Bord Náisiúnta na hÉireann um Chreidiúnú
Irish National Accreditation Board

QI-FoKuS
Research on Conformity Assessment and Safety

BAM
Bundesanstalt für Materialforschung und -prüfung

Technische Universität Berlin

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UC University of Canterbury
Te Whare Wānanga o Waitaha Christchurch New Zealand

Sicherheit in Technik und Chemie

2022

Digitalization in Conformity Assessment in Ireland

Study

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The Study - An overview

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 Ireland.

Major topic areas covered

Digital Maturity Level	Drivers, Benefits and Barriers	Technology Trends
▪ Assessment of the digital maturity of the CABs in Ireland based on a tailored digital maturity model	▪ What motivates CABs to transform digitally, what impact do they experience, and what hurdles must be overcome?	▪ 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	260 accredited conformity assessment bodies (CABs) in Ireland
Data collection method	Online survey
Survey period	December 17, 2021 January 28, 2022
Sample	29 fully completed questionnaires (= 11% response rate)

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The Sample

General information about the participating Conformity Assessment Bodies

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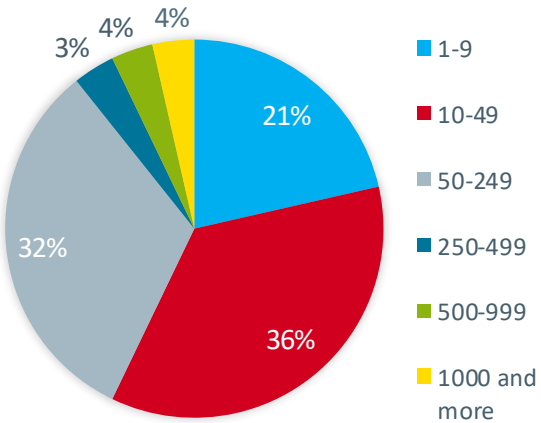
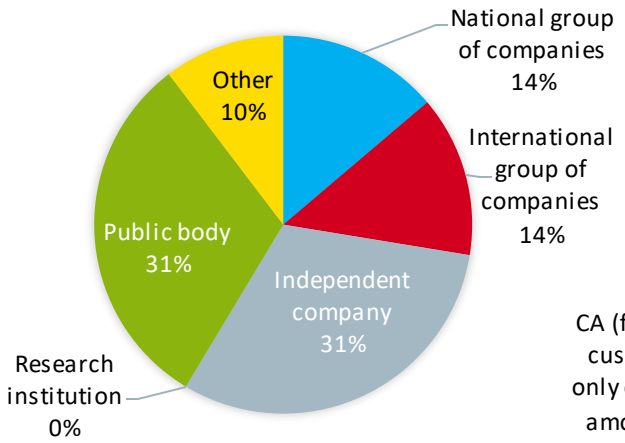
29 conformity assessment bodies (CAB) in Ireland participated in the survey

- 57% of participating CABs are **small businesses** with less than 50 employees
- 34% are **independent companies**, 28% belong to a **group of companies**, 31% are **public bodies**
- For 45% Conformity Assessment (CA) is the main economic **focus of activity**, **38**% are an **internal CAB** of a higher-level organization

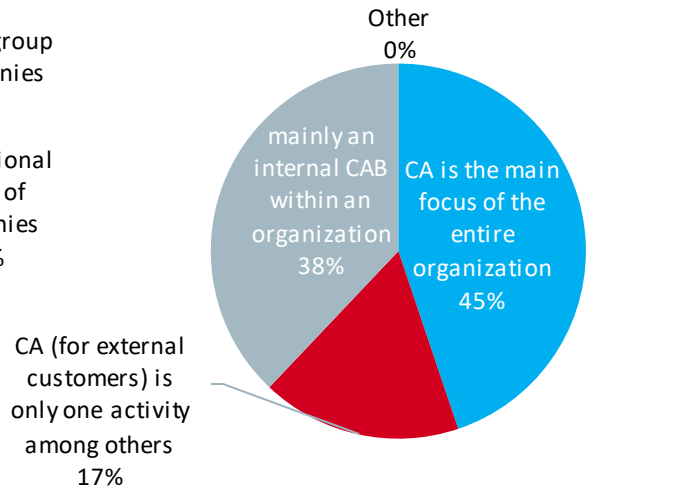
Number of employees (n=29)



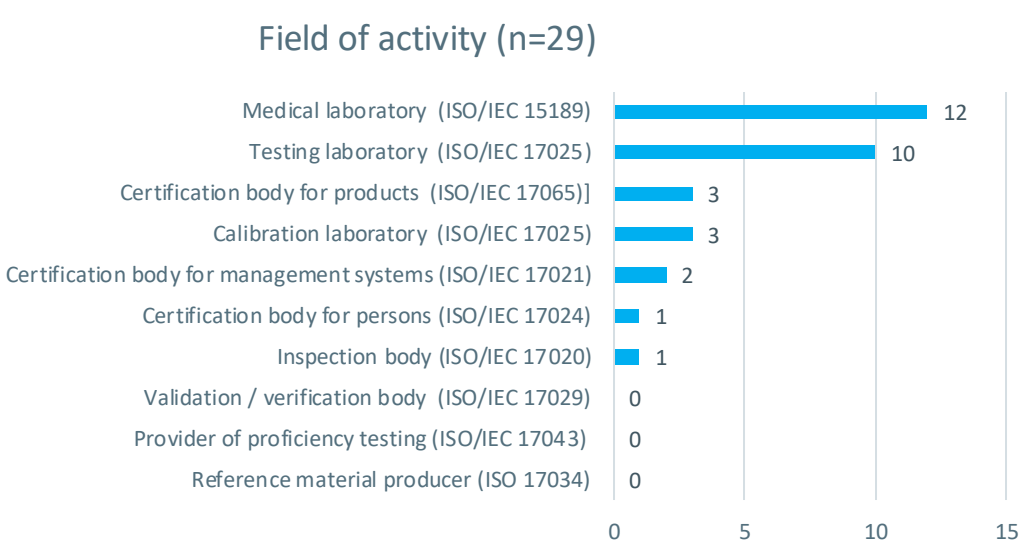
Type of organization (n=29)

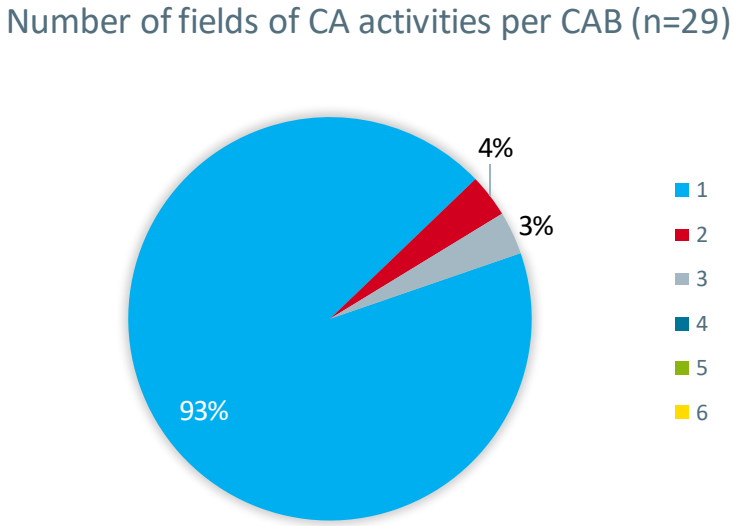


Role of CA for the organization (n=29)



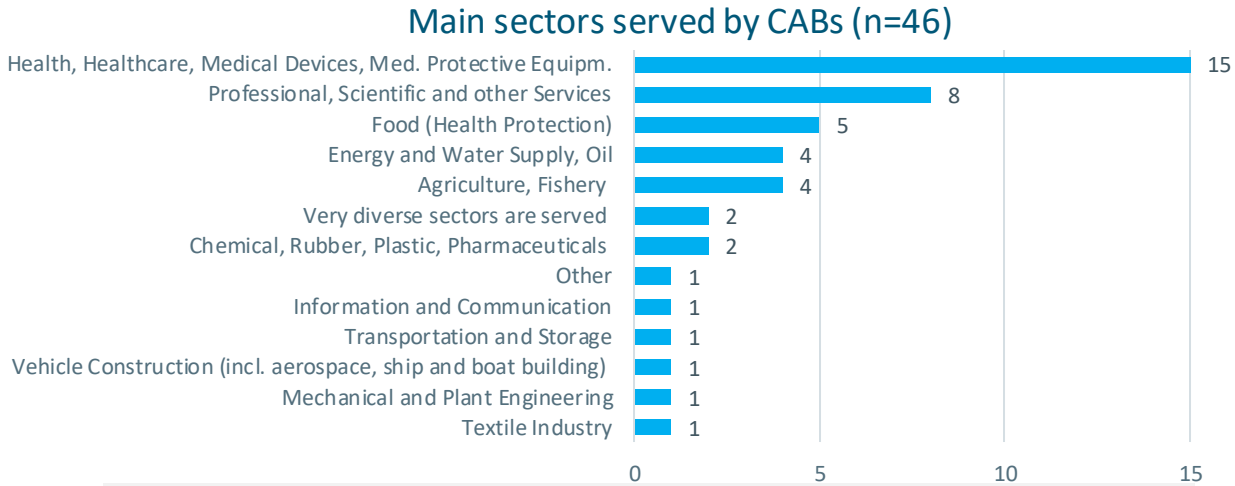
The 29 participating CABs cover a broad range of activities

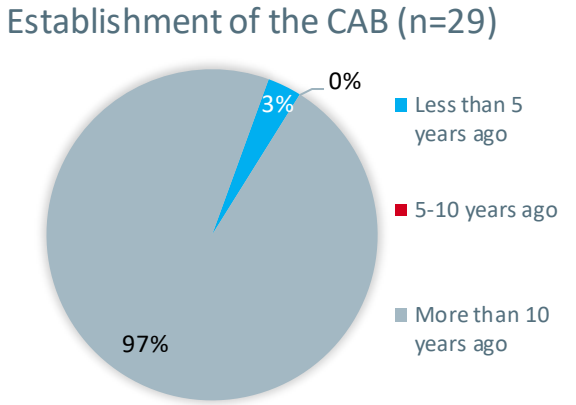


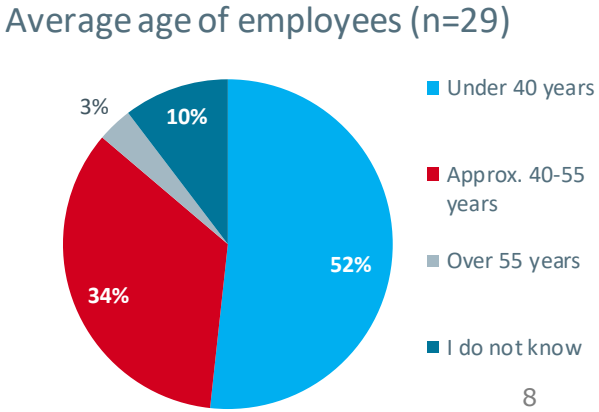


- Medical laboratories represent the **largest group of participants**, followed by testing laboratories and certification bodes for management systems
- 93% of CABs **specialize** in a single field of activity in conformity assessment; only a few cover a broad range of activities (up to 3)

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







- The customers served by the CABs are mainly from the **health sector**, but also professional, scientific and other services are important
- Almost all participating CABs (97%) have been operating for at least 10 years
- While the **average age of the employees** is below 40 years in every second CAB, only few have an average staff age of more than 50 years (3%)

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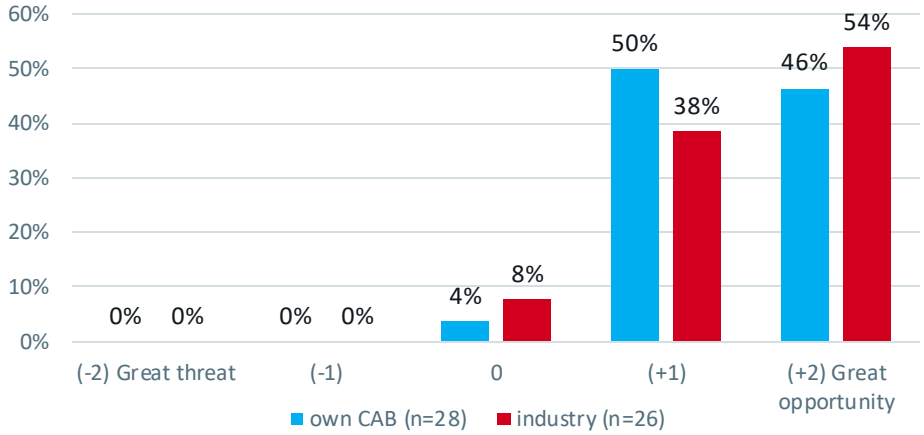
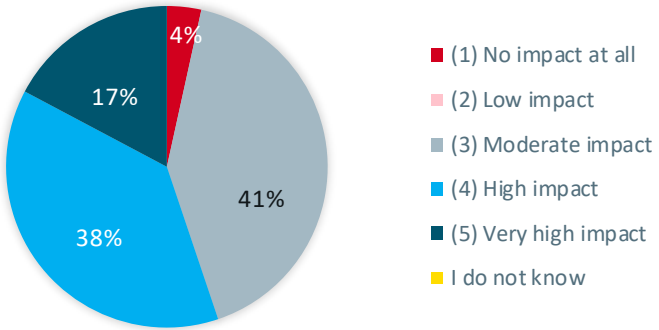
Digitalization more of an opportunity rather than a threat // Major influence expected

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



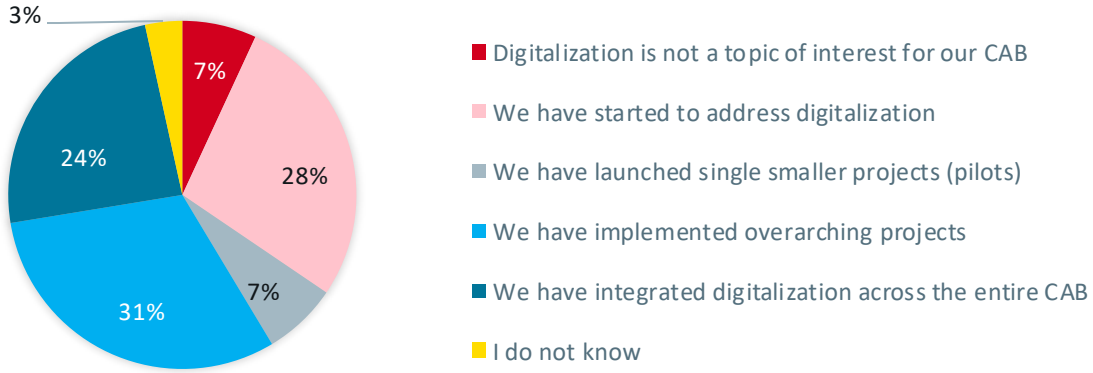
Expected impact of digitalization in the next 5-10 years (n=29)



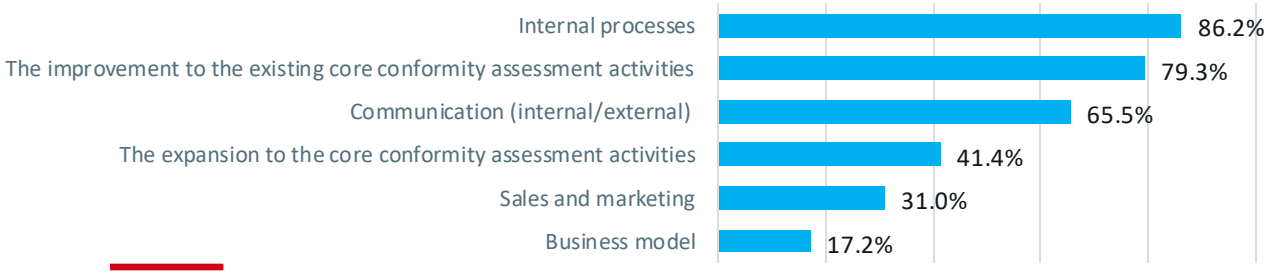
- In general, CABs have a **positive perception** of digitalization: 96% of the surveyed CABs recognize digitalization as an **opportunity or even a great opportunity** rather than a threat for their own organization, and 92% with regard to the whole CA industry
- 55% of the participants expect digitalization to have a **great or even very great impact on CA activities** in the next 5-10 years, however 41% expect only a moderate impact

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

Status and extent of digitalization in the CABs (n=29)

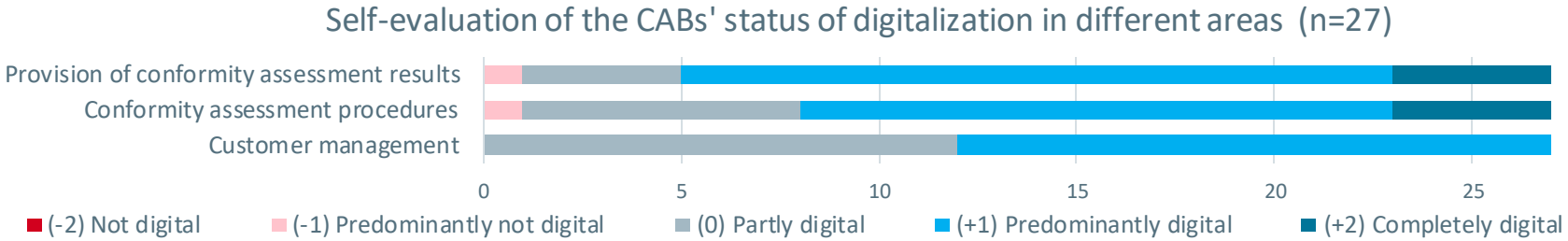


Areas targeted by digitalization (multiple answers possible, n=29)

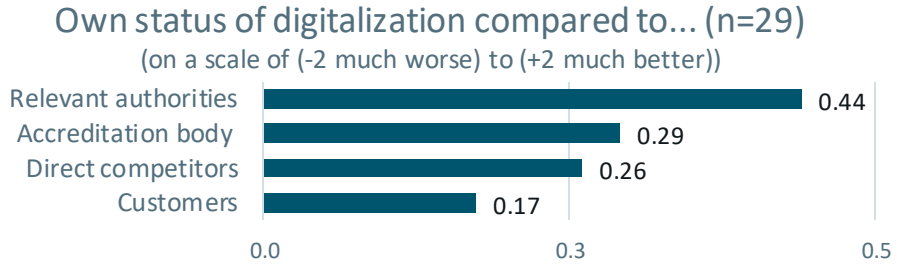


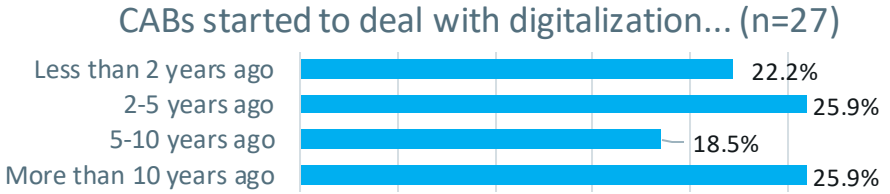
- **The status of digitalization is quite diverse** across the CABs in Ireland: While 28% of the CABs have just started to address this topic, 7% have launched single smaller projects and 31% have already implemented overarching projects. 24% state to have integrated digitalization across the whole organization
- Most **digitalization activities concern internal processes**. Yet improving CA activities and communication are also relevant areas. However, digitalization is currently rarely used for sales and marketing or even less to adopt new business models.

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



- The CA results are provided predominantly or completely digitally by the majority of CABs. Customer Management is less frequently digitalized.
- Compared to **other organizations** that are direct stakeholders, CABs rate their digital status on average as at least as good or slightly better, especially with regard to the relevant authorities and the accreditation body.
- Digitalization has not been a topic for long: every second CAB **has only started to deal with it** during the last 5 years. Only 26% have already done so at least 10 years ago.



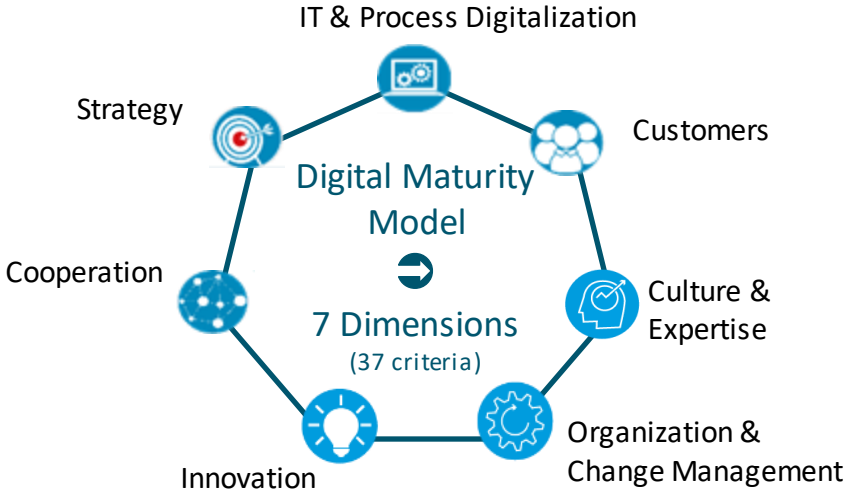


Digital Maturity of CABs

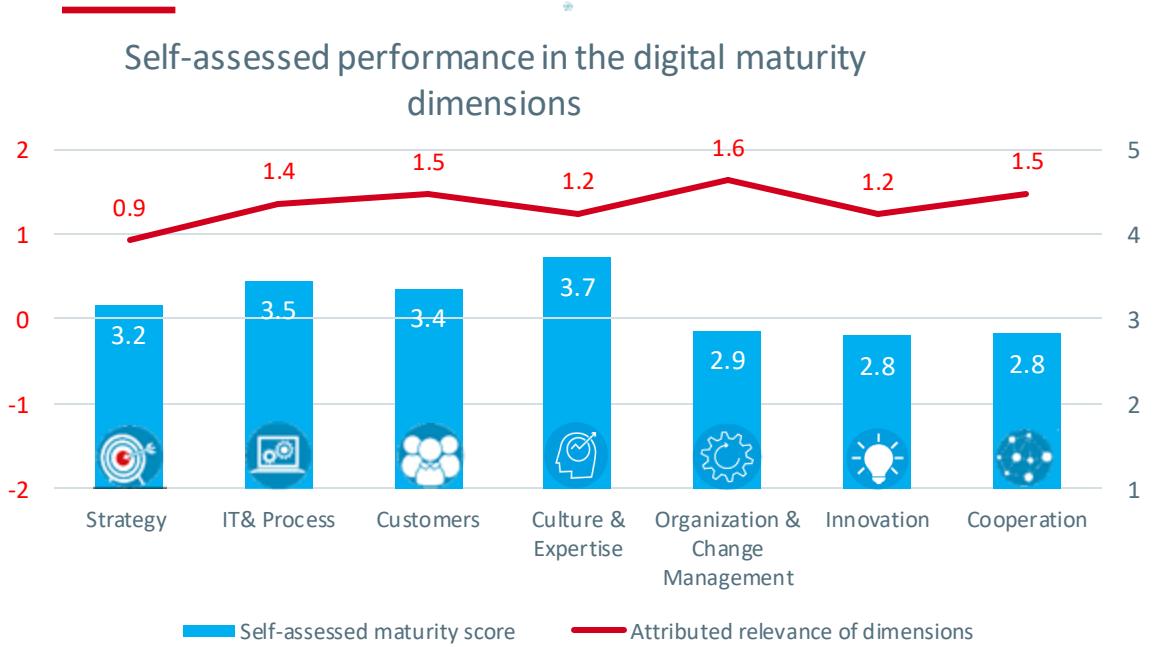
The "digital maturity" of an organization describes its status in the digital transformation. Digital maturity models use predefined dimensions and criteria to assess the ability of organizations to cope with the digital transformation. The following chapter presents the results for CABs in Ireland based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

The digital maturity model for the conformity assessment industry

- The digital maturity level reflects the status of 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 thier 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).

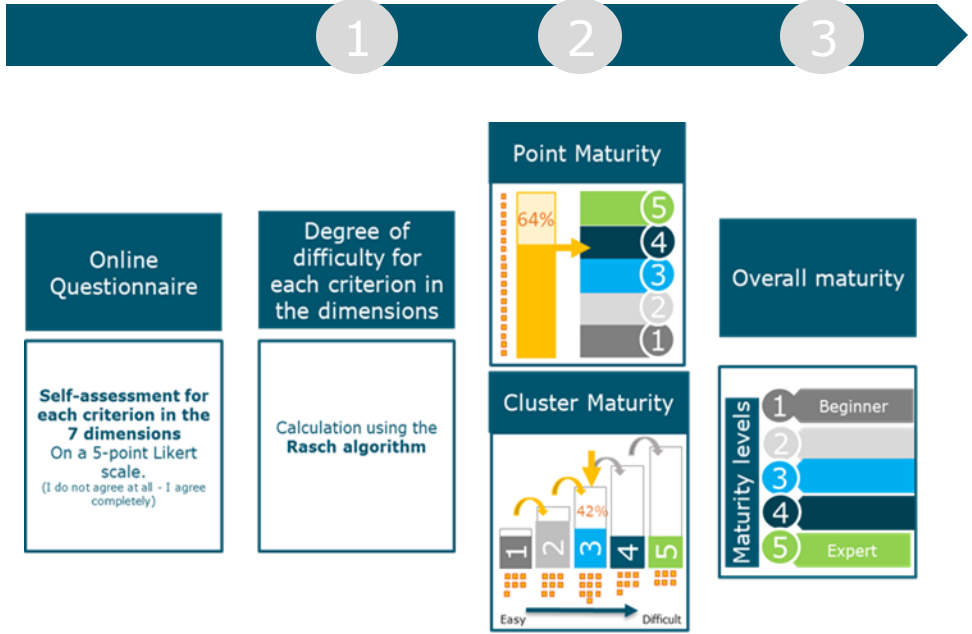
- The results of the maturity model show that the status of the CAB slightly differs in the various dimensions:
  - The CABs consider themselves to be **most advanced** in the area of "Culture and Expertise" and "IT & Process Digitization" followed by "Customers" and "Strategy"
  - The **greatest need** to catch up is in the areas of "Innovation", "Cooperation" and "Organization" - 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

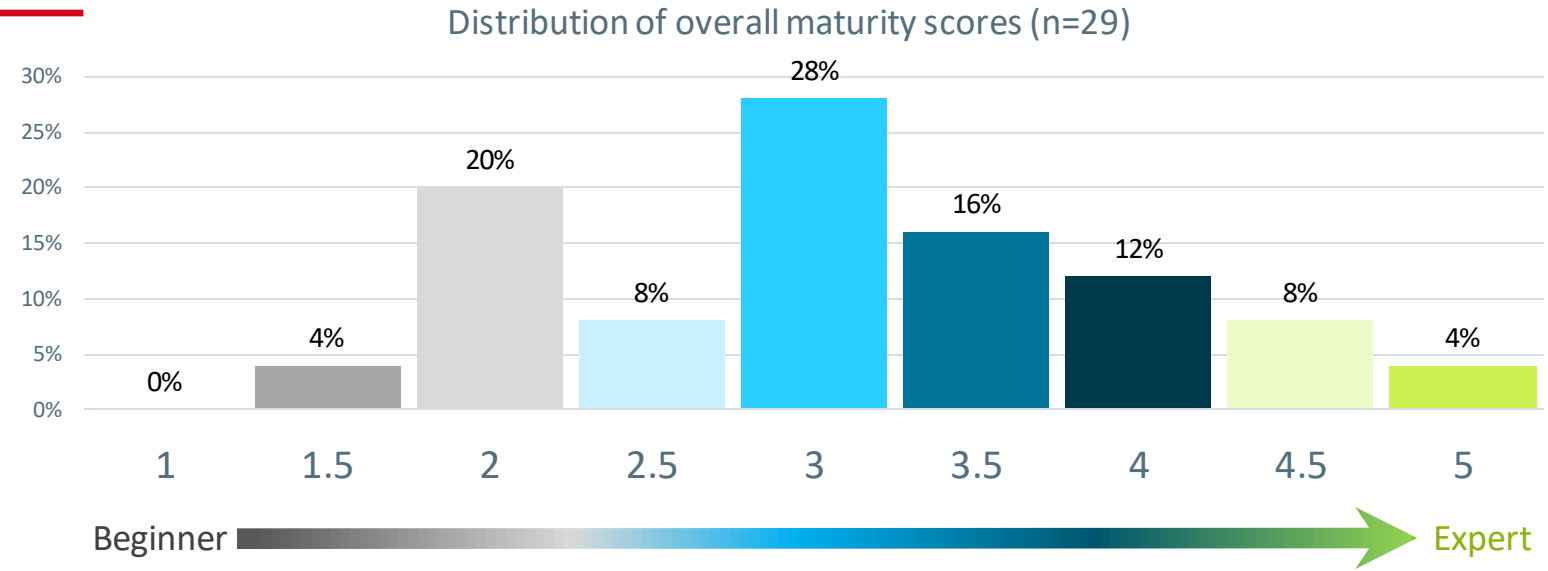
In the questionnaire, participants indicate the extent to which each of the criteria of the 7 dimensions applies to their CAB. In a **multi-stage process**, digital maturity is determined on the basis of these assessments:

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 Irish CA industry



The **digital maturity levels** achieved by the 30 participating CABs in Ireland follow a right-skewed *normal distribution*:

- 28% of the CABs have reached medium level 3, and 40% have already reached a higher level of maturity. However, every third CAB still is in early stages of transformation (though none is at the absolute beginner level. 4% of the CABs have already reached expert level 5.

The 5 Digital Maturity stages in Irish CABs

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Beginner 1

- ✓ Digitalization has central role in strategy
- ✓ Evaluation of dig. technologies with regard to innovation potential
- ✓ IT security: awareness and compliance
- ✓ Openness to change

2

- ✓ Networked processes
- ✓ IT department
- ✓ Digitalized customers' interactions
- ✓ Digitalized customer care
- ✓ Right skills for digital Transformation
- ✓ Digital transformation is important
- ✓ Risk of failure accepted
- ✓ Digital activities integrated into core processes
- ✓ Digitalization as a new source of value creation
- ✓ Work across departments
- ✓ External experts

Intermediate 3

- ✓ Investment in digital technologies
- ✓ Most important technologies are known
- ✓ Analysis of customer data
- ✓ Digital solutions based on customer needs
- ✓ Digital expertise
- ✓ Digital innovations are driven forward systematically and purposefully
- ✓ Collaboration with stakeholders
- ✓ Collaboration supported

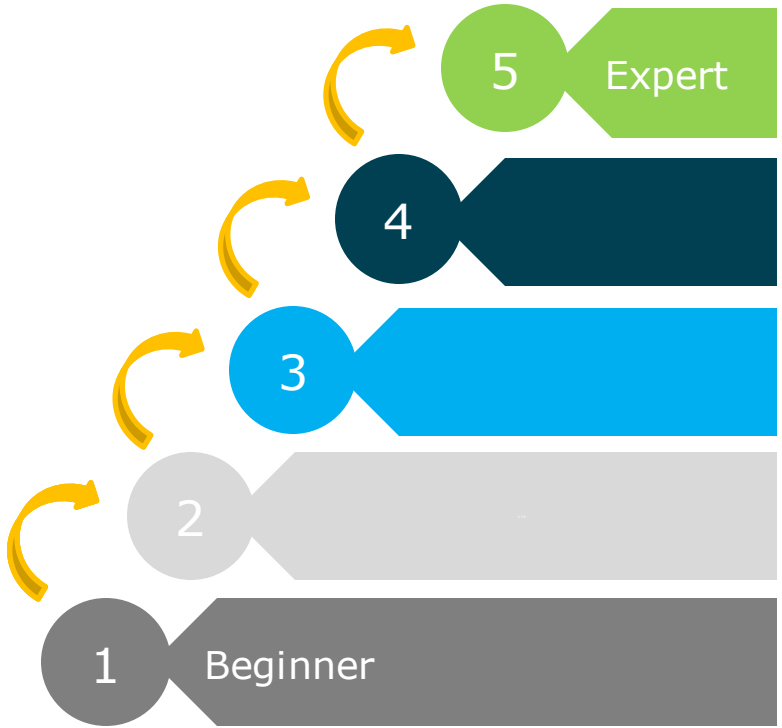
4

- ✓ Digital opportunities are exploited
- ✓ Structured digital transformation
- ✓ Digitalization goals defined and measurable
- ✓ Competitive advantages generated
- ✓ Customers involved in development of digital innovations
- ✓ Defined innovation process
- ✓ Network of partners

Expert 5

- ✓ Key indicators for measuring the implementation of the digital strategy
- ✓ Documented digital strategy
- ✓ Responsibilities for strategic goals
- ✓ Digital Roadmap
- ✓ Early warning system to identify relevant digital technologies and business models
- ✓ Resources to drive digital innovation
- ✓ Quick reaction to change

The Digital Maturity of CABs in Ireland // Summary of the observed patterns



- Even at the **first maturity level**, digitalization is given a central place in the corporate strategy.
- Organizations at the **second maturity level** have a strong focus on Culture & Expertise as well as IT and process digitalization. The necessary personnel skills/competences are available and there is cross-functional and cross-departmental collaboration on this topic. Digitalization is recognized as source of value creation.
- For **stage three**, capabilities, resources, and capacities are activated further in all dimensions, especially with regard to innovation and customers. External collaboration is strengthened and customer data purposefully analyzed and used to drive digital innovations based on customer needs.
- In the **fourth maturity stage**, the focus shifts towards organizational adaptation i.a. with defined and measurable digitalization goals and a clear innovation process. A partner network for digital transformation is established.
- Organizational change is further intensified in the final **fifth stage,** providing enough resources for transformation. A digital roadmap and metrics support strategy implementation.

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Motives, Impacts, and Hurdles of Digitalization

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

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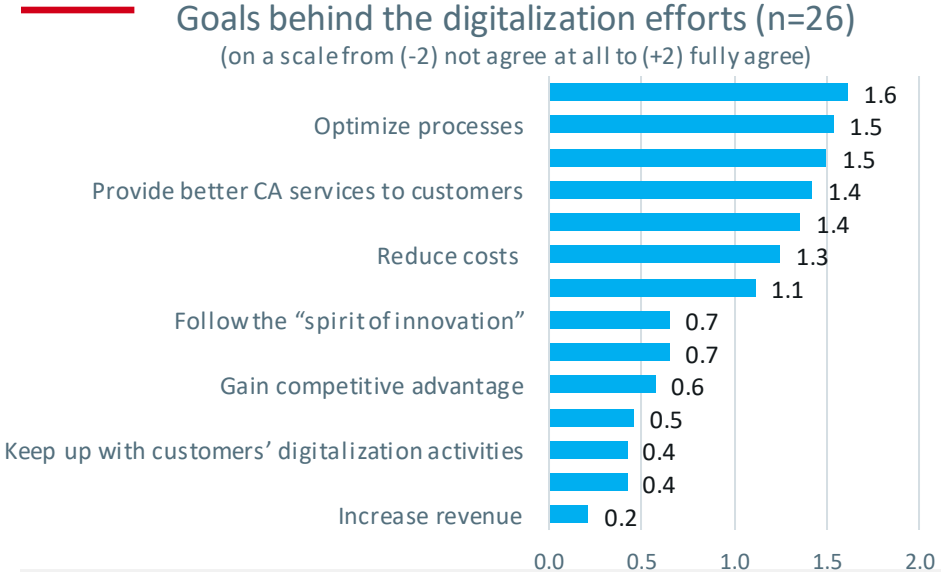
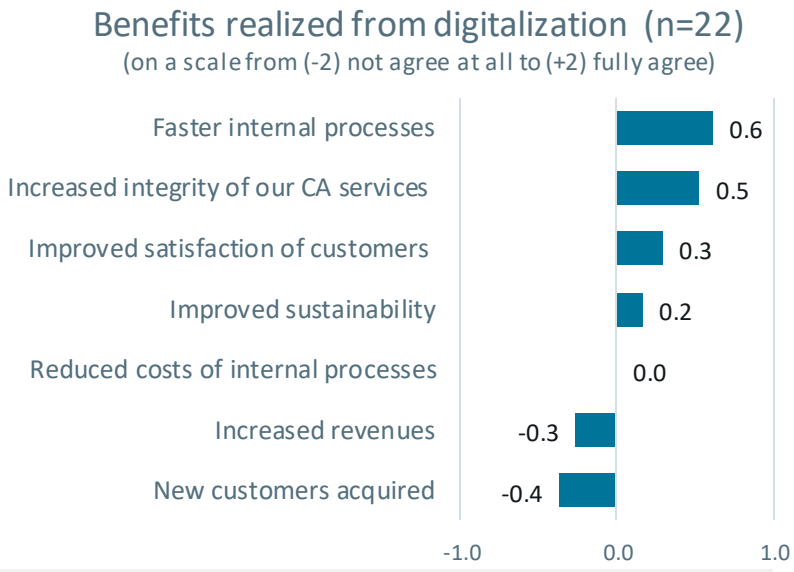
Focus on process optimization and efficiency enhancement– but not yet realized on a large scale

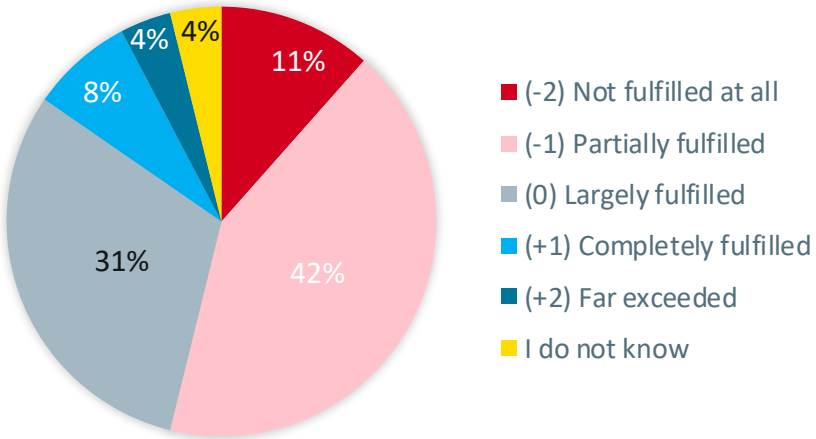




- Increased efficiency and process optimization are the **main goals** behind the digitization efforts of CABs in Ireland. In fact, faster internal processes are among the greatest and most frequently realized **effects** (though not yet to the desired extend). Cost benefits are *not* achieved yet.
- Market objectives such as the development of new business areas or increased sales are no big drivers. In fact, the effects achieved on sales and new customer acquisition are correspondingly low. However, the satisfaction of existing customers can be increased. So does the integrity of the CA services and sustainability of the CAB.

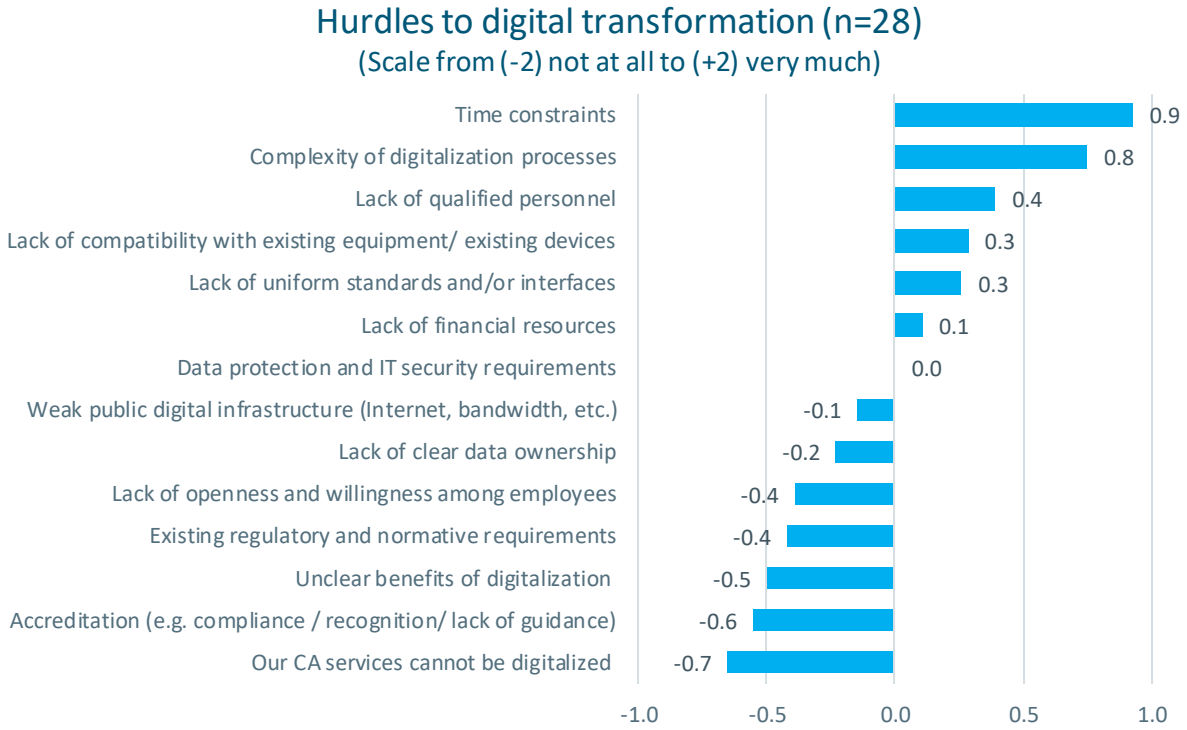
CABs' expectations in connection with digitalization are (at least partially) met

Whether expectations behind the introduction of digital processes/technologies have been fulfilled overall so far (n=26)



- 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 hurdles to digital transformation



- Time constraints in managing the digital transformation are the biggest hurdles for CABs, followed by the general complexity of this topic.
- Technical aspects such as lack of standards and/or interfaces and lack of compatibility are also an issue for many CABs.
- While the lack of qualified personnel is an obstacle, lack of openness/ readiness on the part of employees is not.

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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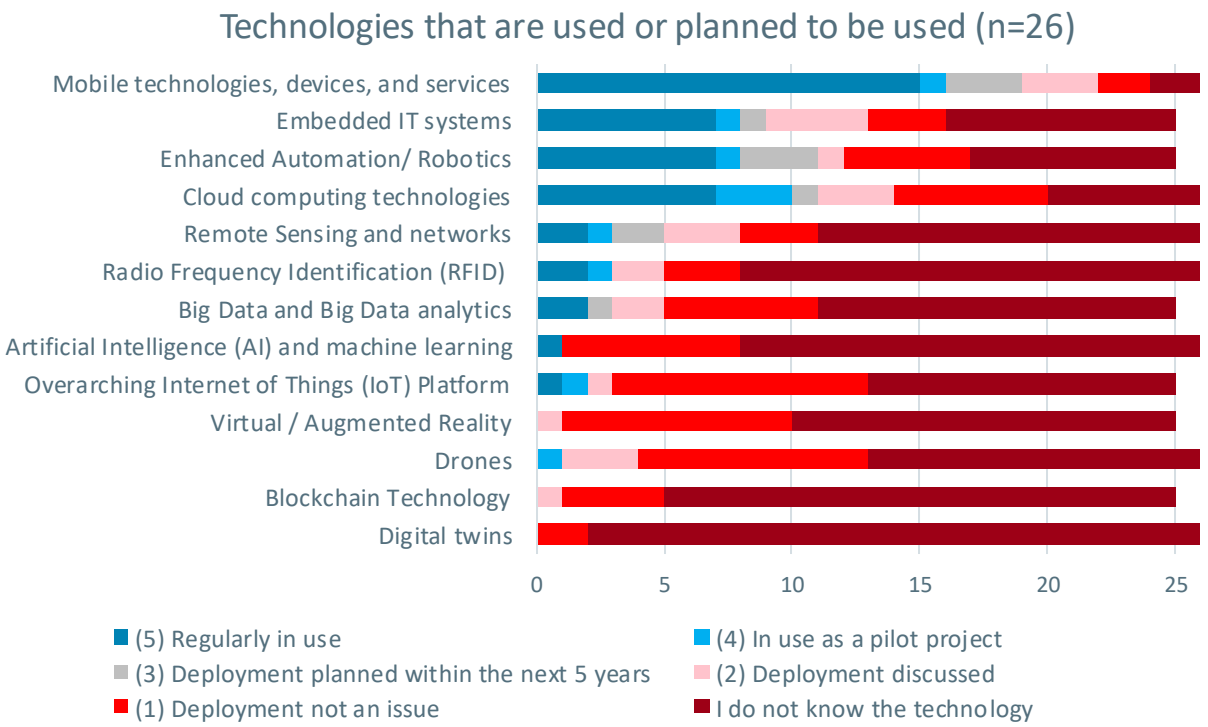
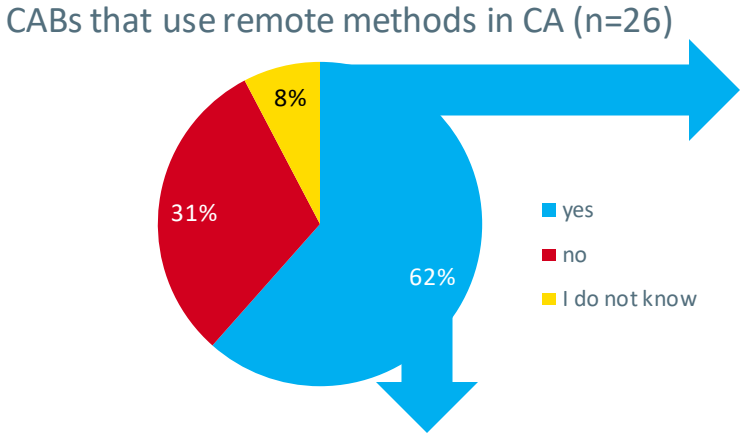
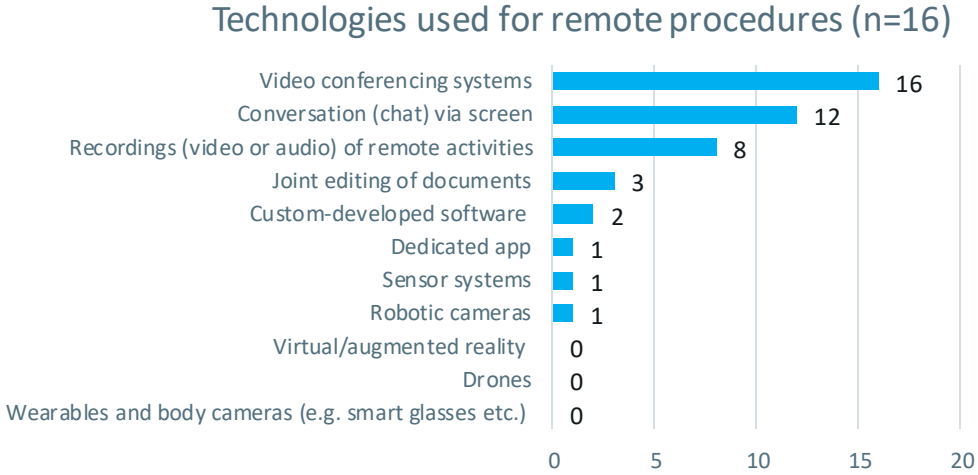
Latest digital technologies are not yet widely used in CABs

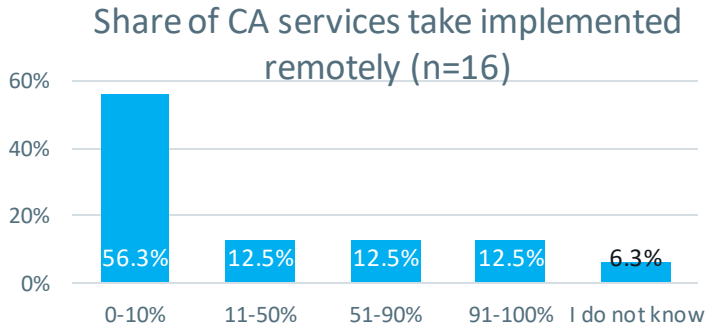


- Everyone is talking about the latest digital technologies such as blockchain, artificial intelligence, virtual reality, and big data analytics. However, they are not yet in widespread use by CABs in Ireland. Only a few use them for their work. In some cases, they are not even known (blockchain technologies, for example, mean nothing to 77% of the respondents). Digital twins are unknown to.
- Among CABs, mobile technologies are the most widely used ones.
- Embedded IT systems, enhanced automation/robotics and cloud technologies are also in use in many CABs.

Remote methods and technologies are used by most CABs

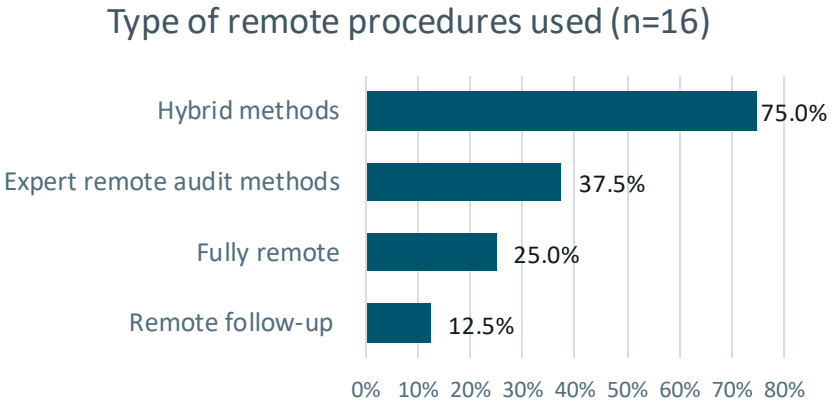


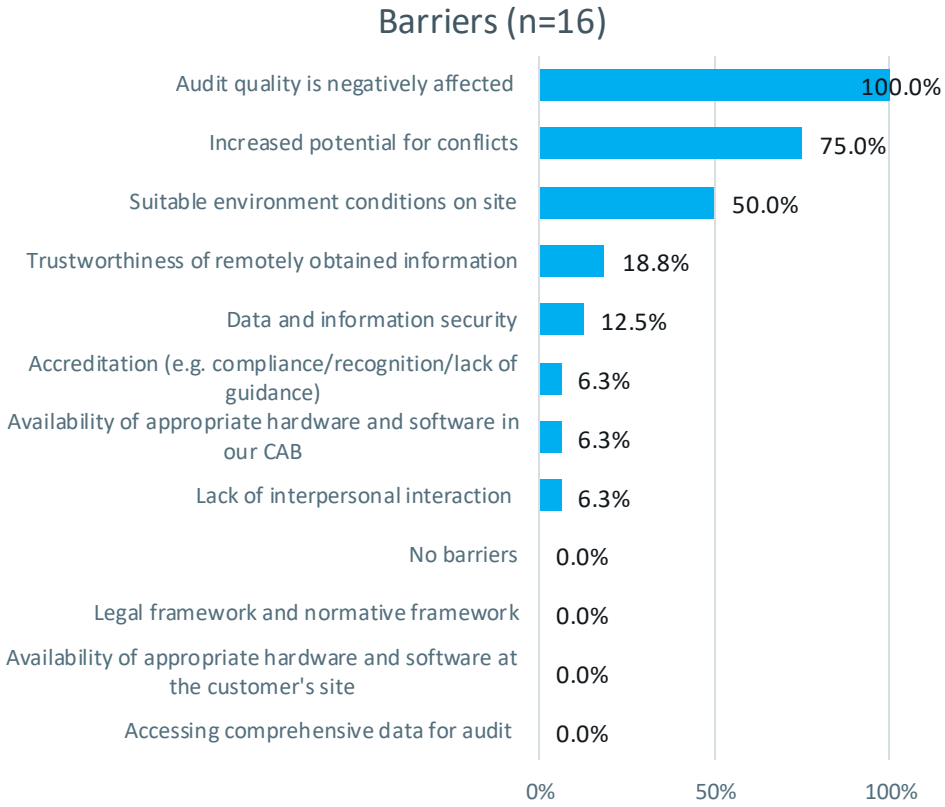




- 3 out of 5 CABs use **remote methods** in their CA activities.
- Of these, however, every second CAB has not even reached to perform 10% of its activities remotely. Only a few (13%) have switched completely.
- Video conferencing is the most common used **tool for remote working**, while wearables, drones or virtual reality are not used at all.

Diverse approaches used and experienced hurdles in remote procedures

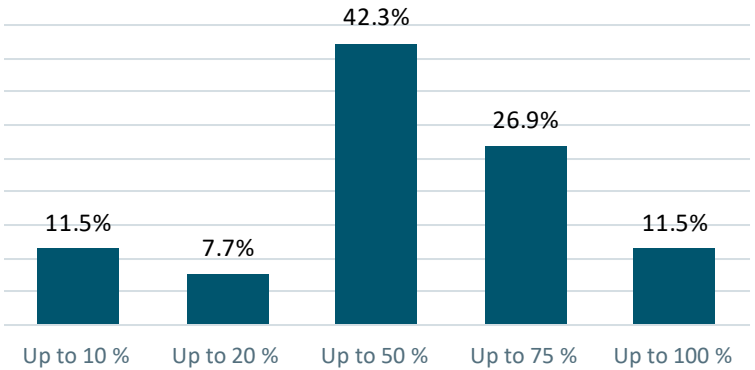




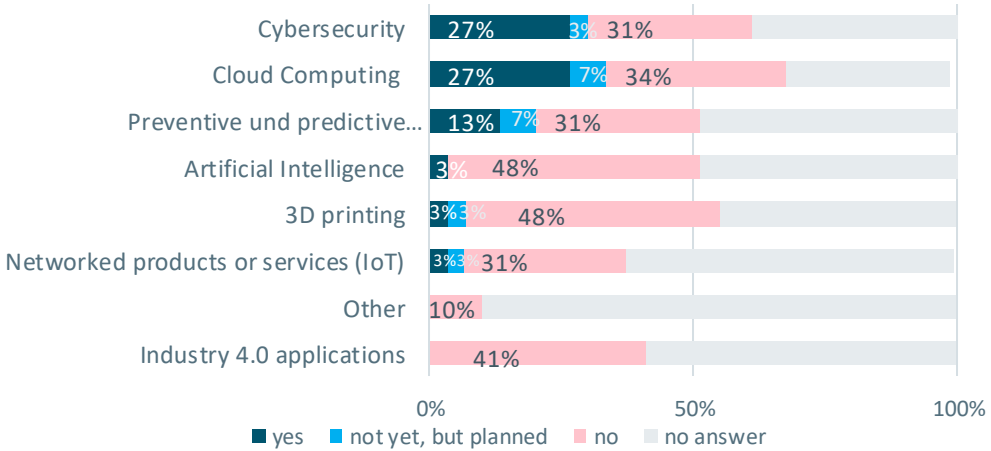
- **Hybrid methods** are the predominant type among remote methods used by CABs.
- Practical issues such as impairment of audit quality or on-site conditions are perceived as potential **obstacles**. Also, an increased potential for conflicts is seen as one of the biggest hurdles for using remote procedures.

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

Share of routine processes that are digital (n=26)



Digital products and applications for which CA is conducted (n=29)



- 37% of the CABs have digitalized more than half of their **routine processes**. However, one in ten CABs has not digitally converted even 10% of their processes.
- 50% of the surveyed CABs conduct **conformity assessments for modern digital technologies and applications.** In focus: cloud computing (27%) and cybersecurity (27%).

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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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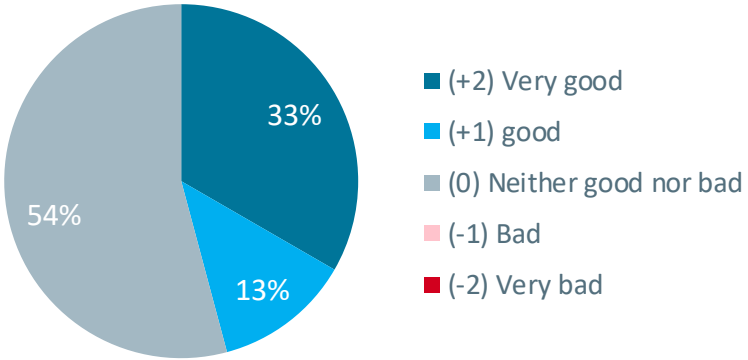
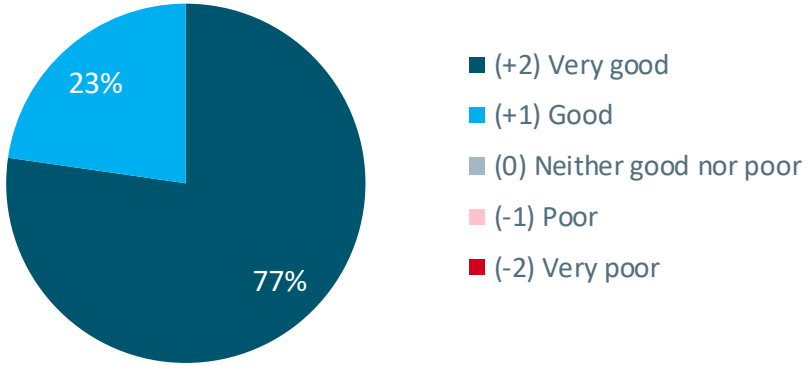
Most CABs have coped well with the COVID-19 pandemic

CABs´ order situation in 2021 compared to pre-COVID-19 times (n=26)



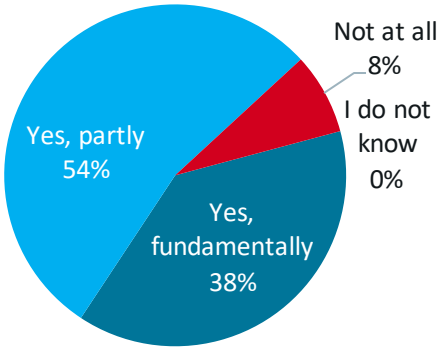
Response to the challenges of the COVID-19 pandemic (n=22)



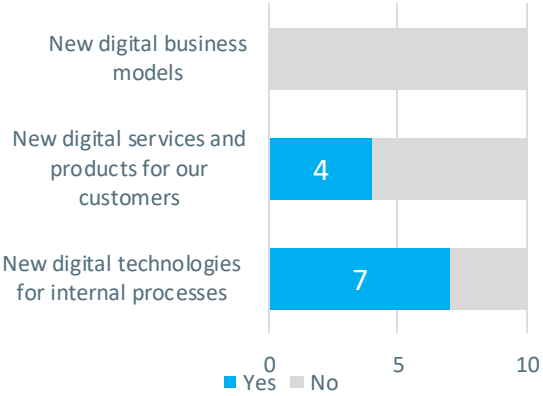
- For 54% of the CABs, the **economic situation** in terms of incoming orders in 2021 was no better or worse than before the pandemic. No CAB stated that its orders have declined, and 46% of CABs have actually seen their order situation improve.
- All CABs reported a good or very good response to the challenges related to the COVID-19 pandemic.

Pandemic and digitalization

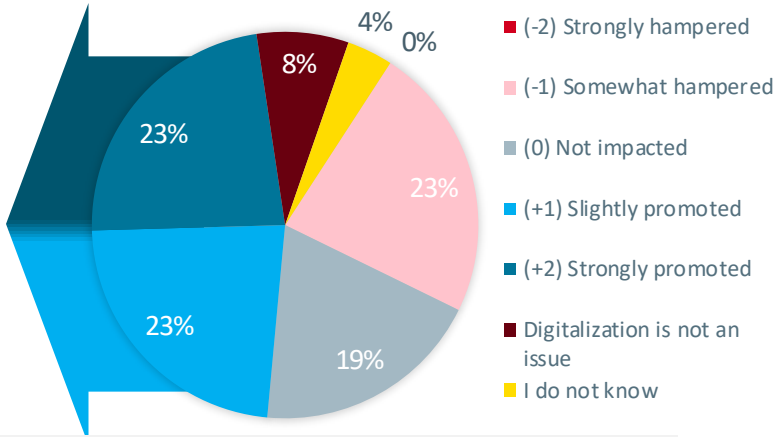
Digital technologies have helped coping with challenges of the COVID -19 pandemic (n=26)



Digital adaptation in course of the COVID-19 pandemic (n=12)



Impact of the Covid-19 pandemic on the digitalization of CABs (n=26)



- For 92% of CABs, digital technologies have helped in coping with the challenges of the COVID-19 pandemic.
- The pandemic has hindered digitalization in 23% of CABs while 46% of CABs report that digital transformation has been slightly or even strongly encouraged and has led to adaptations:
- Every second of these CABs has introduced new digital technologies for internal processes and every third new digital services and products for their customers. New digital business models have not been introduced.

Conclusion and outlook

- CABs in Ireland clearly see digital transformation as an opportunity. The **level of digitalization** varies greatly.
- Even though digital transformation is an individual project for each organization, **typical patterns of digital maturity** in Irish CABs are nevertheless confirmed: An initial strong technological focus is followed by holistic organizational transformation, including change management and strong innovation networks.
- 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 primarily **aiming** at internal process improvements. Routine processes are increasingly being digitalized and there is a switch to - mostly hybrid - remote processes.

Ireland in international comparison

How do Irish 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 our website. Furthermore articles and an extensive 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-digtal.de**

The project

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QI-FoKuS stands for ***Q**ualitäts**i**nfrastruk-tur - **Fo**rschung für **K**onformitätsbewer-tung **u**nd **S**icherheit* ("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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Annexes

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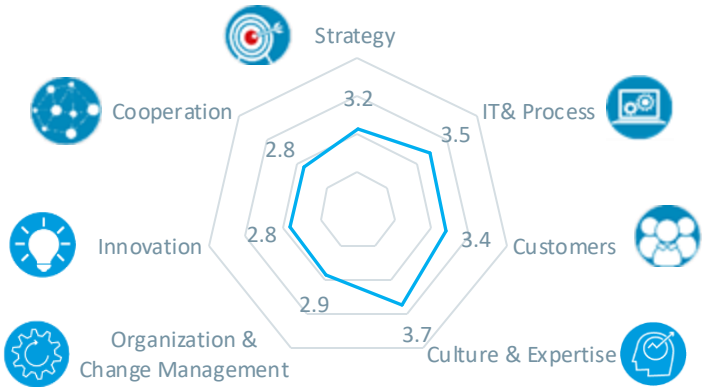
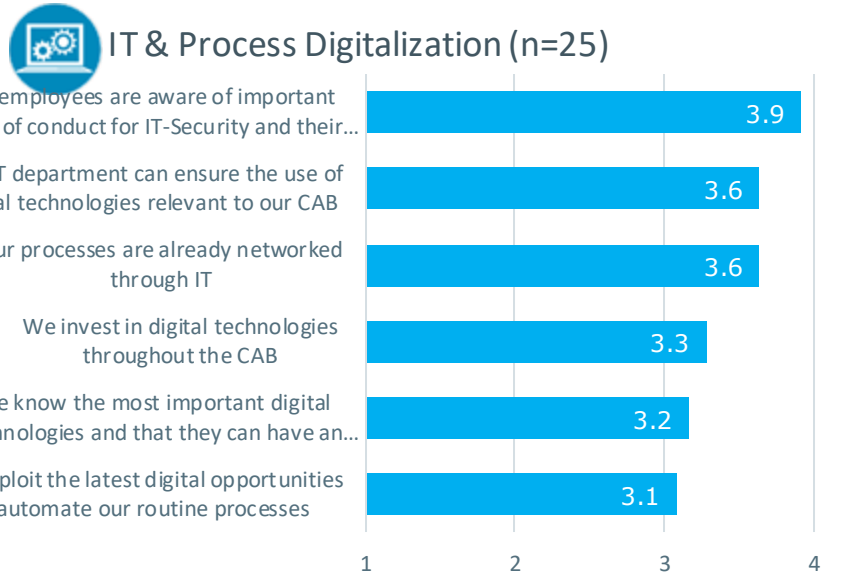
Dimensions of digital maturity: Detailed overview

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.

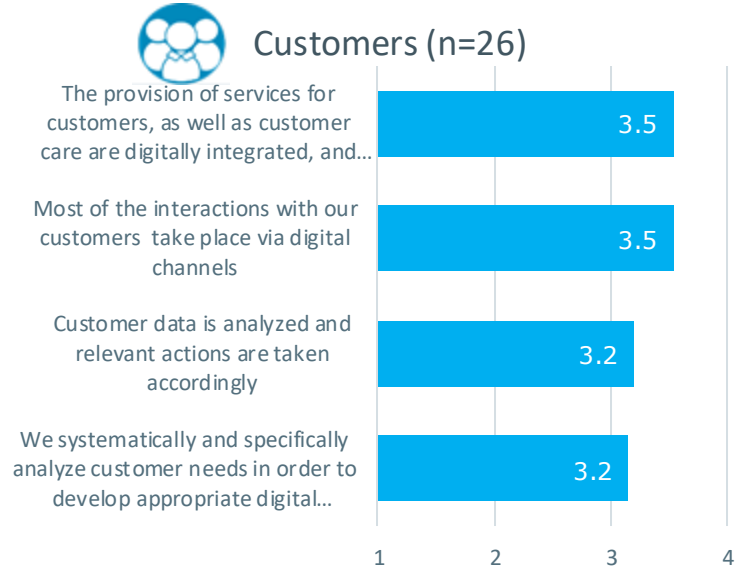


- In most CABs (86%), digitalization plays a central role in their overall strategy, with 56% having a well documented digital strategy.
- Only 50% have set up a Digital Roadmap and 56% use key metrics to measure the implementation status of their digitalization strategy.

Dimensions of digital maturity: Detailed overview

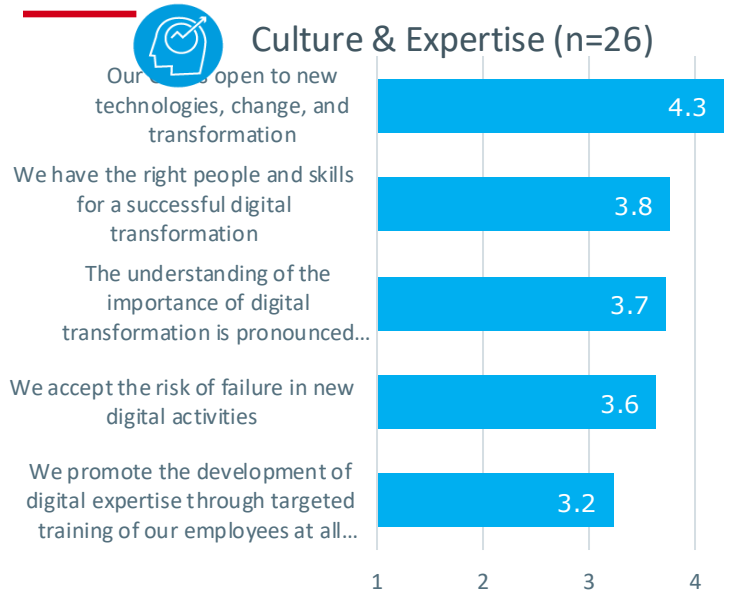


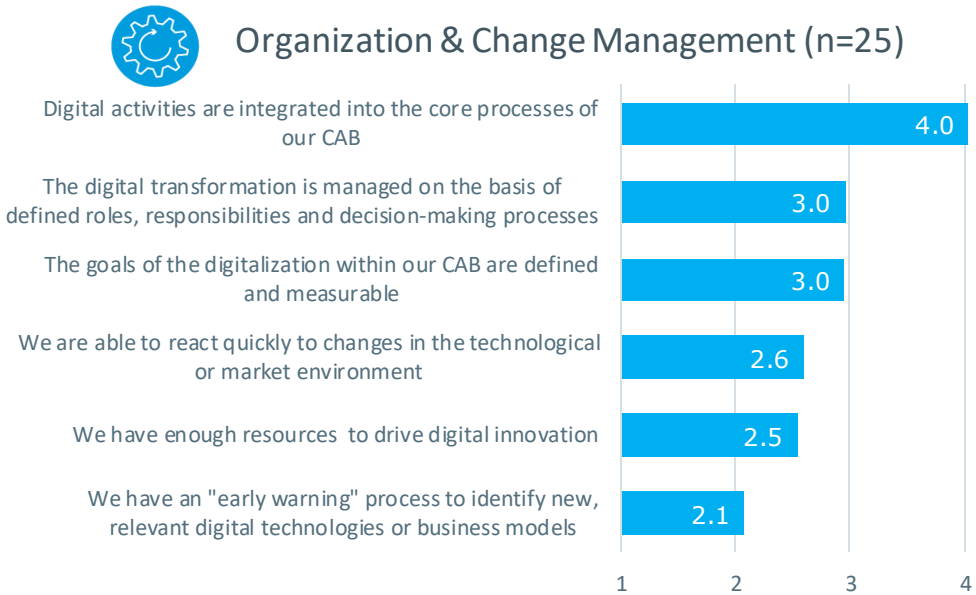
- At least 64% of CABs are aware of, invest in and are able to use digital technologies properly while complying with IT security regulations.
- More than 60% of CABs have networked their processes and automated routine procedures.



- 70% of CABs in Ireland interact with their customers via digital channels.
- 70% offer digitally integrated services to customers and only 64% of them develop appropriate digital solutions based on customer needs.

Dimensions of digital maturity: Detailed overview



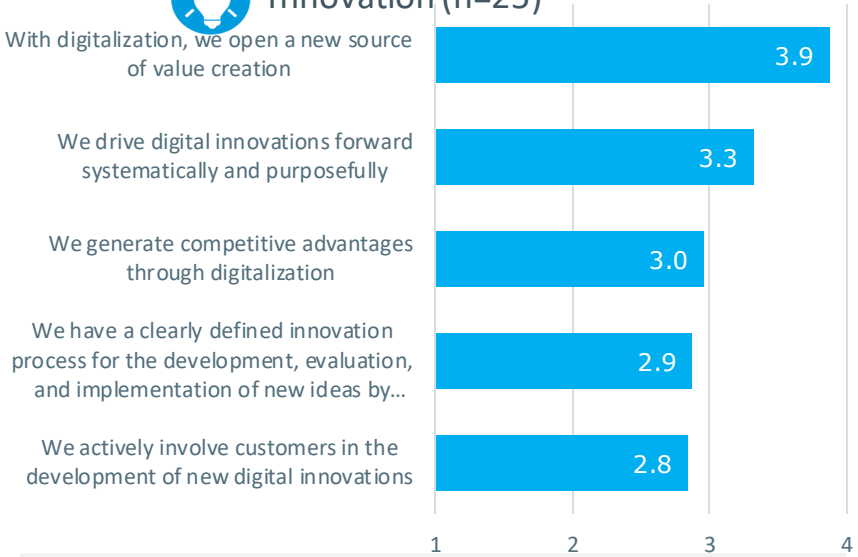


- Irish CABs are definitely open to new technologies, changes and transformations (86%).
- 74% of them have a strong understanding of the importance of digital transformation and have the right skills to successfully implement the change.

- 90% 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.

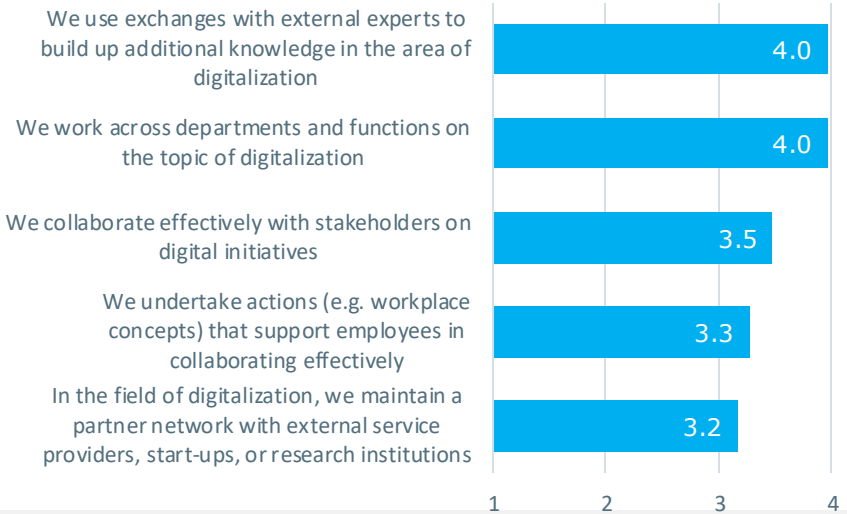
Dimensions of digital maturity: Detailed overview

Innovation (n=25)



- For the majority of participants (78%), digitalization represents a new source of value creation.
- However, customers are hardly involved in the innovation process.

Cooperation (n=26)



- The majority of CABs work across departments and functions on the topic of digitalization and obtain additional knowledge by consulting external experts.
- Collaboration with specific stakeholders of the CAB is less intensive. 64% 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	■
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	■
Our CAB is open to new technologies, change and transformation	■

Strategy

IT & Process Digitalization

Customers

Culture & Expertise

Organization & Change Management

Innovation

Cooperation

Digital Maturity Model
Level 2

Description Level 2	Dimensions						
Our IT department can ensure the use of digital technologies relevant to our CAB							
Our processes are already networked through IT							
Most of the interactions with our customers (e.g., advise, purchase conclusion and customer service) take place via digital channels							
The provision of services for customers, as well as customer care are digitally integrated, and personalized							
We have the right people and skills for a successful digital transformation							
We accept the risk of failure in new digital activities							
The understanding of the importance of digital transformation is pronounced within our CAB							
Digital activities are integrated into the core processes of our CAB							
With digitalization, we open a new source of value creation							
We work across departments and functions on the topic of digitalization							
We use exchanges with external experts to build up additional knowledge in the area of digitalization							

Digital Maturity Model
Level 3

Description Level 3	Dimensions						
We invest in digital technologies throughout the CAB		■					
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			■				
We systematically and specifically analyze customer needs in order to develop appropriate digital solutions			■				
We promote the development of digital expertise through targeted training of our employees at all levels				■			
We drive digital innovations forward systematically and purposefully						■	
We undertake actions (e.g. workplace concepts) that support employees in collaborating effectively							■
We collaborate effectively with stakeholders on digital initiatives							■

Digital Maturity Model
Level 4

Description Level 4	Dimensions						
We exploit the latest digital opportunities to automate our routine processes				■			
The digital transformation is managed on the basis of defined roles, responsibilities and decision-making processes					■		
The goals of the digitalization within our CAB are defined and measurable					■		
We actively involve customers in the development of new digital innovations						■	
We generate competitive advantages through digitalization						■	
We have a clearly defined innovation process for the development, evaluation, and implementation of new ideas by employees and/or customers						■	
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	■						
Our digital strategy is well documented and communicated	■						
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 have an "early warning" process to identify new, relevant digital technologies or business models for us					■		
We have enough resources to drive digital innovation					■		
We are able to react quickly to changes in the technological or market environment					■		