0025 (0.0022)	-0.0009 (0.0016)	-0.0003 (0.0018)	-0.0011 (0.0017)	-0.0024 (0.0018)	0.0003 (0.0012)
Env. Dynamism	0.0573 (0.0595)	0.0523 (0.0673)	0.0410 (0.0611)	-0.0093 (0.0500)	0.0794 (0.0585)		0.0484 (0.0501)
Trust	0.4240*** (0.0689)	0.1969** (0.0688)	0.2293*** (0.0662)	0.5692*** (0.0605)	0.3100*** (0.0664)	0.3189*** (0.0746)	-0.1044 (0.0694)
Rou. oper. lev.	-0.1585** (0.0546)	-0.0923 (0.0651)	-0.1932** (0.0621)	-0.1271* (0.0511)	-0.1247* (0.0597)	-0.1441* (0.0659)	0.0158 (0.0502)
Rou. stra. lev.	0.1397* (0.0693)	0.2908*** (0.0715)	0.2958*** (0.0671)	0.1605* (0.0637)	0.2745*** (0.0749)	0.2191** (0.0766)	0.1066* (0.0540)
<i>Mediators</i>							
Employee involvement							0.3373*** (0.0716)
Behavior control							0.0069 (0.0689)
Outcome control							0.1844** (0.0710)
Social control							0.4002*** (0.0707)
R <sup>2</sup>	0.2857	0.1544	0.1968	0.4006	0.2219	0.2351	0.5564
F	10.5264***	6.8168**	7.3199***	19.9292***	6.9276***	6.3352***	20.0806***
n	249	249	249	249	249	161	249
highest VIF	1.061	1.061	1.061	1.061	1.061	1.102	2.203

OLS with robust standard errors; unstandardized coefficients and standard errors (in parentheses) are reported;

<sup>+</sup> p < 0.10; \* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001; n=249

The a-paths with managerial trust in employees as the independent variable are all positive and significant ( $\beta=0.4240$ ,  $SE=0.0689$ ,  $p\leq 0.001$  for employee involvement in strategic renewal;  $\beta=0.1969$ ,  $SE=0.0688$ ,  $p\leq 0.01$  for behavior control;  $\beta=0.2293$ ,  $SE=0.0662$ ,  $p\leq 0.001$  for outcome control;  $\beta=0.5692$ ,  $SE=0.0605$ ,  $p\leq 0.001$  for social control). Thus, as Hypothesis 2 implies there is a positive relationship between trust and employee involvement. Moreover, as proposed in Hypothesis 7, I found a positive relationship between trust and social control. The b-paths are, with the exception of behavior control ( $\beta=0.0069$ ,  $SE=0.0689$ , and  $p=n.s.$ ), also positive and

significant ( $\beta=0.3373$ ,  $SE=0.0716$ ,  $p\leq 0.001$  for employee involvement in strategic renewal;  $\beta=0.1844$ ,  $SE=0.0710$ ,  $p\leq 0.01$  for outcome control;  $\beta=0.4002$ ,  $SE=0.0707$ ,  $p\leq 0.001$  for social control). As required by Baron and Kenny (1986), the total effect of managerial trust in employees (c-path) is significant ( $\beta=0.3100$ ;  $SE=0.0664$ ;  $p\leq 0.001$ ) and the direct effect (c'-path) is less significant, in this case even non-significant ( $\beta=-0.1044$ ;  $SE=0.0694$ ;  $p=n.s.$ ). This indicates an indirect effect only.

The bootstrapped results for the indirect effects further support the findings of the stepwise-regression analysis (see Table 16). The confidence intervals are, except for behavior control (-0.0231 to 0.0331), all above zero (0.0944 to 0.2116 for employee involvement in strategic renewal; 0.1504 to 0.3174 for social control; 0.0112 to 0.0953 for outcome control), also indicating an indirect positive effect on dynamic capabilities. With the a-paths and b-paths being positive and significant, there seems to be a positive indirect effect of managerial trust in employees through the hypothesized mediators employee involvement in strategic renewal, supporting Hypothesis 3, and social control, supporting Hypothesis 8. Furthermore, outcome control mediates the relationship between managerial trust in employees and dynamic capabilities. As the relationship between behavior control and dynamic capabilities is not significant, behavior control cannot be a mediator in any of the proposed relationships with dynamic capabilities as the dependent variable.

Table 16. Bootstrapped results for indirect effects of managerial trust in employees on dynamic capabilities

	$\beta$ (data)	$\beta$ (boot)	Bias	SE	Confidence intervals	
					Lower	Upper
Total	0.4144	0.4090	-0.0054	0.0550	0.3195	0.5353
Employee involvement	0.1430	0.1396	-0.0034	0.0293	0.0944	0.2116
Behavior control	0.0013	0.0006	-0.0008	0.0133	-0.0231	0.0331
Outcome control	0.0423	0.0412	-0.0010	0.0199	0.0112	0.0953
Social control	0.2278	0.2276	-0.0002	0.0429	0.1504	0.3174

95% confidence interval; 1000 resamples;  $n=249$

The same mediators seem to apply for the effect of routinization at the operational level on dynamic capabilities. However, the indirect relationships appear to be negative here. Except for behavior control ( $\beta=-0.0923$ ,  $SE=0.0651$ , and n.s.), all a-paths are negative and significant ( $\beta=-0.1585$ ,  $SE=0.0546$ ,  $p\leq 0.01$  for employee involvement in strategic renewal;  $\beta=-0.1932$ ,  $SE=0.0621$ ,  $p\leq 0.01$  for outcome control;  $\beta=-0.1271$ ,  $SE=0.0511$ ,  $p\leq 0.05$  for social control). This supports Hypothesis 11 that proposes a negative relationship between routinization at the operational level and employee involvement in strategic renewal. Hypothesis 15 is only partially supported as not all types of control are significantly related to dynamic capabilities. The b-paths equal the ones of the indirect effects of managerial trust in employees and are, except for behavior control, positive and significant. The total effect of routinization at the operational level on dynamic capabilities (c-path) is negative and significant ( $\beta=-0.1247$ ,  $SE=0.0597$ ,  $p\leq 0.05$ ) and the direct effect (c'-path) is positive and not significant ( $\beta=0.0158$ ,  $SE=0.0502$ ,  $p=n.s.$ ), indicating an indirect effect only. Similar to managerial trust in employees, the total and the direct effect are opposite in sign. This would indicate competitive mediation given that the direct effect would be significant, which is clearly not the case here ( $p=0.7525$ ). The confidence intervals from the bootstrapped analysis of the indirect effects (see Table 17) are, except for behavior control (-0.0190 to 0.0137), all below zero (-0.1032 to -0.0198 for employee involvement in strategic renewal; -0.0844 to -0.0092 for outcome control; -0.1058 to -0.0112 for social control). Thus, they are further supporting the existence of an indirect negative effect on dynamic capabilities. As implied in Hypotheses 12, employee involvement in strategic renewal mediates the negative indirect relationship of routinization at the operational level and dynamic capabilities. Not all types of control mediate the relationship, indicating only partial support for Hypothesis 16. Routinization at the operational level is only very weakly correlated to managerial trust in employees ( $r= 0.091$ ). This indicates separate constructs, although they seem to share mediators within their indirect effects on dynamic capabilities.

Table 17. Bootstrapped results for indirect effects of routinization at the operational level on dynamic capabilities

	$\beta$ (data)	$\beta$ (boot)	Bias	SE	Confidence intervals	
					Lower	Upper
Total	-0.1406	-0.1386	0.0020	0.0432	-0.2482	-0.0648
Employee involvement	-0.0535	-0.0524	0.0011	0.0215	-0.1032	-0.0198
Behavior control	-0.0006	-0.0004	0.0002	0.0074	-0.0190	0.0137
Outcome control	-0.0356	-0.0354	0.0003	0.0179	-0.0844	-0.0092
Social control	-0.0509	-0.0504	0.0005	0.0238	-0.1058	-0.0112

95% confidence interval; 1000 resamples; n=249

Furthermore, routinization at the strategic level appears to have a positive indirect effect on dynamic capabilities through the same mediators. The a-paths are all positive and significant ( $\beta=0.1397$ ,  $SE=0.0693$ , and  $p\leq 0.05$  for employee involvement in strategic renewal;  $\beta=0.2908$ ,  $SE=0.0715$ , and  $p\leq 0.001$  for behavior control;  $\beta=0.2958$ ,  $SE=0.0671$ , and  $p\leq 0.001$  for outcome control;  $\beta=0.1605$ ,  $SE=0.0637$ , and  $p\leq 0.05$  for social control). This supports Hypothesis 13 and 17. Again, the b-paths equal the ones of the indirect effects of managerial trust in employees and routinization at the operational level. Except for behavior control, they are positive and significant. The total effect (c-path) is positive and significant ( $\beta=0.2745$ ;  $SE=0.0749$ ;  $p\leq 0.001$ ) and the direct effect (c'-path) is positive and less significant ( $\beta=0.1066$ ;  $SE=0.0540$ ;  $p\leq 0.05$ ). As the direct effect is still significant, although to a lesser extent, the presence of partial mediation is possible. Thus, there might also be a further mediator not included in the model (Zhao et al., 2010). The confidence intervals of the bootstrapped results for the indirect effects on dynamic capabilities (see Table 18) are, except for behavior control (-0.0390 to 0.0421), above zero (0.0094 to 0.1063 for employee involvement in strategic renewal; 0.0146 to 0.1167 for outcome control; 0.0172 to 0.1256 for social control), further supporting Hypothesis 14 and partially supporting Hypothesis 18. Again, the correlations with the other independent variables, that share these mediators are weak ( $r=0.138$  for routinization of the operational level; and  $r=-0.149$  for managerial trust in employees), indicating independence of the constructs.

Table 18. Bootstrapped results for indirect effects of routinization at the strategic level on dynamic capabilities

	$\beta$ (data)	$\beta$ (boot)	Bias	SE	Confidence intervals	
					Lower	Upper
Total	0.1679	0.1662	-0.0017	0.0483	0.0780	0.2703
Employee involvement	0.0471	0.0470	-0.0001	0.0246	0.0094	0.1063
Behavior control	0.0020	0.0024	0.0004	0.0200	-0.0390	0.0421
Outcome control	0.0545	0.0532	-0.0014	0.0245	0.0146	0.1167
Social control	0.0642	0.0636	-0.0007	0.0264	0.0172	0.1256

95% confidence interval; 1000 resamples; n=249

The found indirect relationships of routinization at both levels are in contrast to the only weakly significant negative direct effect of routinization at the operational level on dynamic capabilities in highly dynamic environments ( $\beta=-0.0312$ ;  $SE=0.0528$ ;  $p\leq 0.1$ ) and the non-significant direct effect of routinization at the strategic level on dynamic capabilities in highly dynamic environments ( $\beta=0.1019$ ;  $SE=0.0589$ ;  $p=n.s.$ ). Whilst neither Eisenhardt and Martin (2000), nor Winter (2003), or Schreyögg and Kliesch-Eberl (2007) explicitly argue for the found mediators, it appears fair to assume that they are not focused on a direct effect either. All of the papers discuss mediator-like constructs. To provide examples, Eisenhardt and Martin (2000) as well as Winter (2003) explain that routinization locks-in specific behavior that might later become inappropriate and reduce the dynamic capabilities of the firm. The lock-in of actions might therefore be a mediator. Similarly, Schreyögg and Kliesch-Eberl (2007) argue that routinization leads to inertia and escalating commitment, which would consequently diminish the ability to change. The authors might thus arguably rather discuss total effects (c-paths) of routinization than direct effects (c'-paths).

Model 2 provides the total effects on dynamic capabilities in highly dynamic environments. The total effect of routinization at the operational level is negative and significant ( $\beta=-0.1441$ ,  $SE=0.0659$ ,  $p\leq 0.05$ ), supporting Hypothesis 9a and rejecting the rival Hypotheses 9b and 9c. Routinization at the strategic level has a positive and significant total effect on dynamic capabilities ( $\beta=0.2191$ ,  $SE=0.0766$ ,  $p\leq 0.01$ ). This supports Hypothesis 9b, but not the rival Hypotheses 9a and 9c. The results in model 1 are essentially similar ( $\beta=-0.1247$ ,  $SE=0.0597$ , and  $p\leq 0.05$  for routinization at the operational level;  $\beta=0.2745$ ,  $SE=0.0749$ , and  $p\leq 0.001$  for routinization at the

strategic level). This indicates that the total effects of routinization might not differ strongly in diverse regimes of environmental dynamism. The direct effects did however differ in diverse regimes of dynamism (see Chapter 4.4.2 Direct effects). Interestingly, I could not support any of the concurring theoretical conceptualizations by Eisenhardt and Martin (2000), Winter (2003), or Schreyögg and Kliesch-Eberl (2007) completely in this setting. Instead, only some aspects of the conceptualizations by Eisenhardt and Martin (2000) and Winter (2003) are supported.

#### 4.4.5 Summary of hypotheses support

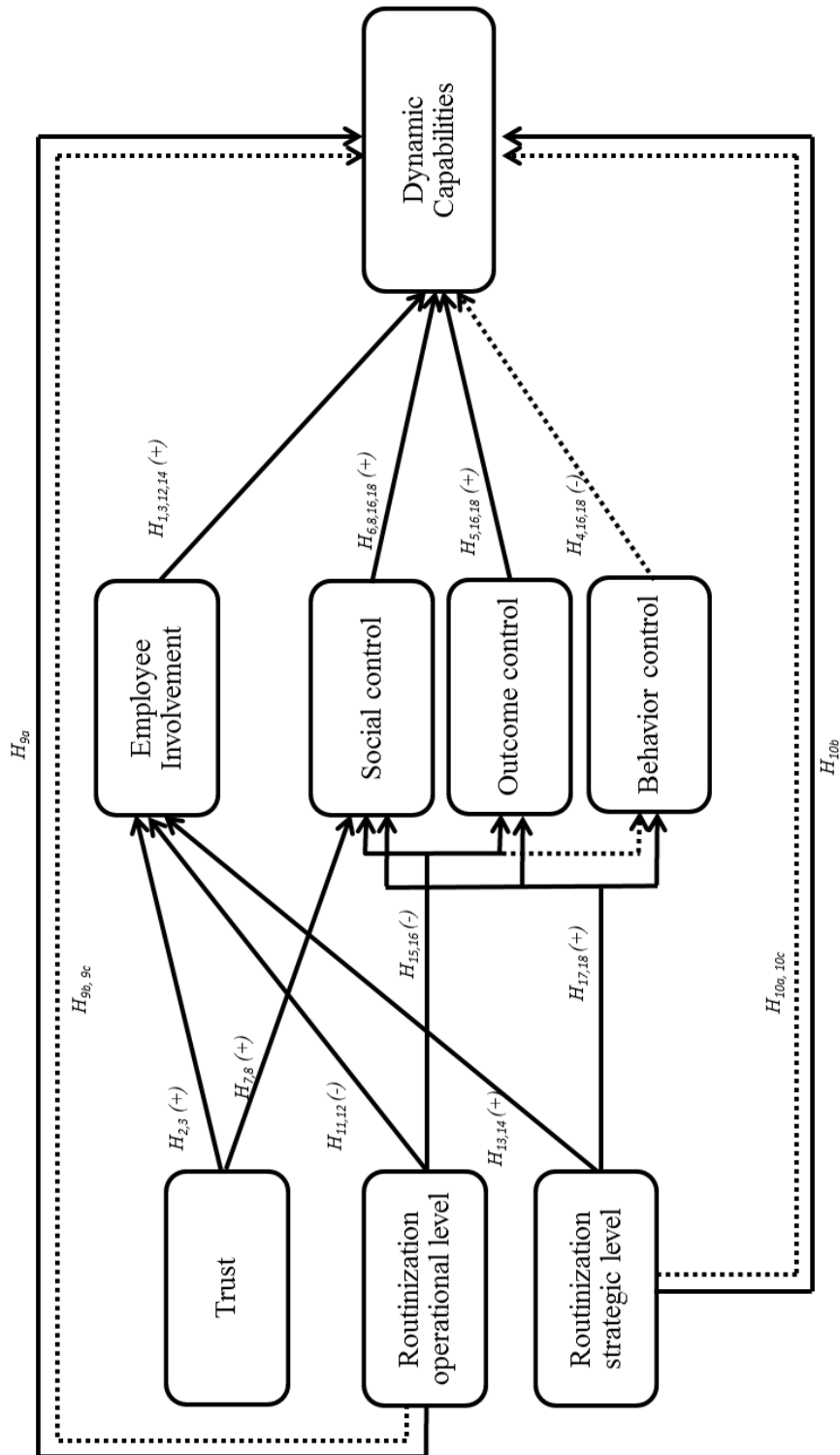
Table 19 provides an overview of the hypotheses supported. Figure 7 also visualizes the supported relationships to provide a better overview. A continuous line indicates hypothesis support. A dashed line represents hypothesis rejection.

Table 19. Overview of hypotheses support

Hypotheses		support
H <sub>1</sub> (+)	Employee Involvement in strategic renewal activities is positively related to dynamic capabilities	supported
H <sub>2</sub> (+)	Managerial trust in employees is positively related to employee involvement in strategic renewal	supported
H <sub>3</sub> (+)	The positive indirect relationship of managerial trust in employees and dynamic capabilities is mediated by employee involvement in strategic renewal	supported
H <sub>4</sub> (-)	Behavior control is negatively related to dynamic capabilities	not supported
H <sub>5</sub> (+)	Outcome control is positively related to dynamic capabilities	supported
H <sub>6</sub> (+)	Social control is positively related to dynamic capabilities	supported
H <sub>7</sub> (+)	Managerial trust in employees is positively related to social control	supported
H <sub>8</sub> (+)	The positive indirect relationship of managerial trust in employees and dynamic capabilities is mediated by social control	supported
H <sub>9</sub>	a) Following Eisenhardt and Martin (2000), routinization at the operational level has a negative effect on the organization's dynamic capabilities in dynamic environments (-)	supported
	b) Following Winter (2003), routinization at the operational level has a positive effect on the organization's dynamic capabilities (+)	not supported
	c) Following Schreyögg and Kliesch-Eberl (2007), routinization at the operational level has a positive effect on the organization's dynamic capabilities (+)	not supported
H <sub>10</sub>	a) Following Eisenhardt and Martin (2000), routinization at the strategic level has a negative effect on the organization's dynamic capabilities in dynamic environments (-)	not supported
	b) Following Winter (2003), routinization at the strategic level has a positive effect on the organization's dynamic capabilities (+)	supported
	c) Following Schreyögg and Kliesch-Eberl (2007) routinization at the strategic level has a negative effect on the organization's dynamic capabilities (-)	not supported
H <sub>11</sub> (-)	Routinization at the operational level is negatively related to employee involvement in strategic renewal	supported
H <sub>12</sub> (-)	The negative indirect relationship of routinization at the operational level and dynamic capabilities is mediated by employee involvement in strategic renewal	supported
H <sub>13</sub> (+)	Routinization at the strategic level is positively related to employee involvement in strategic renewal	supported
H <sub>14</sub> (+)	The positive indirect relationship of routinization at the strategic level and dynamic capabilities is mediated by employee involvement in strategic renewal	supported
H <sub>15</sub> (-)	Routinization at the operational level is negatively related to all types of control	partially supported
H <sub>16</sub>	The indirect relationship of routinization at the operational level and dynamic capabilities is mediated by all forms of control	partially supported
H <sub>17</sub> (+)	Routinization at the strategic level is positively related to all types of control	supported
H <sub>18</sub>	The indirect relationship of routinization at the strategic level and dynamic capabilities is mediated by all forms of control	partially supported



Figure 7. Visualization of supported hypotheses



#### **4.4.6 Sensitivity analysis**

Several options are available for the treatment of survey data. Table 20 reports regression analysis results for several additional alternatives that appear viable for the course of this research. Model 1 represents the base model. It was used for most of the analyses. The model is based on varimax-rotated factor scores (see 4.3.2 Factor analyses), a listwise deletion of cases with more than 40% missing data (see Chapter 4.3.1 Missing data), an imputation of all additional missing data with the maximum likelihood procedure (see Chapter 4.3.1 Missing data), and a listwise deletion of firms in the sample that reported a firm size above 40 employees (see Chapter 4.1.3 Data collection procedures).

Model 2 differs from model 1 only in the calculation of factors. Model 2 is based on the arithmetic means of the items, and not on varimax-rotated factor scores. Model 3 differs from model 1 *ceteris paribus* through the absence of imputed missing data. I left the unanswered items empty during the analysis. Model 3 differs from model 1 regarding the firm sizes in the sample. Model 1 only includes firms that reported less than 40 employees, whereas model 3 also includes firms with larger reported numbers of employees. No cases are excluded in model 4. Neither the larger firms, nor the surveys with more than 40% of the items left blank have been deleted. The results remain essentially similar throughout all models.

Table 20. Sensitivity analyses

Variables	Model 1 (base)	Model 2 (mean- factors)	Model 3 (no imputation)	Model 3 (firm size)	Model 4 (no deletions)
Intercept	-0.0806 (0.1317)	1,6224*** (0.3582)	-0.0523 (0.1394)	-0.0390 (0.0696)	-0.0367 (0.0753)
<i>Independent variables</i>					
Firm size	0.0047 (0.0061)	0.0032 (0.0041)	0.0009 (0.0070)	0.0010 <sup>+</sup> (0.0005)	0.0010 (0.0008)
Firm age	0.0003 (0.0012)	0.0002 (0.0008)	0.0004 (0.0012)	0.0004 (0.0011)	0.0003 (0.0011)
Env. dynamism	0.0484 (0.0501)	-0.0285 (0.0281)	0.0543 (0.0576)	0.0886 <sup>+</sup> (0.0485)	0.0775 (0.0546)
Employee involvement	0.3373*** (0.0716)	0.2240*** (0.0482)	0.2823*** (0.0805)	0.2882*** (0.0656)	0.2422** (0.0756)
Rou. oper. lev.	0.0158 (0.0502)	-0.0045 (0.0265)	-0.0272 (0.0481)	-0.0175 (0.0482)	-0.0080 (0.0431)
Rou. stra. lev.	0.1066* (0.0540)	0.0574* (0.0287)	0.1299* (0.0617)	0.1468** (0.0545)	0.1278* (0.0570)
Social control	0.4002*** (0.0707)	0.3130*** (0.0555)	0.3213*** (0.0932)	0.3521*** (0.0761)	0.3692*** (0.0907)
Outcome control	0.1844** (0.0710)	0.1184** (0.0424)	0.2625** (0.0921)	0.1641* (0.0758)	0.2143* (0.0847)
Behavior control	0.0069 (0.0689)	-0.0020 (0.0492)	-0.0213 (0.0737)	0.0231 (0.0614)	-0.0043 (0.0692)
Trust	-0.1044 (0.0694)	-0.0727 (0.0493)	-0.0334 (0.0827)	-0.0414 (0.0673)	-0.0406 (0.0774)
R <sup>2</sup>	0.5564	0.5575	0.5441	0.5394	0.5459
F	20.0806***	20.6197***	17.7528***	30.0523***	19.2566***
n	249	249	249	282	311

OLS with robust standard errors; dependent variable is dynamic capabilities; unstandardized coefficients and standard errors (in parentheses) are reported; <sup>+</sup> p < 0.10; \* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

## **5 Discussion**

### **5.1 Employee involvement, trust, and dynamic capabilities**

The results of the hypotheses tests suggest that employee involvement in strategic renewal is supportive of the possession of dynamic capabilities. Organizations appear to make reflected decisions, adjust quicker, and facilitate the implementation of change by including employees in the process. As suggested, dynamic capabilities are thus not solely a managerial concern, but a firm-spanning process. Involving all actors inside the firm, is hence of strategic value.

Nevertheless, involving employees creates risks and behavioral uncertainty for managers. Trust in employees is thus very relevant to facilitate this form of organizing. Without trust, the involvement is less likely. Managerial trust seems to underlie the collective nature of dynamic capabilities.

Employee involvement appears to have a positive effect on dynamic capabilities, but a negative direct effect on performance. Hence, it might not be supportive of all organizations. As empirically proven by Drnevich and Kriauciunas (2011), organizations that do not require change, might not necessarily be positively affected by mechanisms that facilitate it. One explanation for the negative effect might be the time spent by employees for the strategic involvement that is missing for everyday operations. Thus, their overall productivity might decrease.

### **5.2 Control and dynamic capabilities**

Managers seem to influence dynamic capabilities through output control. The collective entity's social control appears to have a similar effect. The results support the proposed positive effects of both on dynamic capabilities. The proposed negative effect of behavior control could not be supported. One reason for the insignificance of the effect on dynamic capabilities might be the small firm setting. Formal control is valuable, due to an information and a reinforcement aspect (Challagalla & Shervani, 1997). In small firm settings, managers might require less additional information-mechanisms, such as

control, as they can overview the organization and its problems quicker and easier than managers in larger firms. Similarly, small firms are often characterized by stronger personal interactions and social relationships. Informal, rather than formal processes of reinforcement, might thus have a stronger influence (Sanzo, Santos, García, & Trespalacios, 2012).

There might also be methodological reasons for the insignificance of the effect. Challagalla and Shervani (1997) exposed in an analysis of the effects of behavior control, that the results of many studies differ, due to different operationalizations. They claimed that the validity and reliability of measures might be a major reason. Although, this possibility cannot be excluded fully, the scale deployed here by Jaworski et al. (1993) is widely used and deemed valid and reliable by many scholars (see Chapter 4.2.2.3 Social control, outcome control, and behavior control). The indicators for validity and reliability exceeded their respective cutoff values (see Table 3 Measurement scales). Another possible methodological reason might be biased answers, due to social desirability. The pre-test of the survey revealed that some participants were unwilling to answer control related questions, as their responses might not be socially desirable. I reworded them for a more euphemistic appearance and reduced the impact of this possible bias. However, I cannot fully guarantee, that some of the respondents did not answer in a socially desirable manner, which would explain the insignificance of the effect.

### **5.3 Trust and control as complements**

I proposed that trust and control influence dynamic capabilities, but also, that they are not separate routes to achieve dynamic capabilities. A reliance on trust does not represent the complete absence of control in pursuing dynamic capabilities. Instead, the two should be combined due to their complementary effects. I hypothesized and found support that trust is positively related to social control. I did not derive hypotheses for the formal forms of control, as the information and reinforcement aspect of control are inseparable here, and the argumentation differs for both aspects. The literature provides evidence that trust and the information aspect of control are positively related.

Conversely, there is empirical evidence that trust and the reinforcement aspect of control are negatively related (see Chapter 3.1.3.6 Complementary nature of trust and control). In the regression analysis, I found that trust positively correlates with both formal types of control here. One reason might be a stronger information aspect than reinforcement aspect in this setting. Thus, managers in small manufacturing firms might exercise control to receive information, rather than to reinforce certain behaviors. The generally stronger shared culture in small firms as compared to larger firms (Sanzo et al., 2012) might replace formal mechanism to support reinforcement. Weibel (2007) for example has argued that value internalization increases shared behavior. The stronger culture in small firm settings might make formal control more of an information mechanism and may explain the positive correlation.

#### **5.4 Routinization and dynamic capabilities**

I aimed to provide empirical support for one of the concurring conceptualizations by Eisenhardt and Martin (2000), Winter (2003), and Schreyögg and Kliesch-Eberl (2007) regarding the routinization of organizations that possess dynamic capabilities. Somewhat surprisingly, the results indicate that a non-routinized operational level and a routinized strategic level are supportive of dynamic capabilities. None of the scholars conceptualized this specific combination of routinization, although argumentations for the results on the respective levels can be found in some of the conceptualizations. The argumentation by Eisenhardt and Martin (2000) seems to apply at the operational level, whereas Winter's (2003) argumentation appears to apply at the strategic level. However, neither of the conceptualizations particularly addressed a small firm setting. Peteraf et al. (2013) introduced a contingency-based logic to the field of dynamic capabilities. Accordingly, various conceptualizations of dynamic capabilities might therefore only hold under certain conditions. The found results thus do not delegitimize any of tested conceptualizations. Instead, the diverging results provide a first indication that firm size might be a decisive, yet neglected factor for the effects of routinization at the operational and strategic level on dynamic capabilities. As conceptualized by Eisenhardt and Martin (2000), environmental dynamism might be another contingency

factor. My results for the direct effects slightly differed in the samples that included only high-dynamism cases and various degrees of environmental dynamism.

## **5.5 Routinization, actors, and dynamic capabilities**

In the first regression model, I tested the effects of routinization, control, and employee involvement in strategic renewal simultaneously and only found a non-significant direct effect of routinization at the operational level. However, the total effects of routinization differ, due to the mediators employee involvement, social control, and outcome control. The total effect of routinization at the operational level on dynamic capabilities is negative and significant. The significance of the total effect of routinization at the strategic level is stronger than the significance of the direct effect. As I argued in Chapter 4.4.4 (Mediated effects), it appears fair to assume that the concurring conceptualizations are based on total effects rather than direct effects. However, while the empirical support for parts of the theoretical conceptualizations is debatable, the results highlight the importance of indirect effects.

Di Stefano et al. (forthcoming) argued in their drivetrain metaphor, that a mix of routines and managerial actions might be required as one cannot be effective without the other. My findings seem to give expression not only to their coexistence, but also to their complementary effects. Instead of regarding the stances of managerial impact versus routinized behavior as contradictory or opposing, they may be regarded as parts of a more complex system. Along with the attempt to merge the existing sub-conversations (Peteraf et al., 2013; Wilden et al., 2013), this provides empirical evidence about the necessity to consider them in a simultaneous model.

Moreover, the interconnectedness of managerial and routine-based microfoundations might add to the idiosyncrasy of capabilities and thus to the possibility of sustaining a competitive advantage in dynamic environments. As argued by Di Stefano et al. (forthcoming: 21), an interconnectedness of complex routines and tacit managerial behavior might be the “real source of sustainable competitive advantage” as the difficulty to imitate or substitute the entire bundle rises.

## **5.6 Dynamic capabilities and performance**

I have shown that dynamic capabilities and performance are separate constructs here. Their operationalizations are unlikely to stand on tautological grounds. While dynamic capabilities positively affect performance, the microfoundations analyzed here do not have the same effects on both constructs. Trust and behavior control for example had a positive effect on performance, but not on dynamic capabilities. Employee involvement in strategic renewal positively affects dynamic capabilities, but seems to have a negative direct effect on performance, when it is controlled for the indirect affect through dynamic capabilities.

## **5.7 Limitations**

As for every empirical research, the derived results and the analysis have its limitations. For the course of this research, I made several choices that represented trade-offs. Some of them provided advantages, but also added limitations.

Although, none of the conducted tests revealed a high-likelihood of common method bias, I cannot completely rule out the possibility of its existence. Furthermore, I provided the possibility of anonymous submissions and assured confidentiality, some respondents might still have answered in a socially desirable manner though. I summarized some of the critique on the value of fit indices for regression analysis (see Chapter 4.3.5 Goodness of fit). Fit indices should not be overvalued for confirmatory factor analysis. The  $\chi^2/d.f.$  and the RMSEA have been in the desirable range. However, some other fit indices, have not been as good as desired by some scholars.

Small German manufacturing firms are not representative for organizations in general. Employees in larger firms are affected by trust and control influences of various hierarchical levels (Fulmer & Gelfand, 2012). To provide an example, effects of a possible lower echelon were not present here. Moreover, power-bases that affect hierarchical control might differ through more extensive micro-politics in larger firms (Pfeffer, 1993). Another difference might be the centralization of decision-making in



small firms. Unlike larger firms, decentralized decision making is less likely to occur as the narrow span of control keeps managers less detached from everyday tasks of employees. Employee involvement, the routinization among the whole firm, the sensing of environmental change, and timely adjusting processes might thus differ also.

I also urge the usual caution when applying the results to different countries or industries. As summarized by Werner (2002), a whole field of business research, namely international management, is concerned with cross-border differences and the transferability of management practices throughout countries. As already emphasized in Chapter 4.1.2 (Sample characteristics), trust, control, routinization, employee involvement in strategic renewal, environmental dynamism, and adaption have different propensities to occur in service and manufacturing firms. The effects might thus differ in different industries. A broad literature base analyses the effects of institutions outside of a firm that might be a reason for trusting, involving, or controlling others (e.g. Barney & Hansen, 1994; Huff & Kelley, 2003; Nooteboom, 2007; Scott, 1995; Zucker, 1986). Thus, not only countries or industries should be considered, but several additional institutions. Further research in different countries, different industries, or otherwise institutionally different environments can lead to more insights and might foster the results (Anderson, Dreu, W, & Nijstad, 2004).

## **6 Conclusion**

### **6.1 Review of major propositions and findings**

I began this dissertation with the aim of exposing actor-related as well as process-related microfoundations of dynamic capabilities to clarify some of the confusion surrounding the concept. The literature is diverging and I strongly agree that it is necessary to merge the sub-conversations again (Peteraf et al., 2013). I explained major differences in the literature regarding the aim of the concept, the agents, the actions, and the object of actions.

The aim of achieving a sustainable competitive advantage is a subject of debate among scholars and the seminal conceptualizations differ strongly. In my positioning, I provided reasons for following the view that sustainable competitive advantage, and thus idiosyncrasy, is at the very heart of the concept. However, I also emphasized the importance of making dynamic capabilities and performance distinguishable.

In a review of the literature on agent-related microfoundations of dynamic capabilities, I found a strong emphasize on managers and managerial actions that are task-oriented. I proposed and empirically supported the importance of employees as additional agents in the facilitation of dynamic capabilities. Instead of regarding managers and their subordinates as separate agents, I emphasized their relational interconnectedness and the active role of managers in the involvement of employees.

I attempted to explore actions by managers that facilitate dynamic capabilities, but are relation-oriented, rather than task-oriented. I focused on trust and control. They are primary modes of interaction across echelons and therefore seem very suitable. The findings support the role of managerial trust in facilitating employee involvement and the role of outcome control and social control in facilitating dynamic capabilities. Thus, these actions underlie dynamic capabilities. I could not find support for an effect of behavior control.

Alongside the isolated effects of trust and control on dynamic capabilities, this research sought to explore their interaction effects. I summarized the debate on the complementary/substitutive nature of trust and control and derived a hypothesis for the

positive effect of trust on social control. My findings suggest that trust supports not only social control, but might be supportive of the formal forms of control as well.

I also focused on processes to explore procedural actions and objects of actions. Reviewing the literature on dynamic capabilities, I exposed major differences regarding the role of routines. There are many controversies in the literature, however the routinization of processes appears to be a particularly contradictory aspect. I provided a first empirical test of rival conceptualizations by Eisenhardt and Martin (2000), Winter (2003), as well as Schreyögg and Kliesch-Eberl (2007), but did not find full support for any of them. My findings suggest that strategic actions should be routinized, whereas operational actions should not be routinized to facilitate the adaption to environmental changes.

To merge different sub-conversations, I analyzed the interaction of procedural and actor-related actions that underlie dynamic capabilities. I proposed and found that employee involvement in strategic renewal, outcome control, and social control mediate the relationships of routinization at the operational level and routinization at the strategic level with dynamic capabilities. Therefore, processes and actions by actors are in interaction and should not be regarded separately. I could not support the hypothesized mediation through behavior control.

## **6.2 Theoretical implications and further research**

I contributed to the academic conversation on dynamic capabilities first, by examining and exposing actor-related microfoundations of dynamic capabilities. Only very few researchers emphasized the importance of employee involvement (e.g. Hallin et al., 2009; Sprafke et al., 2012). To my knowledge, the effects of trust and control have not been examined in the context of dynamic capabilities yet. With trust and control, two relational rather than task-oriented behaviors of managers are emphasized, which is rare in the literature.

Second, I provided a first empirical test of the role of routinization for dynamic capabilities. While various conceptual contributions can be found, empirical tests are

desperately sought (Ambrosini & Bowman, 2009). Instead of supporting a specific conceptualization and discrediting others, the findings add to the literature by providing directions to a further possible combination of routinized processes. Contingency factors must be considered when analyzing the effects of routinization. Firm size and environmental dynamism might be decisive and their effects should be tested in a further empirical study. The results also indicate that the operational level as the object of action has an influence on dynamic capabilities. Thus, scholars should not only focus on the action, but also on the object of action.

Third, the direct effects of routinization on dynamic capabilities did not appear as significant as indicated by the literature. I tested indirect effects through control and employee involvement and exposed mediating effects that might complement the discussion. Furthermore, this might explain differences in the conceptualizations of the routinization of dynamic capabilities. Future research on additional mediating effects therefore appears as particularly fruitful. The results also provide empirical evidence that process-oriented behavior and managerial actions cannot be regarded separately. This supports a more holistic understanding of dynamic capabilities and adds to the sought integration of sub-conversations.

Fourth, the paper shed light on controversial definitions of dynamic capabilities that emphasize both, a sustained competitive advantage and an ex ante identification of idiosyncratic dynamic capabilities. At first glance, this appears impossible. The proposed division between an identifiable macro-level and idiosyncratic microfoundations might solve the dilemma (Jacobides & Winter, 2012). I provided empirical support for idiosyncratic microfoundations that might further enlighten the discussion.

Besides the contributions to the literature on dynamic capabilities, this research also contributes to the academic conversation on trust and control. Thus far, research in a dynamic setting has been rare (Mishra & Mishra, 2013). The consistently found positive relationship of trust with all forms of control clearly supports complementarity, and adds to the debate on the substitutive and/or complimentary nature of trust and control. Particularly empirical proof for the interrelation of trust and formal control has thus far not been extensive (Weibel, 2007).

In search for microfoundations, I focused on firm internal actors and processes here. The trust and control literature provides evidence that external objects and sources of trust and domination can also have a strong impact (Bachmann, 2006; e.g. Barney & Hansen, 1994; Clegg et al., 2006; Huff & Kelley, 2003; Nooteboom, 2007; Zucker, 1986). Further research might focus on the impact of firm external stakeholders and institutions that might affect the organization's dynamic capabilities.

Moreover, the found results regarding trust only apply for managerial trust in employees. However, there might also be semi-strong forms of trust present, where managers do not trust their employees directly, but rather a governance mechanism that guides the employees' behavior (see Chapter 3.1.3.2 Trust). Further research might examine those indirect effects. I focused only on control as one form of power. Different forms and types of exercised power might be worth exploring in the context of dynamic capabilities.

### **6.3 Managerial implications**

The results might provide guidance for business practitioners that are willing to implement dynamic capabilities. First, the importance of a shift towards enabling subordinates to support change, rather than implementing everything through management has been highlighted. Organizations that involve employees in strategic renewal are likely to make reflected, quick, and well implemented adjustments to environmental changes. I emphasized that managers can contribute strongly through relational actions. Hence, task-orientation is only one fraction of managerial work on dynamic capabilities.

Second, the identification of factors that underlie a competitive advantage through academic research might thus far have had disadvantages for practitioners. Factors that are exposed are also more likely to be copied by competitors. Managers however should focus on achieving a sustainable advantage through resources and behavior that cannot easily be copied (Barney, 1991; Porter, 1980). A well-balanced application of trust and control has idiosyncratic characteristics that cannot be copied easily. Only a few previous studies have examined coordinating mechanisms that might enforce the

possession of dynamic capabilities, but are difficult to transfer. However, this also means that trust and control require a long timeframe to develop. Trust is highly fragile and control is not invincible (Bachmann, 2001). Managers therefore need constant effort to unfold their positive effects.

Third, the relevance of trust in subordinates has been emphasized. Popular theories in economics and management, such as principal-agent-theory (Jensen & Meckling, 1976) or transaction cost theory (Williamson, 1975), are rather focused on a control perspective, which has led to a neglect of trust. Sometimes it is worth it for managers, to let go and embrace the upcoming opportunities provided by their subordinates. The popular saying *trust, but verify* does not always provide appropriate guidance. Moreover, I disclosed that trust and control are not opposing forms of interaction with subordinates, but are complementary.

Fourth, it is indicated that a routinization of procedures at the operational level is not supportive of adjustments in highly dynamic environments. Practitioners normally encourage routinization for everyday activities as they are effective, save cognitive and financial resources, and store operational knowledge (Becker, 2004). However, they might also be more complicated to adjust and lead to group-think (Eisenhardt & Martin, 2000; Schreyögg & Kliesch-Eberl, 2007). In case the goal of the organization is strategic flexibility, routinization should be reduced at the operational level. At the strategic level routinization however appears to be useful. The collective knowledge and sensing can be accessed and decisions can be made quickly. Practitioners should also keep in mind, that the routinization of activities affects their ability to involve employees and to exercise control.

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## **Statement of originality**

### **Eidesstattliche Erklärung**

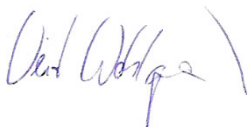
Bei der vorliegenden Dissertationsschrift mit dem Titel: „Microfoundations of dynamic capabilities: employee involvement, managerial trust, control, and routinization“ handelt es sich um eine Monographie in englischer Sprache nach §12 Absatz 1 der Promotionsordnung der Wirtschaftswissenschaftlichen Fakultät der Europa-Universität Viadrina Frankfurt (Oder) in der Fassung vom 7. April 2010.

Ich versichere hiermit an Eides statt, dass ich bisher an keiner anderen Doktorprüfung teilgenommen habe.

Des Weiteren versichere ich an Eides statt, dass ich die Abhandlung selbstständig verfasst habe. Ich habe mich keiner unzulässigen fremden Hilfe bedient und keine anderen als die im Schriftenverzeichnis der Abhandlung angeführten Schriften benutzt. Die Abhandlung war bisher nicht Gegenstand einer anderen Doktorprüfung.

Ich versichere an Eides statt, dass ich nach bestem Wissen die reine Wahrheit gesagt und nichts verschwiegen habe.

Berlin, den 03.06.2014



Veit Wohlgemuth

## Curriculum vitae

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### Academic Education

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|-----------------|---|
| 04/2011-today   | European University Viadrina Frankfurt (Oder) and German Graduate School of Management and Law Heilbronn <ul style="list-style-type: none"><li>• degree: Doctorate rerum politicarum</li></ul>  |
| 06/2009-12/2010 | University of Auckland, New Zealand <ul style="list-style-type: none"><li>• degree: Master of International Business</li><li>• thesis topic: “The impact of cultural distance on the choice of cross-border alliance governance modes”</li><li>• final grade: A (first class honours)</li></ul> |
| 10/2003-09/2006 | University of Cooperative Education Riesa, Germany in collaboration with Lidl Germany <ul style="list-style-type: none"><li>• degree: Diplom- Betriebswirt (BA) with a specialization in trade</li><li>• final grade: 1.2 (best student of the year)</li></ul>                                  |

### Teaching

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| 10/12- today | HTW University of Applied Science Berlin, Germany <ul style="list-style-type: none"><li>• lecturer for “International Management” (in English)</li><li>• supervision of master’s theses</li></ul>                                  |
| 04/12-09/12  | BSP Business School Berlin Potsdam, Germany <ul style="list-style-type: none"><li>• lecturer for “Planning and Controlling”</li></ul>  |
| 02/10-11/10  | University of Auckland, New Zealand <ul style="list-style-type: none"><li>• tutor and marker for “Management” and “International Business Operations”</li><li>• research assistant for “International Business Strategy”</li></ul> |

### Management Experience

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| 10/2006-05/2009 | Head of the Inward- Goods Department at Lidl Saxony-Anhalt/ greater Leipzig, Germany |
| 10/2003-09/2006 | Trainee- Program at Lidl Berlin/Brandenburg, Germany                                 |

## List of publications and presentations

### Forthcoming Conference Contributions

- Wohlgemuth, V., Wenzel, M. & Biedulska, M., 2014. Micro-foundations of Dynamic Capabilities: Testing the Degree of Routinization in a Small-Firm-Setting. *Strategic Management Society Conference*. Madrid, Spain.
- Wohlgemuth, V. & Höhne, K., 2014. Stakeholder Management and the Tension between Dynamic Capabilities and Path Dependence. Academy of Management Annual Meeting. Philadelphia, Pennsylvania.
- Wohlgemuth, V., 2014. Enabling Employees to Contribute to the Firm's Dynamic Capabilities: Managerial Impact through Trust and Control. *Strategic Management Society Special Conference*. Copenhagen, Denmark

### Conference Presentations

- Burisch, R. & Wohlgemuth, V., 2013. Blind-spots of Dynamic Capabilities: A Systems-theoretic perspective. *European Academy of Management Conference*, Istanbul, Turkey.
- Wohlgemuth, V., 2013. The Impact of Trust and Control on Dynamic Capabilities. *European Academy of Management Conference*, Istanbul, Turkey.
- Wohlgemuth, V. & Burisch, R., 2013. Microfoundations of Dynamic Capabilities: The Influence of Trust and Power. *Academy of Management Annual Meeting*. Orlando, Florida.
- Wohlgemuth, V., 2013. The Impact of Trust and Control on Dynamic Capabilities. *European Group of Organization Studies Colloquium*, Montreal, Canada.
- Wohlgemuth, V. & Burisch, R., 2012. Micro-foundations of Dynamic Capabilities: The Influence of Trust and Power. *British Academy of Management Conference*. Cardiff, United Kingdom (Winner of the "Best Developmental Paper Award")