

Sicherheit in Technik und Chemie

2022

Digitalization in Conformity Assessment in Italy

A QI-FoKuS study

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The digital transformation of the economy as well as increasingly networked and complex products and applications are bringing digitalization into the focus of conformity assessment bodies (CABs). Innovations, new technologies and processes rely on corresponding conformity assessment services. This poses new challenges for testing and calibration laboratories, inspection and certification bodies, and other CABs. At the same time, however, new digital technologies and applications also offer new opportunities. This study is the first to comprehensively explore "Digitalization in Conformity Assessment" building on data from an online survey of accredited CABs in Italy.

Major topic areas covered:

Digital Maturity Level

- Assessment of digital maturity of the CABs in Italy based on a tailored digital maturity model

Drivers, Benefits and Barriers

- What motivates CABs to transform digitally, what impact do they experience, and what hurdles must be overcome?

Technology Trends

- Assessment of the digital technologies and applications currently in use (now and in a 5-year perspective)



A study conducted within the framework of the QI-FoKuS initiative



Basic statistical population for the survey	2,200 accredited conformity assessment bodies (CABs) in Italy
Data collection method	Online survey
Survey period	January 10, 2022 - February 4, 2022
Sample	114 fully completed questionnaires (= 5.2% response rate)



Digitalization in Conformity Assessment

Online Survey



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The Sample

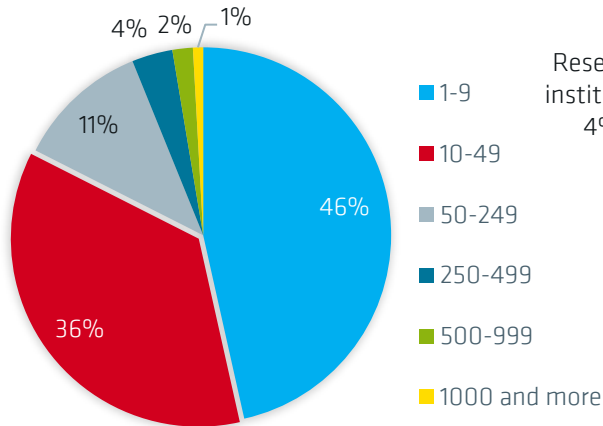
General information about the participating
Conformity Assessment Bodies (CABs)

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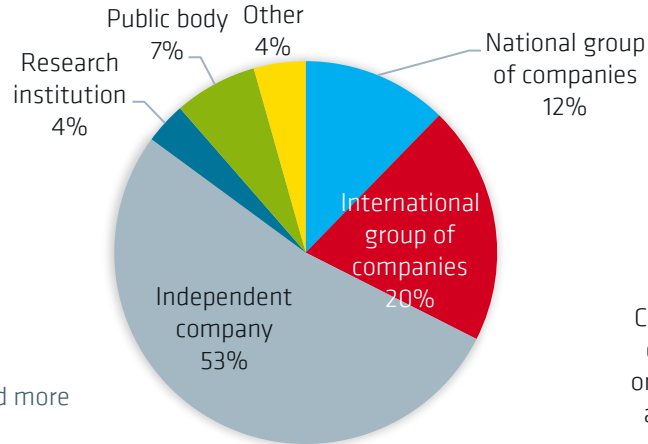
114 conformity assessment bodies (CAB) in Italy participated in the survey

- 82% of participating CABs are **small businesses** with less than 50 employees
- 53% are **independent companies**, 20% belong to an **international group**, 7% are **public bodies**
- For 34% Conformity Assessment (CA) is the main economic **focus of activity**, 16% are an **internal CAB** of a higher-level organization

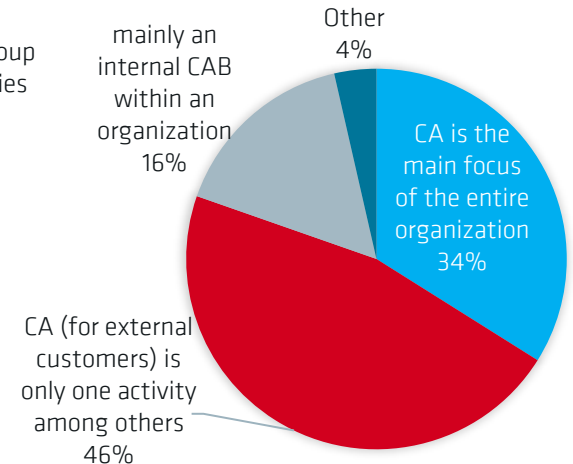
Number of employees (n=114)



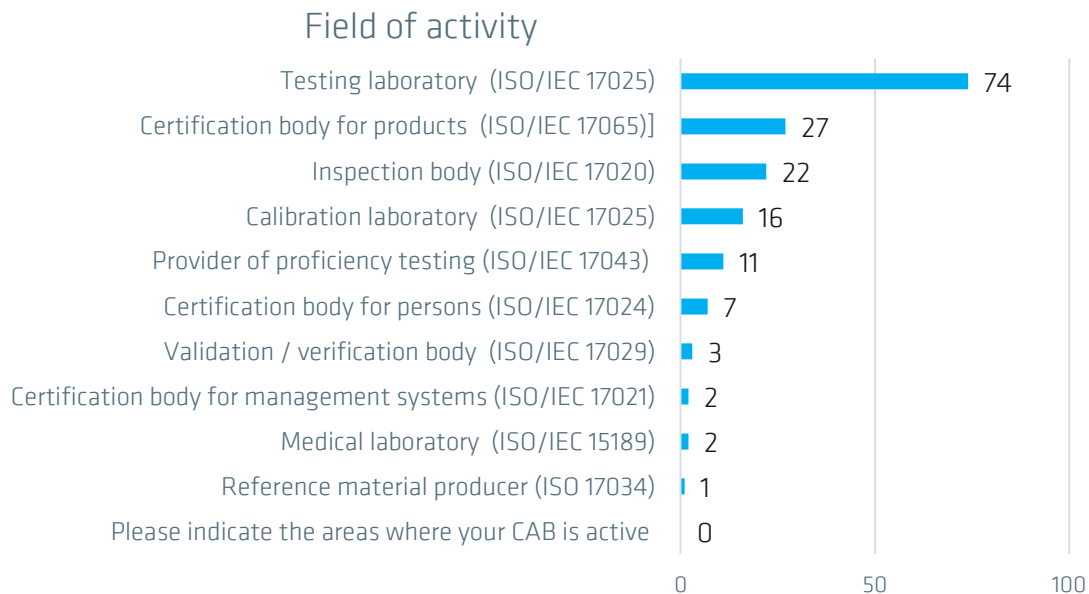
Type of organization (n=114)



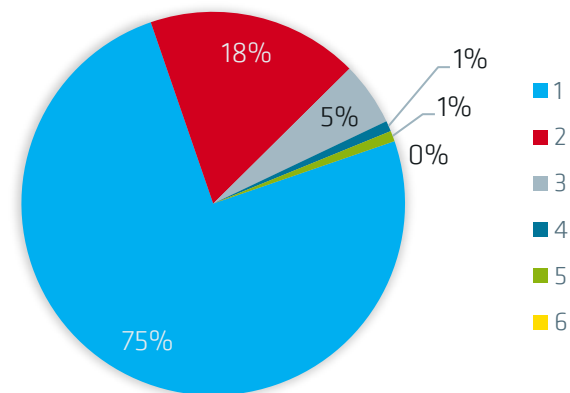
Role of CA for the organization (n=112)



The 114 participating CABs cover a broad range of activities



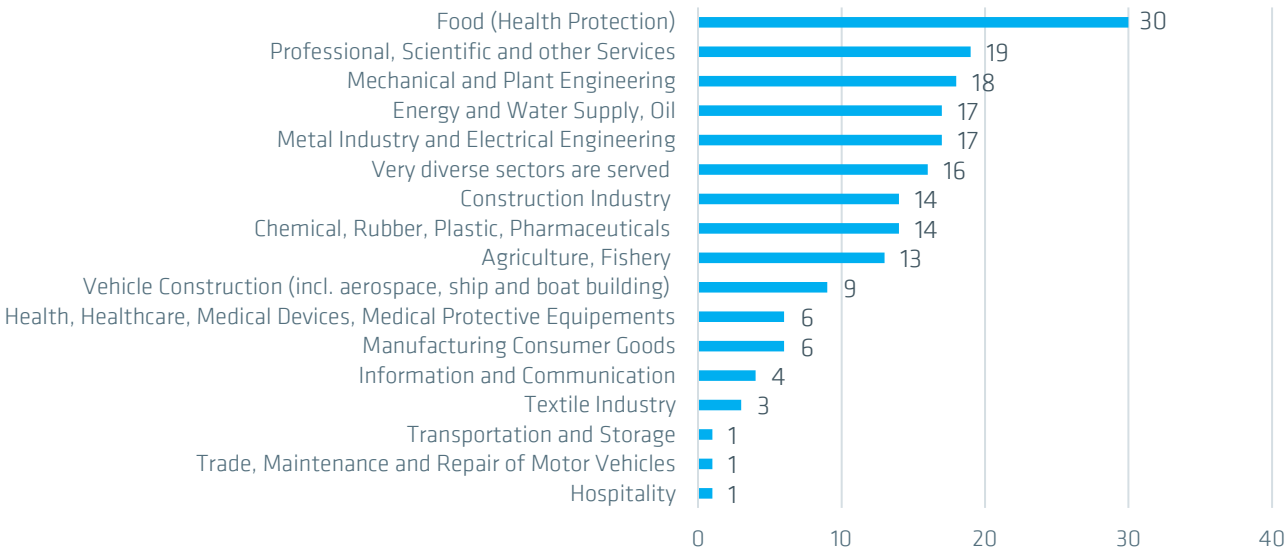
Number of fields of CA activities per CAB



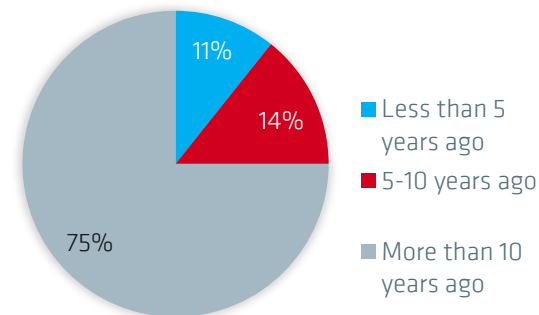
- Testing laboratories represent the **largest group of participants**, followed by certification and inspection bodies
- 75% of CABs **specialize** in a single field of activity in conformity assessment; only a few cover a broad range of activities (up to 5)

The CABs serve a wide range of industries // mostly established on the market for a long time

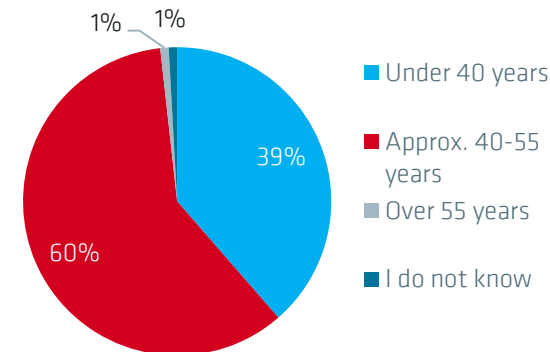
Main sectors served by the CABs



Establishment of the CAB (n=113)



Average age of employees (n=114)



- The customers served by CABs are mainly from the **food sector**, followed by service sectors and industry
- 75% of the CABs were **established** more than 10 years ago
- While the **average age of the employees** in 60% of the CABs is 40-55 years, it is under 40 years in 39% of the CABs

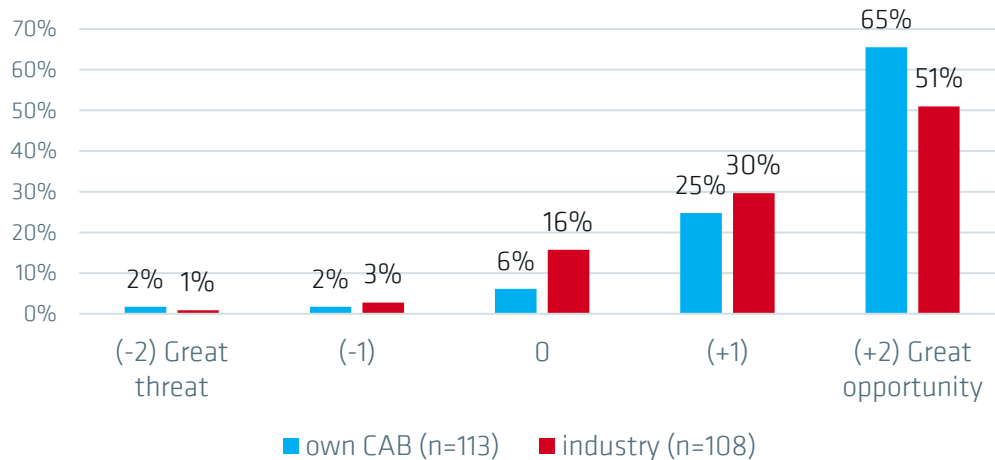
Digitalization in Italian CABs A General Overview

This section covers how the participating CABs perceive digitalization for their organization (now and in perspective) and how they self-evaluate their current state of digital transformation.

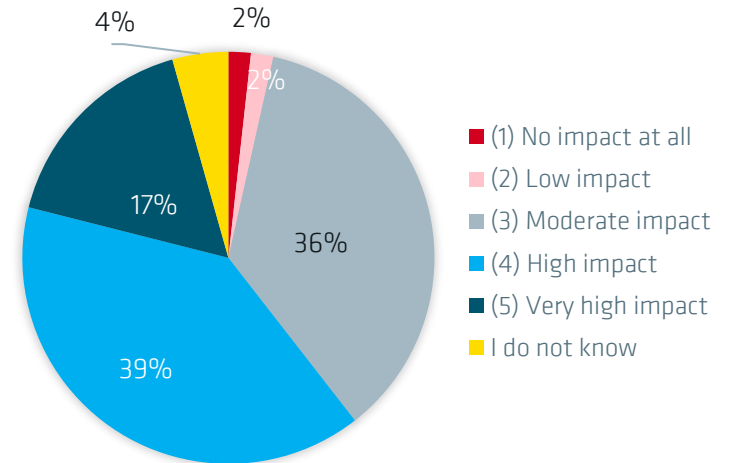
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Digitalization more of an opportunity rather than a threat // Major influence expected

For the CAB itself and the whole industry, digitalization is viewed rather as...



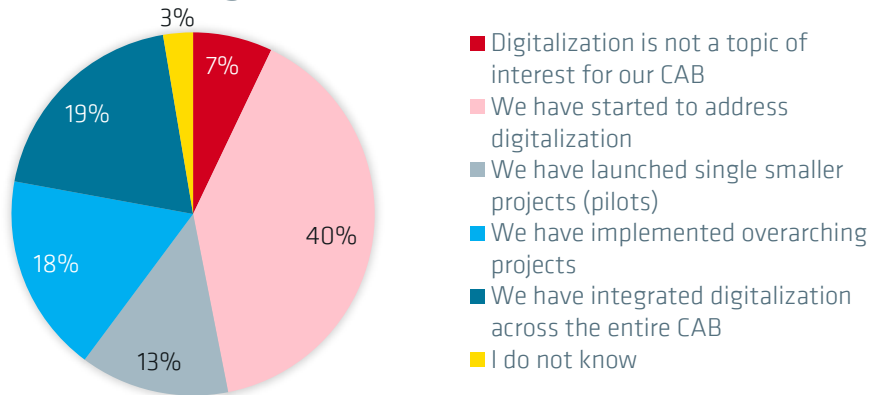
Expected impact of digitalization in the next 5-10 years (n=114)



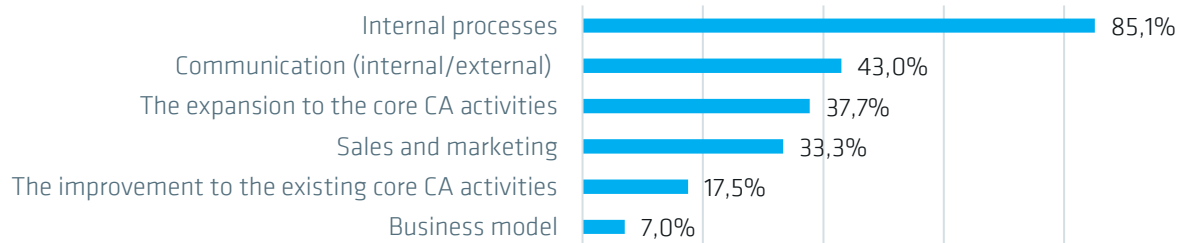
- In general, CABs have a **positive perception** of digitalization: More than 90% of surveyed CABs recognize digitalization as an **opportunity or even a great opportunity** rather than a threat for their own organization, and for the whole CA industry (81%)
- 56% of the participants expect digitalization to have a **great or even very great impact on CA activities** in the next 5-10 years, however 36% expects only a moderate impact

State of digitalization varies greatly // Focus mainly on internal processes

Status and extent of digitalization in the CABs (n=113)



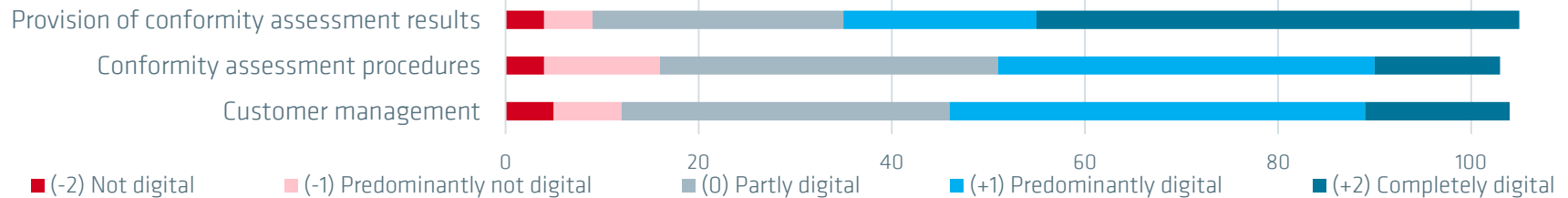
Areas targeted by digitalization (multiple answers possible, n=114)



- **The status of digitalization is quite diverse** across the CABs in Italy: While 40% of the CABs have just started to address this topic, 13% have launched single smaller projects and 18% have already implemented overarching projects. 19% state to have integrated digitalization across the whole organization
- Most of the **digitalization activities concern internal processes**. Yet communication and expanding the core CA activities are also relevant areas. However, digitalization is currently rarely used to improve existing CA services or even less to adopt new business models

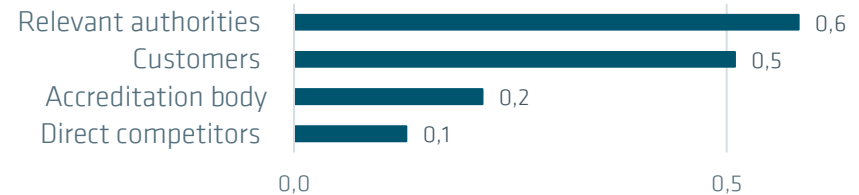
Positive self-assessment on digitalization in core areas - and in comparison with stakeholders

Self-evaluation of the CABs' status of digitalization in different areas (n=106)



- The CA results are provided predominantly or completely digitally by the majority of the CABs. The CA processes themselves are less frequently digitalized.
- Compared to **other organizations** that are direct stakeholders, the CABs on average rate their digital status as at least as good or better, especially with regard to relevant authorities and customers.
- Digitalization has not been a topic for long: 61% of the CABs **have only started to deal with it** during the last 5 years. Only 20% have done so at least 10 years ago.

Own status of digitalization compared to... (n=104)
(on a scale of (-2 much worse) to (+2 much better))



CABs started to deal with digitalization... (n=105)



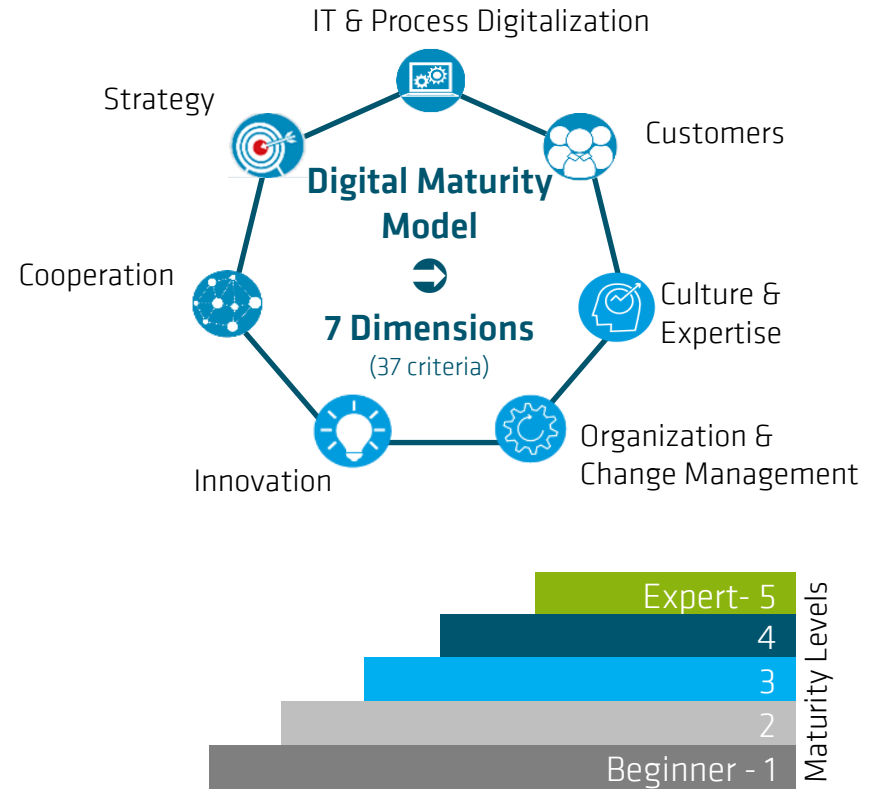
Digital Maturity of CABs

The "digital maturity" of an organization describes its status in the digital transformation. Digital maturity models use predefined dimensions and criteria to assess the ability of organizations to cope with the digital transformation. The following chapter presents the results for CABs in Italy based on a model developed specifically for this study.

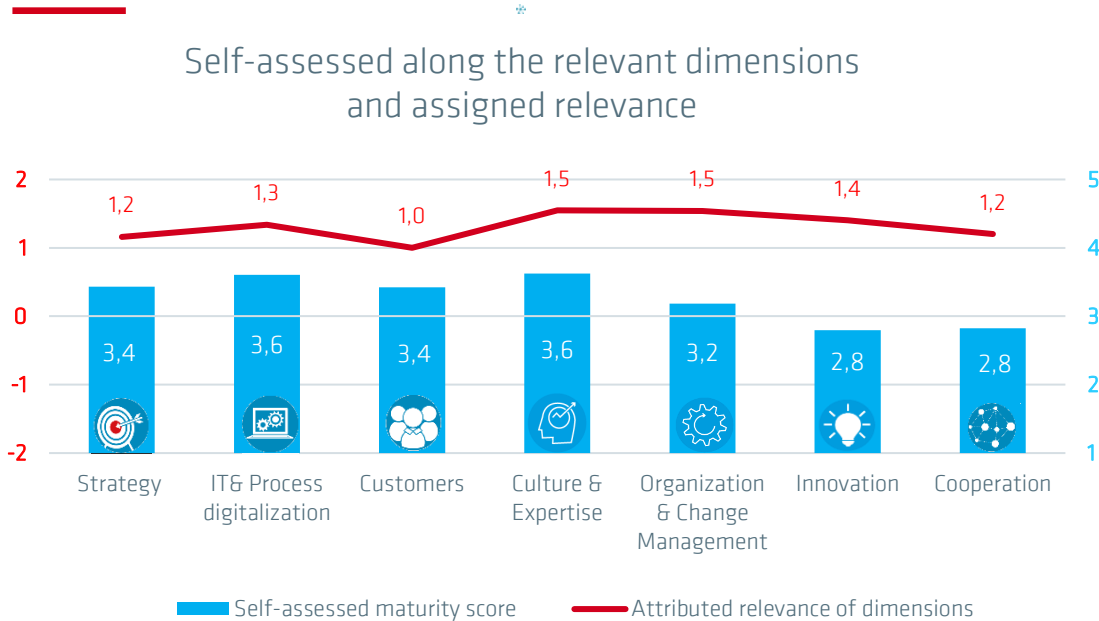
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The digital maturity model for the conformity assessment industry

- The digital maturity level reflects the status of the digital transformation of an organization and includes technical as well as organizational and strategic aspects.
- Becoming a digitally mature organization requires efforts, **capabilities** and **resources** across many areas.
- These are mapped in a maturity model using various **dimensions** and **criteria**:
 - Our specially developed model takes into account 7 dimensions that are essential for the digital transformation of CABs: from technological to strategic and organizational to cultural aspects.
 - Each dimension is operationalized by 4 to 6 criteria describing basic success factors in terms of capabilities, capacities, and resources.
- By means of a self-assessment of the participating CABs along these criteria, an individual digital maturity level is calculated - from level 1 ("beginner") to level 5 ("expert").



Maturity very different in the dimensions: Technology advanced, organization not yet



* The CABs were asked to self-evaluate their maturity/performance along statements in 7 topic areas (dimensions) on a scale from 1 (I do not agree at all) to 5 (I fully agree). These statements and dimensions are displayed in detail in the annex.

The participants were then asked to rate the importance of each dimension with regard to a successful digital transformation on a scale from -2 (not important at all) to +2 (very important).

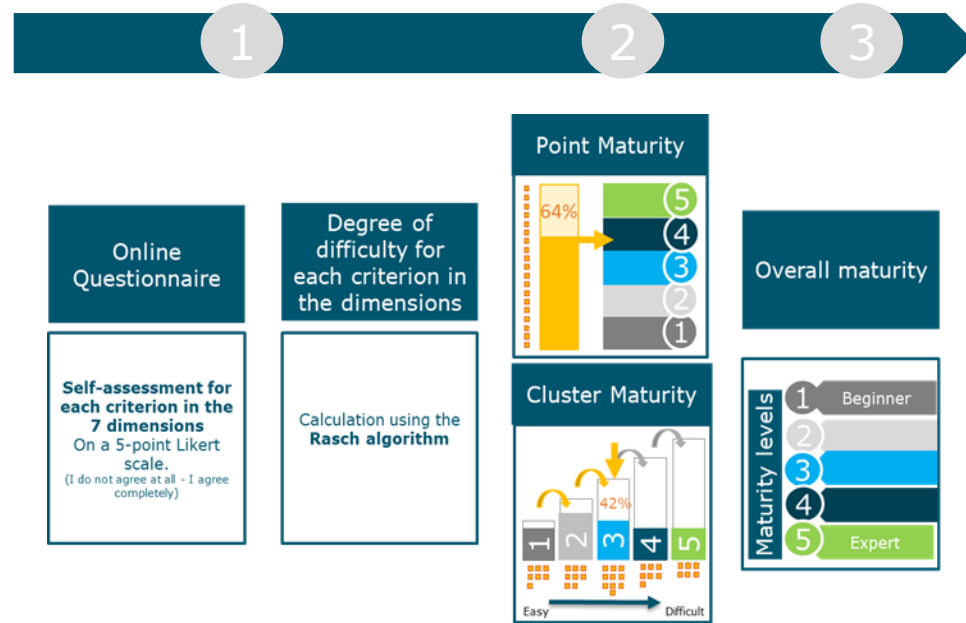
- The results of the maturity model show that the status of the CAB slightly differs in the various dimensions:
 - The CABs consider themselves to be **most advanced** in the area of "Culture and Expertise" and "IT & Process Digitization" and followed by "Strategy" and "Customers"
 - The **greatest need** to catch up is in the areas of "Innovation" and "Cooperation" - although the respondents are actually aware of their high relevance
- This **pattern is typical**: Digital transformation in organizations starts with the introduction of technologies and develops into an implicit holistic organizational transformation

➔ *Details on the composition and partial results in the individual dimensions can be found in the appendix.*

Background information: Calculation of the digital maturity level

In the questionnaire, participants indicate the extent to which each of the criteria of the 7 dimensions applies to their CAB. In a **multi-stage process**, digital maturity is determined on the basis of these assessments:

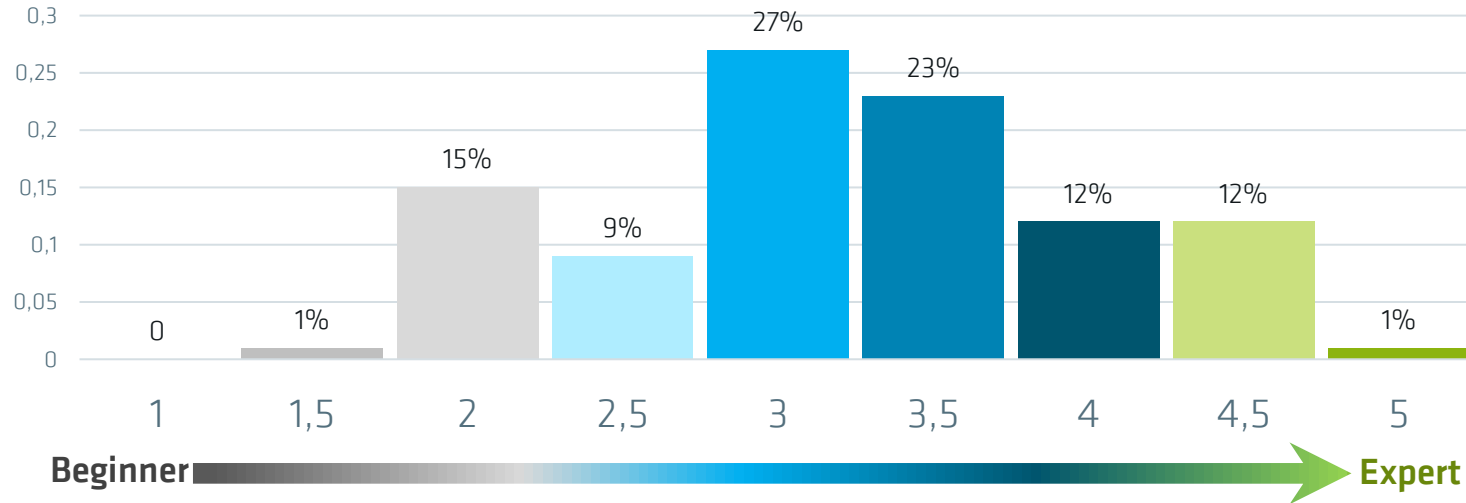
1. For each criterion, the Rasch algorithm is first used to calculate how difficult it is to achieve a good result for it (**degree of difficulty**). If, on average, a large number of participants state that they can meet this criterion, it is classified as easy to achieve.
2. Based on this, 2 types of maturity levels are determined: **Cluster analysis** is used to divide the indicators into 5 sequential maturity clusters (1 = easiest indicators; 5 = most difficult). To reach a higher maturity, the thresholds of the lower maturity levels have to be met first. In addition, the **point maturity** is calculated: Here, the points achieved count in comparison to the possible total points.
3. The **overall digital maturity score** is the average of the cluster and point maturity scores.



The calculation is based on the method of the St. Gallen maturity model. See Back & Berghaus (2016). Digital Maturity & Transformation Study; Berghaus & Back (2016). Stages in Digital Business Transformation; and Friedel & Back (2012). Determination of enterprise 2.0 development levels with a maturity model.

Overall Digital Maturity Scores of the Italian CA industry

Distribution of overall maturity scores (n=114)



The **digital maturity levels** achieved by the 114 participating CABs in Italy follow a right-skewed *normal distribution*:

- Half of the CABs have achieved intermediate stage 3 or even 3.5. 24% have already reached a higher level of maturity, while every fourth CAB still has a lower maturity level.
- Only 1% CAB has yet achieved the expert maturity stage 5. However, no CAB is still on the very beginner level 1.

The 5 Digital Maturity stages in Italian CABs

Beginner

1

- ✓ Digitalization has central role in strategy
- ✓ Openness to change
- ✓ Digitalization as new source of value creation

2

- ✓ Evaluation of digital technologies with regard to innovation potential
- ✓ IT use is reliably ensured
- ✓ Digital opportunities are exploited
- ✓ IT security: awareness and compliance
- ✓ Digitalized customer interactions
- ✓ Understanding of the importance of digital transformation
- ✓ Suitable personnel and know-how
- ✓ Digital activities integrated into core processes

Intermediate

3

- ✓ Documented digital strategy
- ✓ Networked processes
- ✓ Knowledge about most important digital technologies
- ✓ Investments in digital technologies
- ✓ Digitalized customer care
- ✓ Analysis of customer data
- ✓ Targeted training
- ✓ Defined roles, responsibilities & decision-making processes
- ✓ Digitalization goals defined and measurable
- ✓ Competitive advantages through digitalization
- ✓ Digitalization is systematically promoted

4

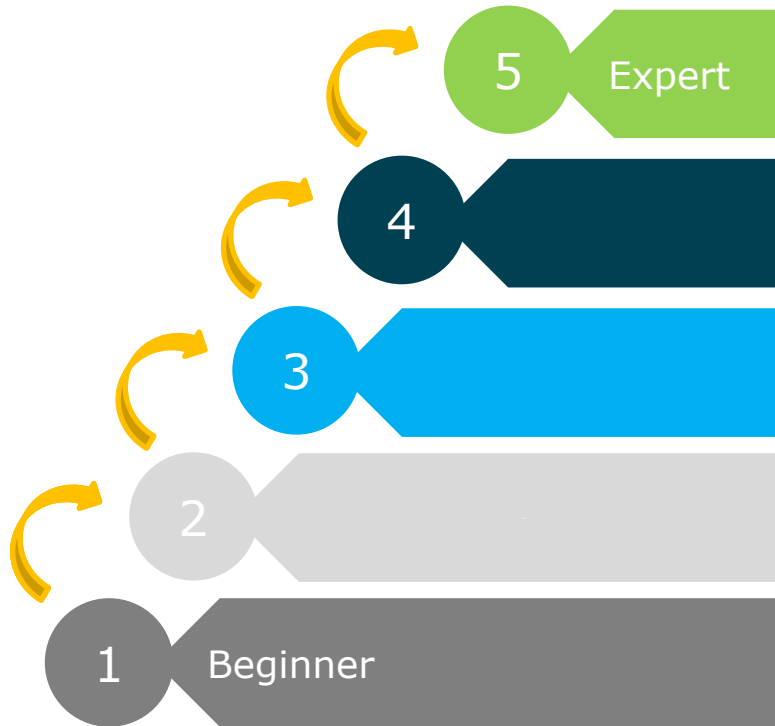
- ✓ Digital Roadmap
- ✓ Clear responsibilities for digitalization goals
- ✓ Digital solutions based on customer needs
- ✓ Risk of failure is accepted
- ✓ Rapid response to change
- ✓ Sufficient resources to drive digital innovations
- ✓ Customers involved in development of digital innovations
- ✓ Clearly defined innovation process
- ✓ Cross-functional and cross-departmental collaboration
- ✓ Exchange with external experts
- ✓ Effective collaboration with external stakeholders
- ✓ Comprehensive partner network for digitalization

5

- ✓ Key indicators for measuring the implementation of the digital strategy
- ✓ Early warning system to identify relevant digital technologies and business models

Expert

The Digital Maturity of CABs in Italy// Summary of the Observed Patterns



- In the **first maturity stage**, digitalization is already given a central place in the organizational strategy and it is considered as a driver of new value creation.
- Organizations at the **second maturity level** exploit the latest digital opportunities to automatize their processes and have suitable personal and know-how. The importance of digital transformation is well understood.
- For **stage three**, capabilities, resources and capacities are activated in all dimensions, especially with regard to innovation and IT & process digitalization. Digitalization is systematically promoted and generates competitive advantages. Corresponding investments in digital technologies are made.
- Finally, the **fourth maturity stage**, is characterized by intensive collaboration, in particular through the establishment of a targeted partner network and the involvement of customers, as well as clear innovation processes. Customer needs and analyses also come increasingly into focus.
- In the final **fifth stage** organizations use key indicators to measure the implementation of the digital strategy and have an early warning system to identify relevant digital technologies.

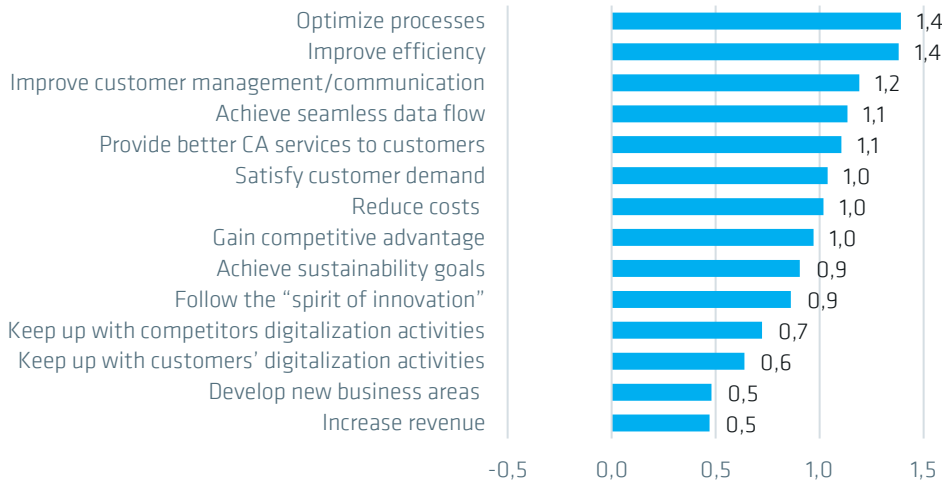
Motives, Impacts and Hurdles of Digitalization

What is driving digitization in the CABs? What effects can be achieved for the organizations? Are expectations being met? And what are the biggest obstacles to be overcome in the digital transformation?

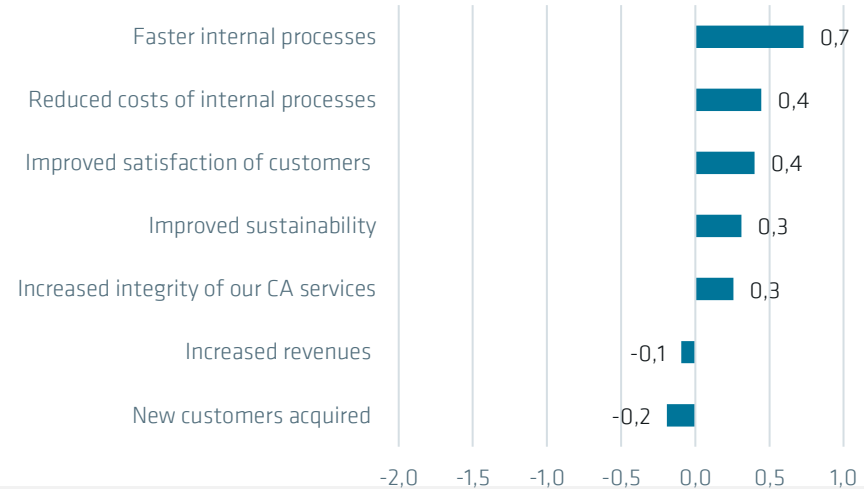
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Focus on process optimization and efficiency enhancement – but not yet realized on a large scale

Goals behind the digitalization efforts (n=106)
(on a scale from (-2) does not apply at all to (+2) fully applies)



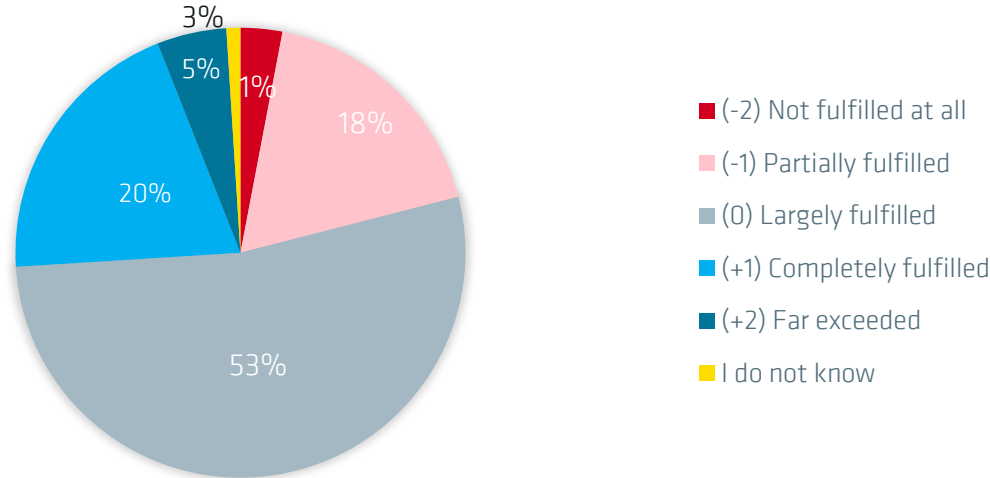
Benefits realized from digitalization (n=103)
(on a scale from (-2) not agree at all to (+2) fully agree)



- Process optimization and improved efficiency are the **main goals** behind the digitization efforts of CABs in Italy. In fact, faster and more cost-effective internal processes are considered as greatest realized benefits.
- Market objectives such as increased revenue or the development of new business areas are not drivers - and the effects realized on sales and new customer acquisition are not translated into realized benefits. In contrast, many respondents see an improvement in the satisfaction of existing customers, as well as in the sustainability of the CAB.

CABs' expectations related to digitalization are (at least partially) met

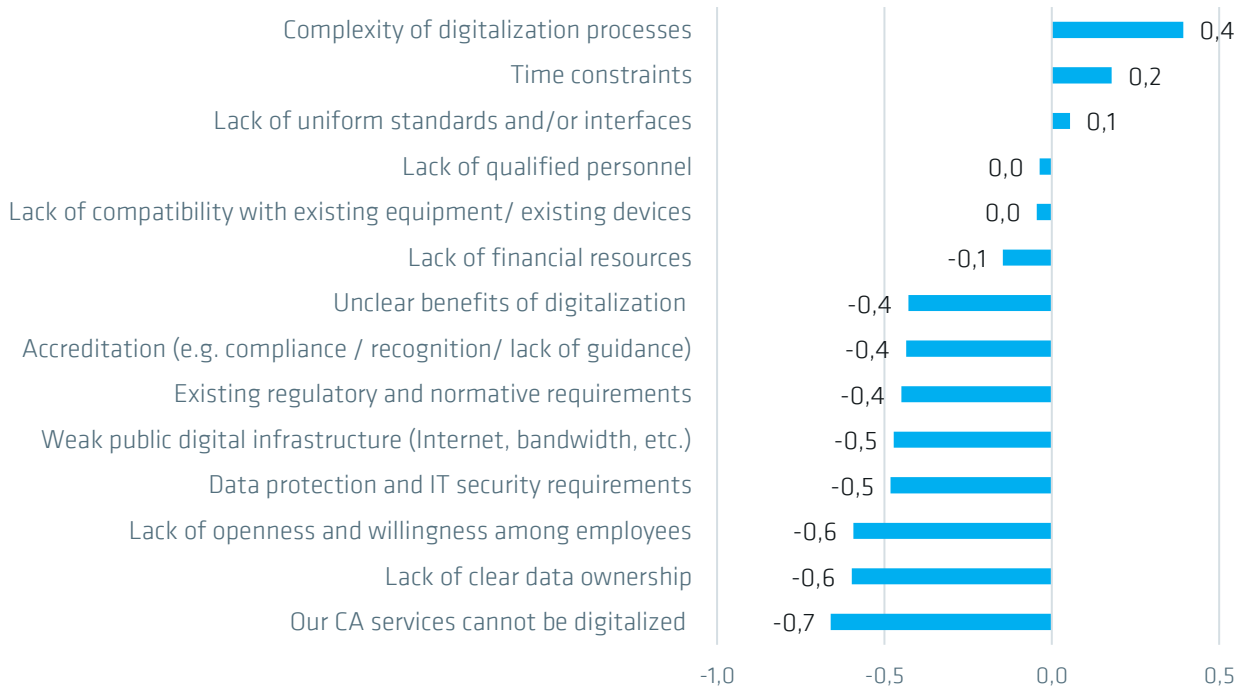
Have expectations behind the introduction of digital processes/technologies been fulfilled overall so far? (n=100)



- 73% of the CABs consider their expectations behind the introduction of digital technologies to have been largely or completely fulfilled. Another 18% find them at least partially fulfilled.
- Only for 1% of the CABs the expectations are not fulfilled at all. They, however, are confident to still meet the expectations in the medium or long run.

Lack of time and complexity of the topic are the biggest obstacles to digital transformation

Hurdles to digital transformation (n=114)
(Scale from (-2) not at all to (+2) very strongly)



- Complexity of digital processes is the most frequently stated obstacle for CABs in their digital transformation, followed by time constraints.
- Technical aspects such as a lack of uniform standards and/or interfaces is only a minor issue for many CABs.
- In contrast, unclear benefits of digitalization or lack of open and willing employees are not severe hurdles.

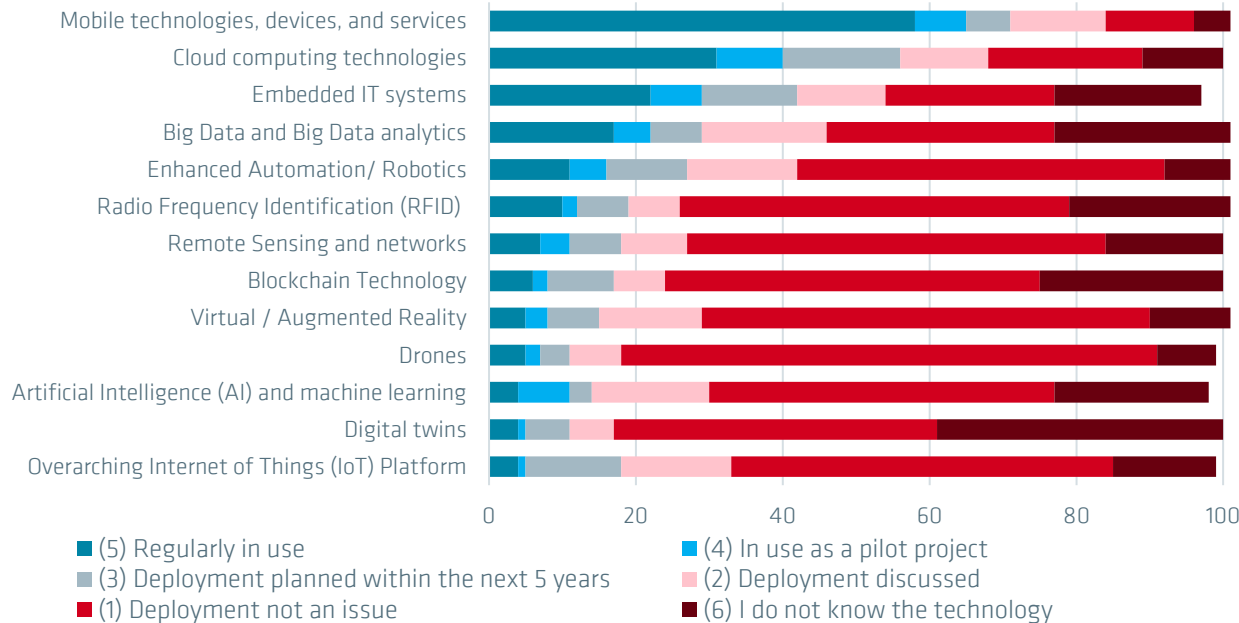
Digital Technologies and Trends

This section highlights the actual (or planned) use of concrete digital technologies and applications in the CABs. In addition, the use of remote procedures and technologies is presented.

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Latest digital technologies are not yet widely used in CABs

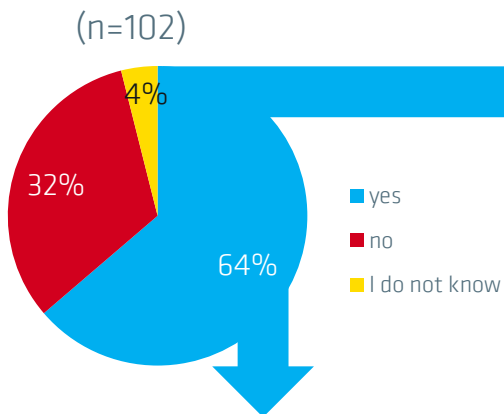
Technologies that are used or planned to be used (n=101)



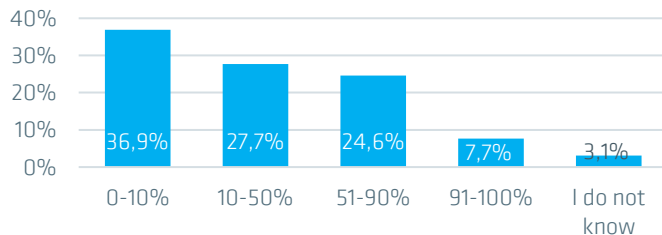
- Advanced digital technologies such as blockchain, artificial intelligence, virtual reality and big data analytics are on everyone's lips - but not yet in widespread use by CABs in Italy. Only a few use them for their work. In some cases, they are not even known (Blockchain technologies, for example, are unknown to every 4th respondent. Digital twins are even less known).
- The most widespread among CABs is the use of mobile technologies, followed by cloud computing technologies and embedded IT systems.

Remote methods and technologies are used by most CABs

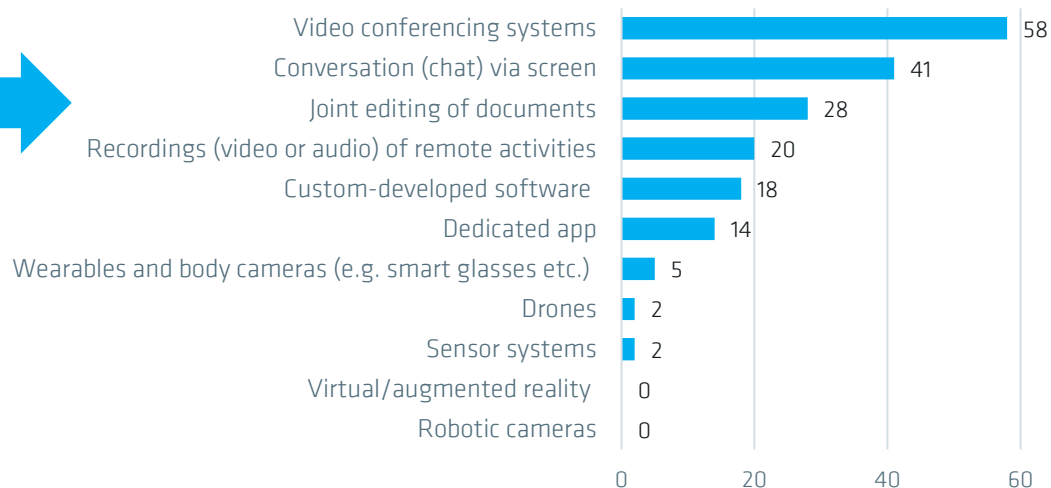
Use of remote methods in CABs



Share of CA services implemented remotely (n=65)



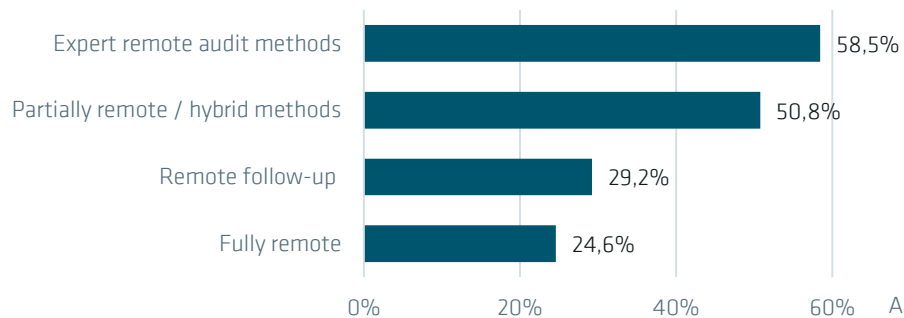
Technologies and applications for remote procedures (n=65)



- 2 out of 3 CABs use **remote methods** in their CA activities
- Very few (8%) have switched (almost) completely. More than one in three CABs has not yet reached 10% of remote activities.
- Video conferencing is the most used **tool for remote work**, while wearables, drones or sensor systems are still rarely used.

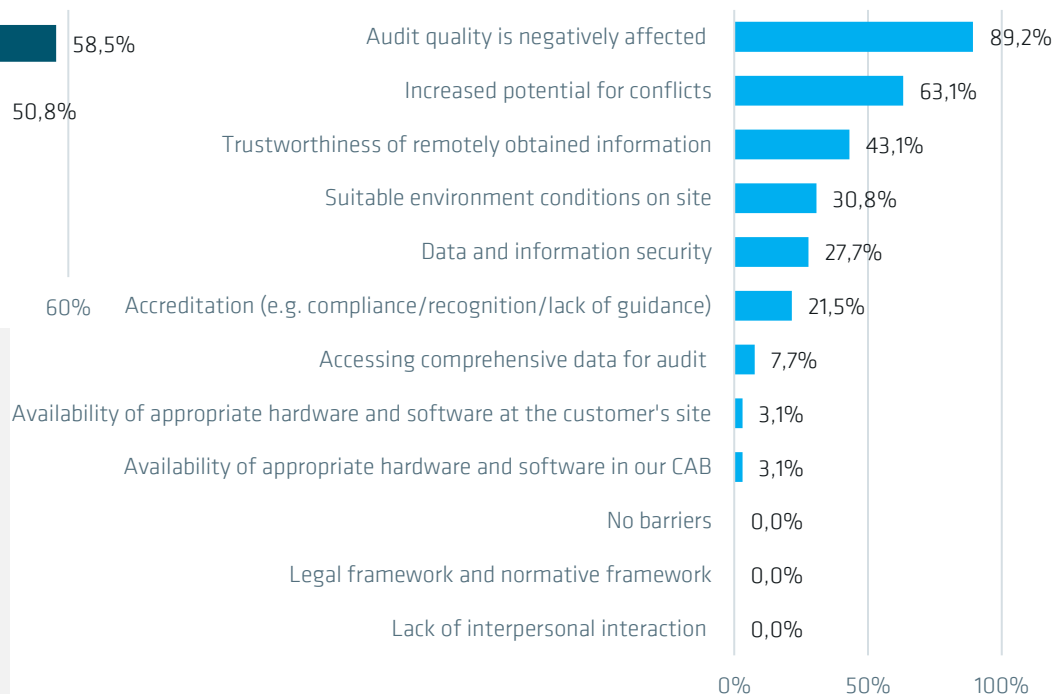
Diverse used approaches and experienced hurdles in remote procedures

Type of remote procedures used (n=65)



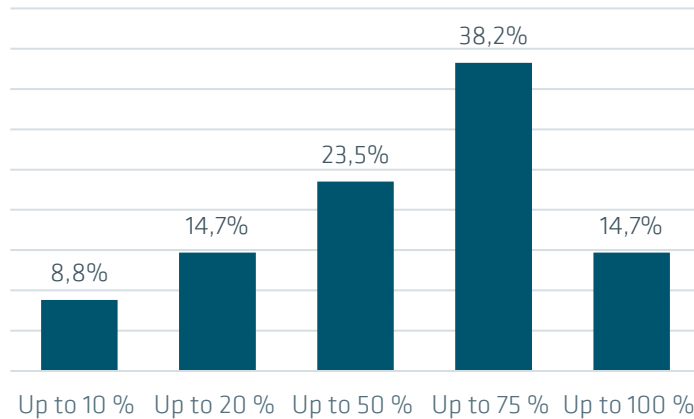
- **Expert remote audits** are the predominant type among remote methods used, followed by hybrid approaches.
- Practical issues compromising the quality of audits or inspections are seen as the biggest **hurdles** in the use of remote methods. The increased potential for conflicts and the trustworthiness of remotely obtained information are also seen as potential barriers.

Barriers (n=65)

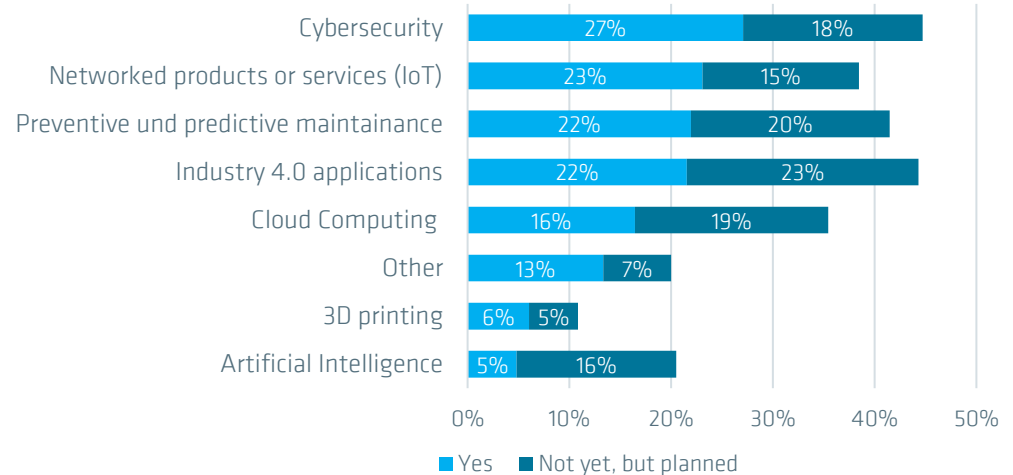


CA for advanced digital technologies is only performed by a minority of CABs so far

Share of routine processes that are digital (n=102)



Digital products and applications for which CA is conducted (n=79)



- Every second CAB has digitalized more than half of its **routine processes**, only 9% of the CABs have not digitally converted even 10% of their processes.
- 37% of the surveyed CABs conduct **conformity assessments for modern digital technologies and applications**. In focus: cybersecurity (27%) and networked products or services (23%).

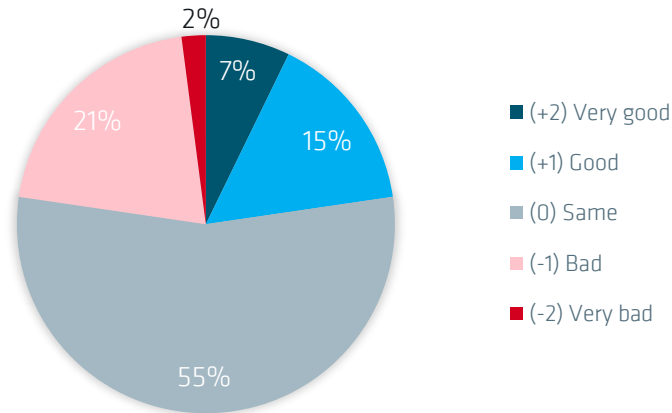
The COVID-19 Pandemic and Digitalization

The COVID-19 pandemic has accelerated digitalization in many organizations. At the same time, previous studies show that digital organizations are more resilient. This section looks at the interaction of pandemic response and digitalization in CABs.

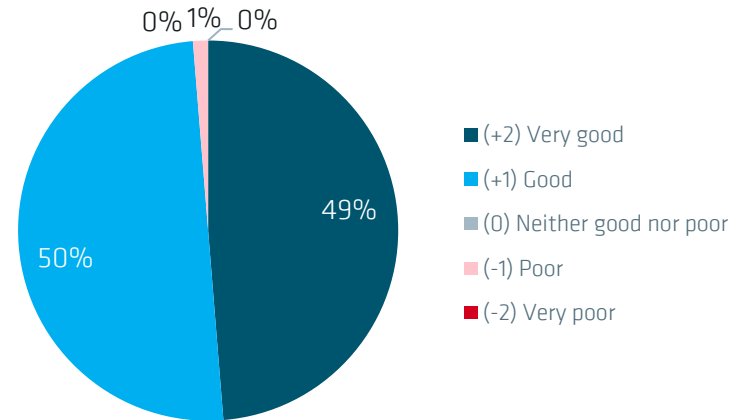
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Most CABs have coped well with the challenges of the COVID-19 pandemic

CABs' order situation in 2021 compared to pre-COVID-19 times (n=102)

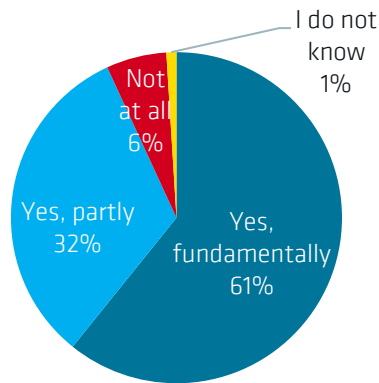


Response to the challenges of the COVID-19 pandemic (n=78)

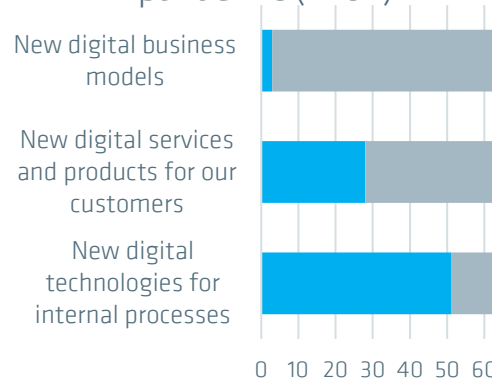


- For 55% of the CABs, the **economic situation** in terms of incoming orders in 2021 was no better or worse than before the COVID-19 pandemic. 22% claimed their order development had improved, for another 23% orders had declined
- The majority of CABs (99%) reported that they have **responded** well or very well to the challenges associated with the COVID-19 pandemic

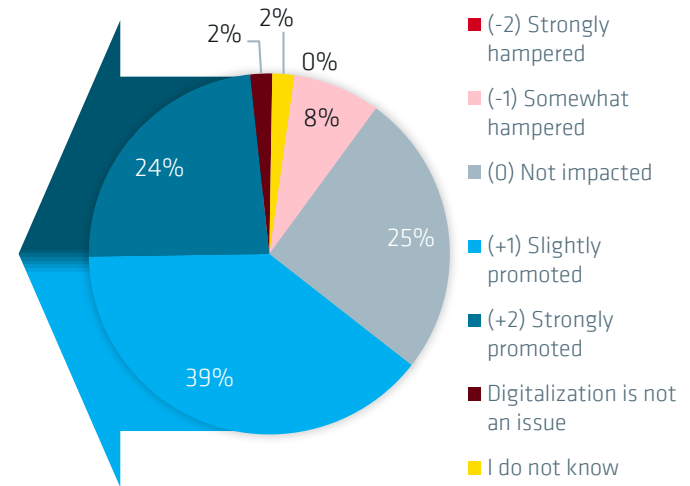
Digital technologies have helped coping with challenges of the COVID-19 pandemic (n=102)



Digital adaptation in course of the COVID-19 pandemic (n=64)



Impact of the Covid-19 pandemic on the digitalization of CABs (n=102)



- For 93% of the CABs, digital technologies have helped coping with the challenges of the COVID-19 pandemic
- The COVID-19 pandemic has hindered digitalization in only 8% of the CABs. Rather, 63% of CABs report that digital transformation has been **slightly or even strongly encouraged** and has led to **adaptations**:
- 80% of CABs have introduced new digital technologies for internal processes, 44% new digital services and products for their customers, 5% even new digital business models

- CABs in Italy clearly see digital transformation as an opportunity and most CABs are in the intermediate or even higher levels of digital maturity.
- Even though digital transformation is an individual project for each organization, **typical patterns of digital maturity** are nevertheless confirmed in Italian CABs: An initial strong technological focus is followed by holistic organizational transformation, including change management and strong innovation networks and finally intensive collaboration.
- It is striking that many of the **cutting-edge digital technologies** that are on everyone's lips as buzzwords have not yet found their way into application in CABs. Blockchain, Artificial Intelligence, Big Data Analytics are only used by a few, many are not yet aware of the technologies and their potentials.
- With their digitalization efforts the CABs are **aiming** in particular at internal process improvements. Routine processes are increasingly being digitalized and there is a switch to - mostly hybrid - remote processes.

Italy in international comparison

How do Italian conformity assessment bodies compare internationally? We have conducted the survey on digitalization in conformity assessment in around 20 other countries. The individual country reports and a final comparative study will be published step by step on the QI-FoKuS website. Further scientific articles and a detailed report with further detailed analyses are planned.



➔ www.qi-fokus.de



This study was developed in the context of the QI-Digital initiative. Its goal is to develop solutions for a modern digital quality infrastructure (QI) - together with stakeholders from business, politics, science and QI. More information on the initiative and the opportunities for participation can be found at www.qi-digital.de

The project



Project partners



Supported by



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Prof. Dr. Pavel Castka (University of Canterbury, NZL)

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QI-FoKuS stands for **Qualitätsinfrastruktur - Forschung für Konformitätsbewertung und Sicherheit** ("Quality Infrastructure - Research for Conformity Assessment and Safety").

The initiative was launched jointly by BAM and TU Berlin in 2019 and is supported by the Federal Ministry of Economic Affairs and Climate Action (BMWK).

We conduct studies on current and fundamental topics of conformity assessment and accreditation. The studies are based on our comprehensive surveys of companies and in particular conformity assessment bodies in Germany and abroad. By publishing the results, we contribute to an improved database, scientifically sound findings and the identification of trends in quality infrastructure.

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Contact

Bundesanstalt für Materialforschung und –prüfung (BAM)

S.2 Accreditation and Conformity Assessment

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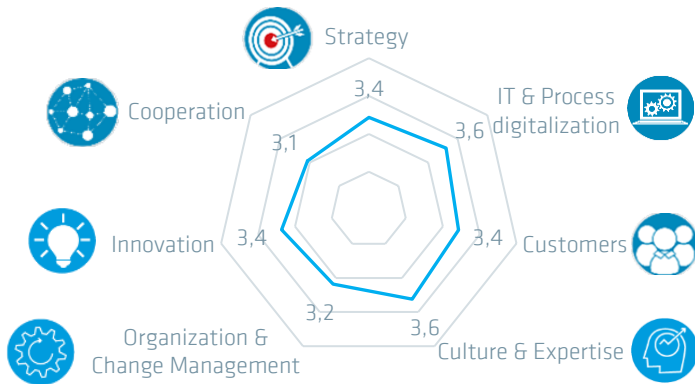
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Annexes

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Dimensions of digital maturity: Detailed overview

Each dimension of the maturity model consists of 4-6 criteria that describe its content. This includes, for example, relevant skills and resources. The survey participants were presented with corresponding statements for agreement on a 5-point scale (from 1 - I do not agree at all - to 5 - I fully agree). These values form the basis for calculating the digital maturity. The average results for the individual criteria in all dimensions are presented in detail below.



Strategy (n=106)

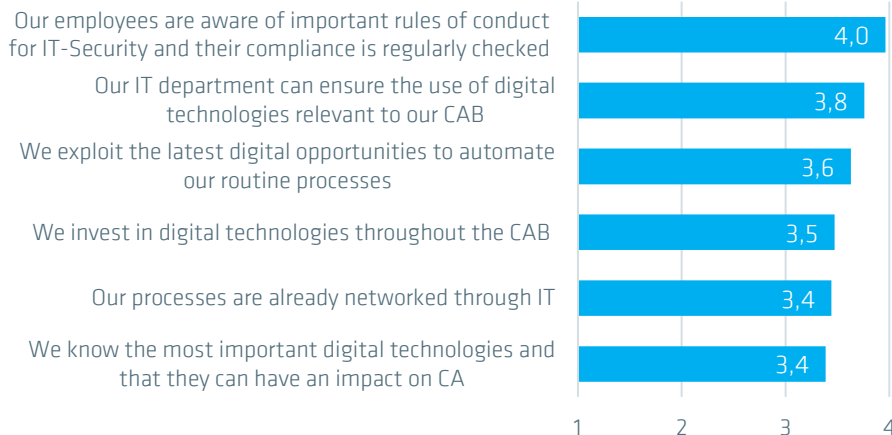


- In most CABs (86%), digitalization plays a central role in their overall strategy, with 70% having a well documented digital strategy
- 62% set up a Digital Roadmap and 56% use key metrics to measure the implementation status of their digitalization strategy.

Dimensions of digital maturity: Detailed overview



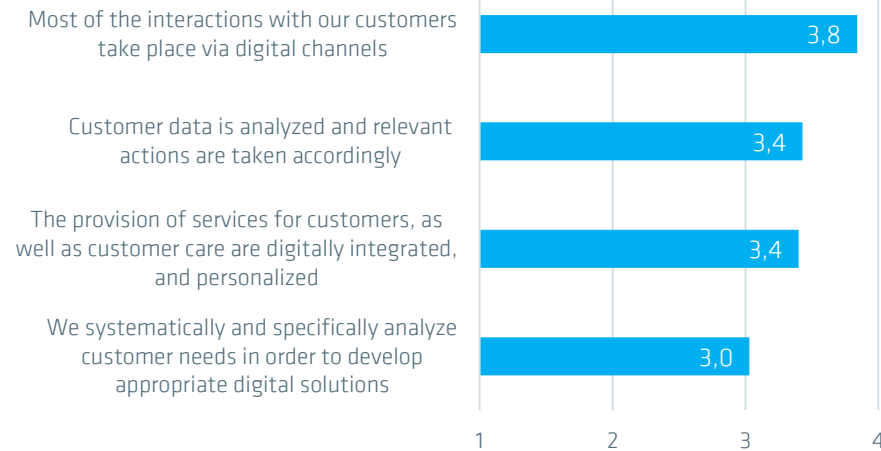
IT & Process Digitalization (n=106)



- At least 75% of CABs are aware of new digital technologies, invest in them and are able to use them properly in compliance with IT security regulations.
- More than 68% of CABs have networked their processes and automated routine procedures.



Customers (n=106)

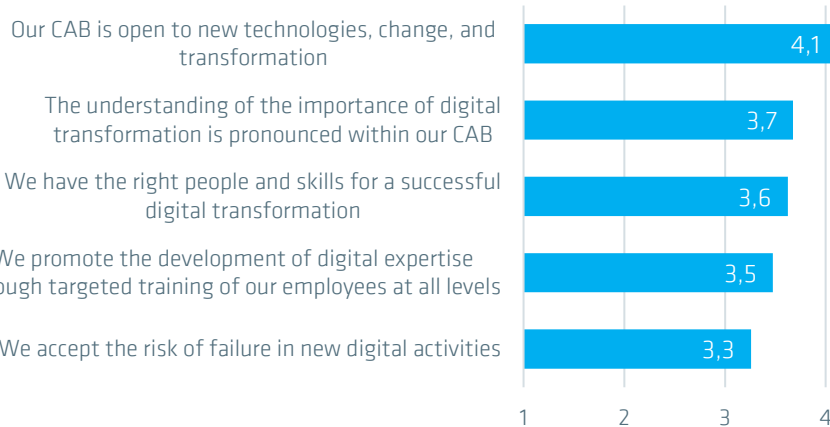


- 76% of CABs in Italy interact with their customers via digital channels.
- However, a lower proportion of CABs (68%) offer services to customers in a digitally integrated way and only 60% of them develop appropriate digital solutions based on customer needs.

Dimensions of digital maturity: Detailed overview



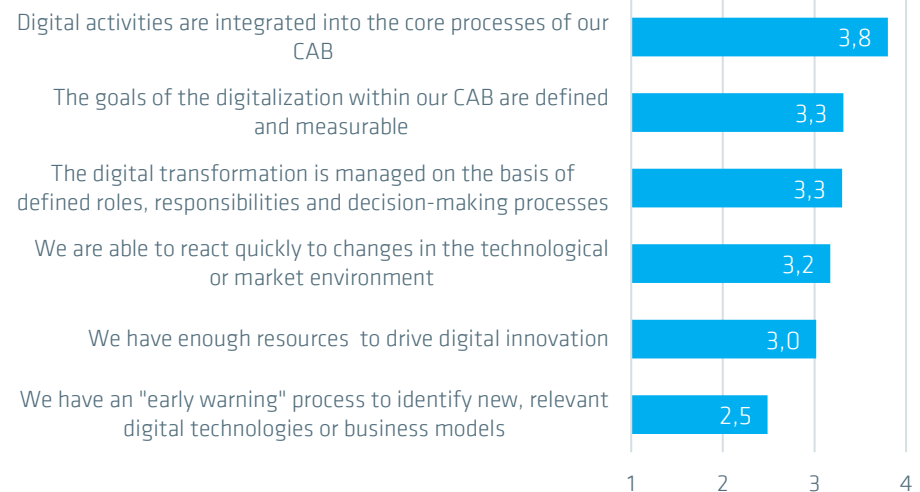
Culture & Expertise (n=106)



- Italian CABs are definitely open to new technologies, changes and transformations (82%).
- 74% of them have a strong understanding of the importance of digital transformation and have the right skills to successfully implement the change.



Organization & Change Management (n=106)

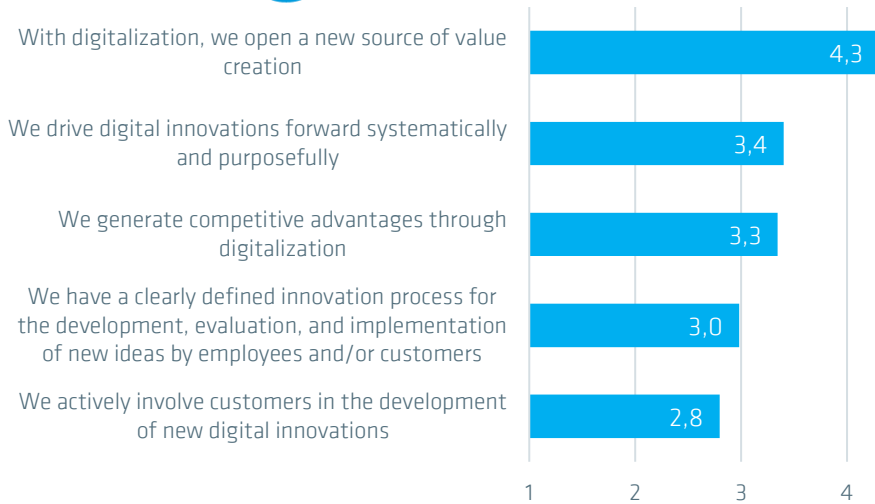


- 76% of CABs have integrated digital activities into their core processes. The clear definition of responsibilities and strategic goals is key to the implementation of digital transformation.

Dimensions of digital maturity: Detailed overview



Innovation (n=105)



- For the majority of participants (86%), digitization represents a new source of value creation and creates competitive advantages.
- However, customers are hardly included in the innovation process.










Cooperation (n=105)



- The majority of the CABs work across departments and functions on the topic of digitization and obtain additional knowledge by consulting external experts.
- Collaboration with specific stakeholders of the CAB is less intensive. 58% maintain a partner network with external parties.

Digital Maturity Model








Level 1 (Beginner)

Description Level 1: Beginner	Dimensions						
							
Digitalization has a central role in our overall strategy	■						
Our CAB is open to new technologies, change and transformation				■			
With digitalization, we open a new source of value creation						■	










Digital Maturity Model

Level 2

Description Level 2	Dimensions						
							
We evaluate new technologies as well as changes in customer behavior to identify potential for digital innovation	■						
Our employees are aware of important rules of conduct for IT Security and their compliance is regularly checked		■					
We exploit the latest digital opportunities to automate our routine processes		■					
Most of the interactions with our customers (e.g., advise, purchase conclusion and customer service) take place via digital channels			■				
Our IT department can ensure the use of digital technologies relevant to our CAB			■				
The understanding of the importance of digital transformation is pronounced within our CAB				■			
We have the right people and skills for a successful digital transformation				■			
Digital activities are integrated into the core processes of our CAB					■		








Digital Maturity Model

Level 3

Description Level 3	Dimensions						
							
Our digital strategy is well documented and communicated	█						
We invest in digital technologies throughout the CAB		█					
Our processes are already networked through IT		█					
We know the most important digital technologies and that they can have an impact on CA		█					
Customer data is analyzed, and relevant actions are taken accordingly			█				
The provision of services for customers, as well as customer care are digitally integrated, and personalized			█				
We promote the development of digital expertise through targeted training of our employees at all levels				█			
We generate competitive advantages through digitalization						█	
We drive digital innovations forward systematically and purposefully						█	
The goals of the digitalization within our CAB are defined and measurable						█	
The digital transformation is managed on the basis of defined roles, responsibilities and decision-making processes						█	
We undertake actions (e.g. workplace concepts) that support employees in collaborating effectively							█


Digital Maturity Model

Level 4

Description Level 4	Dimensions						
							
We have clearly defined the responsibilities for implementing the goals derived from the strategic consideration on digitalization	■						
We have defined a step-by-step implementation plan (Digital Roadmap) for achieving the goals	■						
We systematically and specifically analyze customer needs in order to develop appropriate digital solutions			■				
We accept the risk of failure in new digital activities				■			
We are able to react quickly to changes in the technological or market environment					■		
We have enough resources to drive digital innovation					■		
We have a clearly defined innovation process for the development, evaluation, and implementation of new ideas by employees and/or customers						■	
We actively involve customers in the development of new digital innovations						■	
We use exchanges with external experts to build up additional knowledge in the area of digitalization							■
We work across departments and functions on the topic of digitalization							■
We collaborate effectively with stakeholders on digital initiatives							■
In the field of digitalization, we maintain a partner network with external service providers, start-ups, or research institutions							■

Digital Maturity Model

Level 5 (Experts)

Description Level 5: Expert	Dimensions						
							
We use key metrics to measure the implementation status of our digitalization strategy	■						
We have an "early warning" process to identify new, relevant digital technologies or business models for us					■		