Output 01

Best practice customer-focused Innovations & Digitization

Partner

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Miskolci Egyetemt (MU), Hungary

Language

English

Content

1. Project Summary and Introduction

On average, SMEs are less innovative than large companies, as they have limitations due to more limited internal resources (EC, 2019a). Especially in Eastern European countries, SMEs have very low innovation activity and there are large differences between SMEs and large companies. In the field of customer innovation, SMEs find it particularly difficult to innovate. Meeting real customer needs is the core factor for successful innovation management, for generating customer-oriented business ideas and innovative concepts (von Hippel, 2005).

SMEs do not have the time and resources to receive feedback and ideas from their customers. And when they do find the time, it is difficult to process the information and turn it into valuable solutions. A holistic approach to customer-centric innovation is complex and requires changes at all levels of a company. However, digitization and new media are now opening up far-reaching opportunities to make full use of customer-centric innovations in SMEs as well, thus strongly promoting innovative strength and competitiveness (Robra-Bissantz, 2017). These technologies and the opportunities they offer have so far been little known in SMEs and are only used by very few SMEs. They lack information, experience, knowledge and skills on instruments, methods and procedures as well as on the use of digital technologies to acquire, process and realize customer innovations.

Against this background, the project pursues on a broad regional basis the objective of enabling and sup-porting SMEs to exploit their customer innovation potential and thus to strengthen the productivity and competitiveness of SMEs, to secure existing jobs and to create new ones. The following main activities will be carried out to achieve the objectives.

a) In 13 countries, analysis and comprehensive investigation of best practices on how SMEs generate, process and realize customer-centric innovation approaches and which digital technologies they can use doing so. The best practices obtained will be processed, transferred to SMEs in the context of training and consulting, and supported in their implementation in the companies.

b) Development of a toolbox with instruments, methods and procedures for the realization of customer innovations in SMEs.

c) Through the development of two specific training and coaching programs, SMEs gain digital skills and are enabled to continuously realize comprehensive customer-centric innovations. The learning takes place mainly at the workplace and at the same time includes individual company development projects, so that digital technologies are already used and corresponding innovations are realized during the further training.

d) Comprehensive qualification of teachers and consultants of SMEs.

The qualification, consulting and support programs are carried out by chambers, which, as central SME supporters, have direct access to SMEs and, with their training and

technology centers, also have corresponding capacities. However, many teachers and consultants lack the knowledge and skills to qualify and advise SMEs and their staff in the application of digital technologies and in the acquisition, processing and realization of customer innovations at a high-quality level. Therefore, two specific train the trainer pro-grams for teachers and consultants are being developed, which will be imple-mented and permanently run by 18 colleges and universities from 9 countries. These programs are:

a) strengthening and promoting the knowledge and skills of teachers and consultants on digital technologies on the one hand and on the realization of customer-centric in-novations on the other hand.

b) constantly providing well qualified teachers and consultants on a broad regional ba-sis.

The developed instruments, digital models, educational and support programs will be tested and evaluated under different national conditions in several countries and im-plemented by all project partners. A continuation of the work after the end of the project with an ongoing implementation of the educational and support programs is secured, including financing.

The project is carried out by eight experienced partners (chambers, other institutions of vocational training and universities) from Denmark, Germany, Poland and Hungary with different levels of development and conditions. The transnational project approach enables learning from each other, identification and trans-fer of best practices and joint development work.

All results of the project will be transferred to 70 chambers, SME associations and colleges/universities from 13 countries, which will receive implementation advice and will be involved in the project work as associated partners from the beginning of the project.

The following activities were carried out to produce Output 01 Best Practice customer-centric innovation & digitalization.

1. Best practices in the use of digital technologies

a) Conducting surveys and identifying best practices.

b) Analysis and evaluation of the best practices and indications for adaptations to na-tional conditions.

c) Detailed description of the selected best practices with application instructions and recommendations for use for SMEs on the one hand and for counsellors and teachers on the other hand.

The results were compiled in two reports:

- Part A: Experiences of Best Practices in the use of digital technologies support-ing customer innovations by SMEs

- Part B: Results of an Empirical Research

2. Toolbox with already known as well as new instruments, methods and procedures for the acquisition, processing and realization of customer innovations in SMEs.

a) Investigation of applied instruments, methods and procedures

b) Research and development of new and additional possibilities, instruments, methods and procedures for the realization of customer innovations in SMEs.

c) Development of a toolbox with known, new and additional possibilities, instruments, methods and procedures.

d) Detailed description and evaluation of the instruments etc. of the toolbox and development of application notes and recommendations for use for SMEs on the one hand and for advisors and teachers on the other hand

The results were compiled in Part C: Best practices of customer-focused Innovations & Digitalization and Toolbox

3. Digital technologies for the realization of customer innovations

a) Investigation of applied digital technologies

b) Research and development of new and additional possibilities for the application of different digital technologies

c) Detailed description and evaluation of digital technologies with regard to their use in different fields and approaches for the generation and realization of customer innovations. of customer innovations

d) Elaboration of application notes and recommendations for use for SMEs on the one hand and for advisors and teachers on the other hand

The results were compiled in Part D: Study of applied instruments, methods and procedures for the integration of customer-based innovation in SMEs

4. Best practices in teaching skills and digital technologies for the realization of customer innovation.

a) Interviews and identification of best practices for corresponding training measures

b) Analysis and evaluation of best practices and recommendations for adaptation to national conditions

c) Detailed description of the selected best practices with application instructions and recommendations for chambers with their training institutions as well as for other institutions of vocational education and training.

The results were compiled in Part E: Experiences of Best Practices from Training Institutions

The results of other studies are shown on the project website https://ci-smes.eu/ under "Other Results".

1. Case Study of applied digital technologies in SMEs in Poland, Denmark and Germany
    - Digital skills
    - General integration of Information- and Communication technologies
    - Integration of Cloud Computing
    - Integration of the Internet of Things
    - Application of Social Media
    - Use of Artificial Intelligence
    - Big Data Analytics
    - Survey results – Applied Digital Technologies in Denmark, Germany Poland and Hungary
    - Conclusion and recommendation

2. How can innovations, especially customer-centric innovations, be measured and what are methods for implementing customer-centric innovations in SMEs?
    - I. Innovation in SMEs and large companies
      1. How can innovation in SMEs as well as in large companies be measured? – Different degrees of innovation
      2. Strengths and Successes – Hidden Champions
      3. Digitalization in SMEs
      4. The use of Artificial Intelligence in SMEs
    - II. Customer-Centric innovations in SMEs and large companies
      1. How can customer-centric innovations in SMEs be measured? – Different indicators of innovation
      2. Strengths and Successes
    - III. Tools and methods for implementing customer-centric innovations in SMEs
      1. Co-creating innovations with users
      2. Seven methods of customer-integration
      3. The SCAMPER-Method
    - IV. Conclusion

3. Indicators & Options for customer-centric Innovations
    - Indicators that determine the degree of innovation in large companies as well as in SMEs
      1. Focus on the human as a resource through communication culture and transparency
      2. Overall Economic Contribution of AI in Innovation and Business Performance
    - II. What options do companies have to incorporate customer-centric innovations?
      1. Encouraging overall cooperation
      2. Business-Model innovation

3. Personalization
4. Surveys for customers

Part A

Experiences of Best Practices in the use of digital technologies supporting customer innovations by SMEs

Customer-centric Innovation in SMEs

Experiences of Best Practices in the use of digital technologies supporting customer innovations by SMEs

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Introduction

This report is prepared within the framework of the EU Program *Erasmus + Key Action 2: Cooperation for innovation and the exchange of Good Practices* funded project **"Digital methods, toolbox and trainings for increasing customer innovation in SMEs"**. (ICIinSMEs, Project NO 2020-1-DE02-KA202-007397).

The aim of the project is to strengthen the innovation capacity of SMEs in Eastern Europe. Thereby, the central problem of resource scarcity in SMEs is explicitly addressed, which causes difficulties in the integration of a customer-centric innovation approach within SMEs. To address this problem, this report provides an insight into aspects of the use of digital methods for the identification, processing, and implementation of customer-centric innovations in SMEs. In addition, selected best practices of customer-centric innovation activities are elaborated.

There is a lot of overlap between the different definitions regarding customer-centric, customer-focused, and customer-driven innovations, however, there is a big difference regarding who carries out the innovation process. In the case of customer-focused innovation programs that is the customer who makes it, while in customer-focused innovation it is done by the organization. The case is special in customer-centric innovation, while the new development comes from both the customer and the organization as cooperation.

As a starting point for this research, it is worth describing what we exactly mean by this phenomenon.

"Customer-centric innovation describes a change from innovating for customers to innovate with customers. Therefore, the customer takes an active role in innovation processes and become the primary source of ideas to initiate innovation activities. By integrating the customer-centric innovation philosophy, companies open their research and development activities, meaning that the innovation process happens with input from inside and outside of the company. Customers are involved in all stages of the innovation process." (Desouza et al. 2020; Steinhoff & Breuer, 2014; Zajkowska, 2017)

If the customers are involved in the innovation process, the new product or service will better fit the market demands. There are different methods that ease to get to know the customers' ideas and feedbacks, such as:

Lead-user method based on the fact that lead users' needs will be the future demand of the market.
Experiments when different groups with different demands. The groups will answer the concrete questions, and the results can be compared and the conclusion can be drawn.
In case of **Living labs** the innovation starts with the ideas and needs of customers. There is a created spaces that is similar to the customer's home.
In **field test** products and services will be tested in a real-life context.

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Focus groups are the part of qualitative marketing research when 6-8 people take part in. There is a moderator who directs the process.
Customer group involvement helps developers to find better solutions for customer's needs and problems.
Outcome based interviews are targeted interviews, when the needs of the different customer groups can be identified, that do not reflect the demand of the market.
Questionnaire survey is the part of quantitative marketing research when representative research can be conducted in order to gather statistical information.
In **diaries** the consumers who test the product will make notes about the experiences.

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A brief review of best practices

We have 37 **best practices** from 12 **countries**.

Country	Number of BP
Denmark	4
Estonia	1
Finland	2
Germany	5
Hungary	8
Italy	1
Lithuania	3
Norway	1
Poland	9
Sweden	1
UK	1
US	1

Examples of products or services co-created with customers

Because of the small number of case studies the good practices cannot be compared by countries, company size, and sectors. It is not possible to draw a correct conclusion for such a small number of items. Rather, we can say that the application of customer-centric innovation can be applied successfully in many areas. It is particularly prevalent in areas where personalized (customized) products and services have higher importance.

It can also be seen from the cases that the products and sectors are very diverse. Generally, can be concluded that success can be reached in almost all areas in customer-oriented innovation, regardless of the size, scope, or location of the companies.

In the case studies examined, customer-centric innovation was applied to products such as:
Recipes, DIY-Story cards, Calendar, Meal planner
Beeswax wraps
Sustainable jewellery
Construction toys
Customised and sustainable skin care, sustainable cosmetics, personalised skincare routine,
Fair fashion and living accessories
Design homewares and furniture
Image design editor
Sustainable water bottles, personalised inscriptions and prints onto water bottles, personalised product packaging
Platform which develops new add-ins
Power tools and hand tools for the construction, manufacturing and woodworking industries

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Realway services, travel, logistics and rolling stock maintenance
Postal service
Prepare the apartments for sale and we refurbish apartments
Payment Service,
Special wall and ceiling decoration, digital wallpaper design activities.
Water, gas heating installation
API platform that allows to build customized payment solutions
A retailshop for eyes control and selling glasses. Glasses, (star) binoculars, control/eyes check, contact lenses and can offer services from an eyes-doctor.
Informatics, software development
Digital banking software
Manufacture of medical devices
Operation of hairdresser saloon

However, good examples of customer-centric innovation may not only appear at the product level. Other server processes such as sales, website, delivery can also be made simpler and more efficient by using consumer feedback. In other words, the efficiency of corporate operations and the complex process of customer service can be made more efficient through consumer feedback.

Redesign of webshop and faster delivery option

„Another example where the customers were heavily involved was ***the redesign of her web shop****. The layout and categories were completely restructured due to customer feedback to accommodate their needs and wishes. For instance, the products were restructured according to the product type, rather than according to collections as it had been the case prior to the redesigning process. Another change happened to the check-out process where customers can now add personalised features separately which makes the check-out process easier. The company continuously asks customers for feedback to be able to offer the best possible products and services. Due to the increasing international demand for her products, the company reached out to DHL to add another,* ***faster delivery option*** *especially for international customers."*

New Vintage by Kriss, a jewellery company, Estonia

Providing a high-level service in terms of efficiency

"Over the last few years laRinascente has carried out a progressive restructuring of the shops in the name of design, with the opening of new avant-garde stores and a continuous updating of the product offer." "The customer must be given a high-level service in terms of efficiency, accessibility of the various payment methods and customer recognition."

La Rinascente, Italy

Improving the overall customer experience and business operations

„The company made significant changes to the ways it interacts with customers ***to improve the overall customer experience and to help improve the business operations*** *as a whole. Thus, it redesigned, restructured and modernised "all passenger traffic ticket sales systems and channels for both commuter and long-distance travel".*

VR Group, Finland

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Technology development – finding new solutions

„We continually face with new demands of the clients. They wish to have this technology used in places where there's a high level of strain or even in their bathroom. This has made us find out new solutions. There are clients who wish to have certain decorations outside, on the walls of their houses. This is a new demand and we try to find a suitable technology to satisfy it."

IFresco, Hungary

Platform for freelancers

„The best insight comes from outside. Our mission is to facilitate a community, which works for everyone. Freelancers have access to a buzzing project bazaar, and companies can fulfill their business goals with the right people, handpicked specifically for their needs. We created a platform, where complex goals are made simple. This is a place where freelancers unite and join forces, so businesses can experience solutions like never before. Because diverse mixes bring unique solutions."

Briefly, https://briefly.work/about-us-en

Methods of customer's involvement in innovation processes

Companies can choose different methods to involve their customers in innovation processes. E.g.:
Surveys/questionnaires
Interviews
Focus Groups
Brainstorming
Observations (customers are observed in daily life personally)
Test Groups
Field Test (testing products and/or services in real life circumstances)
Simulations and visualizations
Living Labs (Cooperation with customers in company's laboratories and workshops)
Diary Search: (target groups are asked to write the product and/or service experiences in a pre-structured online diary)
others

The most common method of involving customers is conducting interviews, surveys, and questionnaires, which are relatively easier to implement and better known, especially among SMEs. The companies use more of the digital communication channels used for communicating and collaborating with customers at the same time. The highest proportion was the use of e-mail, which was followed by the use of social media (Facebook, Instagram, Pinterest, Twitter, Youtube). In addition, the use of online advertising (Google ads, Instagram ads), an interactive website, and Q&R are mostly mentioned. The use of novel tools such as chatbots, support teams, or gamification tools is present, but in a rather minor proportion.

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E-mail, phone

„In general, in the area of services, we contact the customers on the phone, via email, but above all in person. Based on the orders we can receive information, again electronically, about the products, spare parts, and the necessary new tools."

Földvári, self-employed, Hungary

Social media

„In terms of social media presence, DHL is active on several platforms (e.g. Facebook, Instagram, Twitter) and shares a mix of personal stories from employees and new products and services, but also offers quick and simple customer service through a customer support account on twitter, for instance (@DHLPaket, @DHLexpress, @DHLPaket)."

DHL, Germany

„To cooperate with consumers in the field of innovation, we primarily use: Website, Facebook, You Tube, Instagram, Blog, E-mail communication."

OMEGA, Poland

Social media and company website

„Another way of reaching out to her customers is through social media. For instance, the company often uses Instagram to receive quick and direct feedback from customers, e.g. in the form of short question and answer options on Instagram, or through short questionnaires. She encourages customers to share pictures of the jewellery and shares the stories behind certain pieces of jewellery on the company's Instagram and her website. This way she involves her customers in the design of a product or, more recently, in the design of the company's website. Another way in which Kriss uses social media to engage her customers in the design process is by giving the customers a few options in a product's design and letting them vote on which one they like best or encouraging them to name a product, which is always a fun process for all involved. She also engages with customers via email and in her store.

New Vintage by Kriss, a jewellery company, Estonia

User survey

"The OmaPosti concept is based on a comprehensive user survey that interviewed over 50 users, charted their aspirations, and learned about their real needs. The service is constantly being developed and validated according to the needs of the users so that each new concept and feature will provide the best possible user experience."

Posti, Finland

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Digital guest book

„We have a digital guest book and write into it the date and the type of hairstyle we made to the customer. We have been keeping this digital guest book for years now, thus we know about each of our customer when we dyed her/his hair, what type and colour of dye we used and what was the hairstyle.
This way we become familiar with the customs of our clients, the materials used in his/her case. It is also beneficial for us because this way I can avoid buying paints and materials that nobody wants."
Berendi Hair @ Academy, Hungary

Electronic drive interface

„When I receive a concrete order from a client, when I make and/or refurbish an apartment for a customer, I create an electronic drive interface for each of my future apartment owners where I upload the apartment layout, photos, the electricity and furniture I recommend, together with the recommended tiles, doors, windows, lamps, etc. thus the customer can choose from them. All the respective information is on a dedicated drive library specific to the property."
PkHome Kft, Hungary

In some areas where tailor-made and personalized products are more important, or for smaller companies, in addition to online and traditional offline methods, face-to-face encounters may be the most inspiring methods in product development.

Uses customers' stories as inspiration - conversations with loyal customers

„New Vintage by Kriss uses customers' stories as inspiration for jewellery pieces. „Each design has a story behind it, something that moved, encouraged or touched us." The company uses customer-based innovation by having conversations with loyal customers about their wishes and expectations for new products. Kriss believes that owning a small company is an advantage for customer contact and customer-centric innovation as it makes direct contact to customers easier. She is often able to meet customers in person at her design studio or on sales trips. Being a small company means that Kriss can accommodate clients' wishes better and sometimes, for example, can add a specific symbol or engraving to her design. Often, designs come out of personal conversations with customers and the small size means that Kriss has the time to connect to different people on a more personal level."
New Vintage by Kriss, a jewellery company, Estonia

Varkki also designs its products with customer input. and uses personal conversations with loyal customers for their innovation process.
Varkki, a sustainable fashion design company, Estonia

In person consultation, holding events and social media

„The company makes an effort to engage with its customers through several means, both online and in person. The company regularly holds events on a variety of topics that are of interests to its customers. The store also offers personalised makeup and cosmetics consultations in their store and, due to the pandemic, also online through video calls or photos. This allows them to provide the customers with the best possible shopping experience and product choice. The company also runs an online shop and tries to adjust their collection according to customer demands. A big part of their business strategy is using social media to interact with their customers. The company is very

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active on Instagram and regularly does live streams where they present new products and sales and interact with their customers. They also offer services such as customised advent calendars."
Werte Freunde, Germany

Gathering customer feedback is not in itself an innovation. Another important step is when the received consumer opinions and experiences are built into product/service development or to make operational processes more efficient.

Incorporate customers feedback into product development
„We receive suggestions as to which products and aspects of the products are particularly important to the customers. Thanks to the direct and rapid feedback, these are actually incorporated into product development."
mamiblock Shop, Germany

Incorporate customers feedback into product development
„One example of a product that was innovated or rather iterated through the input of customers are the beeswax wraps. After GAIA had received comments on their Instagram profile that the wraps size should be bigger repeatedly (10 comments), they actually changed the size."
GAIA, (Trade) Germany

In the case of individual, personalized products, it is often the case that a product, proven form, design, or technical solution for a customer is later incorporated into the wider product range, using its experience.

From custom-made items to overall market
„The custom-made items often also make their way into the wider collection and are then sold as 'regular' products. „
New Vintage by Kriss, a jewellery company, Estonia

From custom-made items to overall market
„As for churches, we must mention the church in Ipolynyék, Slovakia. A local painter had been instructed to paint the church, so the interior decorations were made by him. But the dome seemed to be a bit more difficult. So, I modelled it on a gym ball. Here we also carried out a 200m2 ceiling design. Incidentally, this work has brought a new product to be sold in the market soon."
IFresco, Hungary

Solutions from different fields could be standardized and synthesized into one software and sold on the market
„The companies approached us for the purpose of process development and based on the experience gained together during this time, we recognized this market need, an innovative idea. Demand process solutions from different fields could be standardized and synthesized into one software and we can sell this to other companies in the market.
Steps of the customer-driven innovation process:
1. Situation analysis of previous clients, identification of processes

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2. Defining automated processes
3. Define user requirements
4. Based on the user requirement, the requirement of the new IT system is created
5. Software development
6. Sales of software supporting standardized processes
7. Software adaptation for the new customer"
FlexInform Kft., Hungary

Getting to know consumers and their behaviors, habits, needs, and preferences, and the increasingly conscious use of information is an important element of marketing strategy. A higher level of use of information collected from customers is the use of digital methods, such as data analysis, or the use of algorithms and applications to better identify consumers and their preferences and to personalize and target marketing communication tools.

Customer community and data analysis
„Through the various channels in place for customer feedback and innovation through customers, GAIA has grown a sustainable customer community. With the help of data analysis, GAIA knows exactly who the customers are and what kind of people are reached through their online marketing strategies. GAIA has formulated a clear target group which helps them deciding on different marketing and customer strategies. Furthermore, they aim to keep their already established customers instead of focusing only on new customer acquisition."
GAIA, Germany

Customer Solution and Innovation (CSI)" system
„The company established a "Customer Solution and Innovation (CSI)" system which is both a primary contact for customers and additionally also closely analyses and monitors customers' needs and satisfaction. On top of that, the company has three innovation centres: one in Germany, one in Singapore and in the USA (Illinois) where customers can discover new trends and innovations and engage with them, but also present their own, personal challenges and issues. It is also important to highlight, that DHL is aiming to receive feedback and customer inputs at a variety of locations to enable a diverse customer group to be involved in the innovation process."
DHL, Germany

ICT, customer loyalty program, CRM and data analysis
„ICT supports the marketing-oriented activities that come into play when the customer is not inside the store and that are used to communicate and let him know what is happening inside our stores. This is why we are committed to carrying out a customer loyalty program, through action on the checkout, CRM and data analysis, to give the consumer an integrated and personalized communication based on his interests."
La Rinascente, Italy

Use of an algorithm based on the skin profiles and customers' feedback
„Nøie allows customers to subscribe to a customised skincare subscription service. Customers do the "Skin Test" and create a unique skin profile which is then analysed and matched with the best skincare routine and products from Nøie's range. The company has accumulated data from over 60,000 people and has created an algorithm

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based on the skin profiles and customers' feedback. Customers are further able to adjust their skin profile and thus their products and skincare routine any time and have the chance to get their money back should they be unhappy with the results. The company relies on customers to continuously provide them with data which is then reflected in the offered products and services. Most of the company's communication with its customers is done online through its website and the personal customer profiles. „

Nøie, Denmark

Skin profile through a personalised online test

„The company offers a skin test where customers can find out their specific skin type through a personalised online test. In addition to their online skin test, the company also offers personal online chats on their website and video call consultations to provide each customer with the best personalised shopping experience and best suitable product."

Manilla, Lithuania

Insights Forum – customer community - Big Data, CRM, and social media analytics

„DEWALT launched the DEWALT Insights Forum, which offers customers the opportunity to provide feedback and to submit ideas for products. The community has over 12,000 members and is made up of its partner Vision Critical, as well as, customers, partners, employees, fans, donors, and alumni. Using an Insight community, DEWALT gets rapid and ongoing feedback that allows them to make easier business decisions. More specifically, the insight community allows DEWALT to engage with customers in an ongoing dialogue that respects members individuality and their humanity, and which complements other data sources, like Big Data, CRM, and social media analytics."

DEWALT, USA

Digitalisation and modernisation

„Due to the increased modernisation and digitalisation, the company can now continuously collect data on its customers and how they use its services which then helps with improvements and innovations."

VR Group, Finland

Applications for learning about end-users

„Nowadays, there are plenty of suitable tools available during development to learn about end-user needs, of which perhaps the following 3 applications are what we come across often in our projects:

***Zeplin** is a designer tool that facilitates group work within the company between the designer and the development team, as well as common processes and communication with the customer (viewing visuals, commenting). The finished design plans can be placed in the Zeplin, which is easy to comment on, so even selected end-user groups can be easily involved in the design process.*

***Figma** is also a designer tool whose best function is to allow live, real-time collaboration with a selected group of customer representatives and even end users, thus speeding up and facilitating the implementation of appropriate user needs and opinions during development.*

***Invision** is the perfect tool for putting together validated design elements to build a workable MVP (Minimum Valuable Product) that allows you to initiate approval processes and test finished user interface designs for either the customer or end users without starting application development. would be.*

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W.UP, Hungary

There are companies that use multiple methods to engage their consumers, combining offline and online methods. Although no general conclusions can be drawn, the results of our survey show that more complex, organized solutions for customer involvement are typically used by larger (primarily large and medium-sized companies) and more mature companies. Also, an important question is whether companies categorize their customers based on their needs or expertise when involving them in the innovation process. This is an important issue because different types of feedbacks and experiences can be incorporated in the case of different customers. Different kinds of information can be obtained from lay customers and from professional users in the product development process. Both kinds of information are extremely useful.

The widest range of tools for consumer involvement has been observed in the practice of one of Norway's leading food companies. In addition to surveys, the methods of focus groups, laboratory, and home testing, among others, are used. In addition, the categorization of consumers can be observed. They differentiate between lead users and professional users from end-users in their involvement in innovation processes. It is important to emphasize that the company also realizes significant and continuous benefits through the introduction of customer-centric innovations (see later). In addition to market (domestic and international) and operational advantages, they also achieve remarkable results from a financial point of view.

More complex, organized solutions for customer involvement - combination of the methods - Categorizing consumers based on their needs and expertise

"In an industrial enterprise like this, there are a number of fairly common methods used to obtain information about customers and markets. Surveys and focus groups are often used to get feedback from customers. Perhaps more interesting is the combination of these methods with direct involvement of users, for example:

focus groups where participants get to taste and evaluate new products, and where they can also be asked to explore new products in use in the kitchen

taste panels in sensory laboratory for scientific testing of users' response to different product variants

survey / home testing of new products to learn how consumers use new products, and how the product fits into the consumer's cooking and eating habits

In addition, professional and industrial partners and customers are often involved in several phases of the innovation process:

Chefs, as an important group of «leading users», from the Department of Gastronomy (now the Culinary Institute) and from various renowned restaurants, as well as experts from Matforsk and the university community at Ås, are often used for advice and participation in product development.

Industrial partners and customers, from retail chains to industrial producers of ready-made food and other foodstuffs, often participate in the formulation of new needs and in the development of new concepts, products and technical solutions."

Data collection about customers in case a project was done in several rounds. Early in the project, the team conducted a study trip to potential market regions. Italy, Belgium, Korea, Japan, etc. were visited to learn about their food cultures, market and distribution structures, etc. Later, when the technology was better developed, they conducted more conventional market studies, using focus groups and home testing of the product in a number of Norwegian home. Finally, a number of marketing and sales promotions provided important learning in direct interaction with potential customers."

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TINE, Norway

In addition to the practice of the Norwegian company, we can also highlight the example of a Hungarian software company and a medical device manufacturer company in terms of combining and applying the methods in many ways. An interesting moment in the case of a software company is that the head of the company highlighted as an important aspect that their own employees look at their products from the customer's point of view and use their own needs in product/service development, as they can be considered customers. They themselves use these services.

Combination of methods - working team as customers

„We use several methods to involve customers, depending on the expectations of our customers. Most often, we use UX research methods, which are performed either by our company or by the customer, otherwise by a third party. During the developments, in addition to the research, we also got our own and our acquaintances' experiences, on the basis of known user market knowledge, and on opinions available on freely available social media interfaces. Also a few examples without claiming completeness:

UX Research: *Knowledge of the operation of the market, users and competitors, collection of information and adaptation of this information in the design phase. Examples of solutions used include user interviews based on online research, ethnographic research and market research methodologies, the main purpose of which is to understand the real needs and difficulties of end users during design, to understand their thinking and to be able to design a solution to them.*

Service Design: *Optimizing the usefulness of the service for the user by involving the customer. This optimization feeds on UX research, user reviews, and marketing research to deliver the most optimal solution for the customer. Solutions used include service scope and customer journey map.*

User Experience Design: *Maximize the usability of the service for the user, with the goal of achieving a perfect user experience that is mapped based on UX research. In each case, the completed sub-plans are tested with different user groups, the results of which are continuously traced back during the development process. Examples of solutions used are information architecture, user personas and usability testing.*

User Interface Design: *User Interface (UI) Design - Facilitate the user-friendliness of the service by using the appropriate design elements based on the above research and current trends. Solutions used include emotion design and design guideline.*

In addition, it is important to highlight the use of ideas within your own team as customer needs. We are all users of such applications in our private lives, so ideas within a team are customer-side innovations, with the difference that perhaps our ideas and opinions are not typical customer opinions, as we look at these products with a slightly different eye due to our work."

W.UP, Hungary

Combination of methods - Categorizing consumers based on their expertise

„We conduct a direct clinical trial involving partners who use the product and services. These data are collected under the supervision of an external CRO (Clinical Research Organization). The CRO plans of what factors (complications, implant loss) we will take into consideration during the research. Then a bio-statist will determine how many people need to be involved in the process. The research leader collects the data and writes the research report. If there are any problems, we will incorporate the solution into the improvements. Doctors are approaching the company with the intention of development, they have an idea and would like us to implement these, which will happen based on the following process.

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1. Defining user requirements
2. the system requirement is created based on the user requirement (technical-engineering data)
3. product design
4. prototype production + verification
5. series production + verification
6. validation before the product goes on the market.

Methods used to involve consumers:

focus group, in-depth Interview, brainstorming, customer satisfaction questionnaire, product lifecycle monitoring, simulation, Collaboration with external laboratories to perform tests, recording a complaint, recording unexpected events, gaining application experience, equivalence test."

Bionika, Hungary

Difficulties in involving customers

When implementing customer-centric innovations, companies face a number of difficulties in engaging customers. The following difficulties can be identified in identifying the needs and experiences of customers and in communicating with customers: Involving consumers is time-consuming and financially resource-intensive (infrastructure, technology, IT). it is sometimes difficult to identify customers who can provide innovative ideas during the innovation process. In addition to these difficulties, companies face the problem that their customers are not motivated enough to give feedback to the company. To increase the willingness to provide feedback, it is important to encourage consumers. Such a tool could be, for example, when it builds on the emotions of consumers. (see, for example, Gaia's motto "We want to learn from you" or developing a sense of "belonging to a community"). Another way to encourage consumer feedback is to generate financial interest from consumers, for example by introducing coupons, vouchers, giveaways, idea contests, or consumer loyalty programs, or even securing a percentage of sales for the best ideas.

„We want to learn from you" – voucher

„GAIA is applying various methods to engage with their customers and to achieve customer innovation through that. They are doing a combination of offline and online strategy. Their offline strategy includes a little leaflet that is added to the customer's purchase with the call "we want to learn from you", so basically an invitation to give feedback on the shopping experience and the product. To motivate the customers to actually give feedback and reviews, they receive a voucher of 15€ for their next purchase. This strategy plays into a lesson learned by GAIA – a company should not only focus on the acquisition of new customers but really invest in the relationship with the already established customers. GAIA mostly works with standardized questionnaires to collect customer feedback. Another method in order to receive customer feedback for innovation is the offer to apply to become a product tester for GAIA's products."

GAIA, Germany

Loyalty programme

„Customers are involved by using mainly digital tools through which the company collects customer feedback. This is done, for example, through social media and in stores. The company also has a loyalty programme for its

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customers which they use as a means to stay in touch with their customers. Additionally, they offer the option of a personal shopper where a customer can get help with the purchase of a product. Through these various interactions with their customers, the company collects data on the customers' needs and wishes and adapts its services and product range accordingly. „

La Rinascente, Italy

Refer a friend" option with a discount

„Additionally, the company offers a "Refer a friend" option which allows both the exciting and the new customer a €14 discount on their next shop."

Nøie, Denmark

Community feeling - storytelling

„Kriss believes that the more customers are part of the creative process, the more the product becomes personal and gets a community feel. The storytelling aspect of her jewellery design connects the customers to a product and the company and creates relationships to a piece. The community feeling is also increased by the fact that customers from all over the world, from very different countries, all have similar stories and experiences which people share across cultures and borders and a piece of jewellery can connect them and can thus feel very personal. Connecting to customers during the design process also makes Kriss feel like she can give something back and does more than 'just create a piece of jewellery' which is incredibly rewarding.

New Vintage by Kriss, a jewellery company, Estonia

Community feeling – share tips & tricks

„On top of that, Pixelmator has an online community, where customers can discuss the product, as well as "image editing, share tips & tricks, tutorials, and other useful resources, or just chat with other Pixelmator users". Users can also request new features which are then taken into consideration and may be added to the editor. The company also has a strong social media presence where it interacts with its customers and regularly shares tips on how to use its editor."

Pixelmator, Lithuania

Design contests

„Additionally to their individual design process, the company engages with its customers through social media. The company regularly hosts design contests and allows customers to pick their favourite design from a range of choices which are then added to the collection. The company also runs a blog on social and sustainability issues and topics and posts about these on their social media platforms, as well."

Sould Bottles, Germany

Online community - competitions of design ideas - financial motivation for the designers

„LEGO is a leading company in the area of customer-centric innovation. The company is making the most of being able to connect to their customers online by providing them with an online community. Customers and fans can submit their own design ideas which then get voted on and if a design receives enough support, the company reviews the design and may turn it into a product. The designer receives a percentage of the sales and is heavily

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involved in the whole process, thus rewarded for being innovative and for sharing their ideas and design with the company. LEGO uses a mix of social media customer mechanisms, such as highlighting customers' ideas and reposting their social media posts, offering competitions, and replying to customers in a personal matter (e.g. @LEGO_Group, @LEGOIdeas)."
LEGO, Denmark

Made Unboxed campaign – TalentLAB – design competition - Talent Award - financial motivation for the designers
„The company relies on customers to showcase its products through its Made Unboxed campaign which allows customers to share photos of a product in their home which then gets uploaded to the company's social media and online presence. The company also has an online platform called the TalentLAB where customers can put down a deposit on an design idea they are interested in and if the design receives enough funds, the company will produce it and the customer who put down a deposit on the design will receive the finished product once it's being produced. Additionally, the company has an annual design competition, the Made Emerging Talent Award, where anyone can submit a design idea and upload it to the TalentLAB platform. A panel of experienced designers then shortlists six products which are then voted on by the public, the customers. The design that wins the contest is produced and sold on Made.com within 12 months and the company publicizes the design, giving the designer exposure, a career boost and royalties."
MADE.com, United Kingdom

Pleasure in creating for clients
„Modern technology meets handcrafts, where clients will be able to paint their pictures chosen, thus, they can take pleasure in creating."
IFresco, Hungary

Benefits from customer-centric innovations

More kind of benefits can be reached by companies through the introduction of customer-centric innovations. These can be divided into five major groups:

1. Financial benefits (increased sales revenue, profitability, cost reduction)
2. Growing operation effectivity (increased sales volume, product and service portfolio, productivity, product and service quality, speed and reliability of communications and transactions, positive change in business model and business practice)
3. Market benefits (increased number of customers and potential clients, market position, market share, entering of new markets, global trade, geographic expansion, business linkages, competitiveness)
4. Increasing customer satisfaction (increased understanding and response to customer needs, tailor-made/customised product development, better and faster communication with the customers)
5. Improving organizational image, reputation.

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In most cases, market advantages were highlighted by companies in presenting their practices. With the involvement of consumers, the products/services offered by the company increasingly meet consumer needs, thereby increasing consumer satisfaction and brand loyalty, strengthening the company's market position, increasing the number of customers and sales volume.

Improve of brand loyalty
„In addition, this also increases the acceptance of the products by the customers and thus sales and brand loyalty."
mamiblock Shop, Germany

Improve of consumer loyalty
„On top of that, engaging directly and continuously with the customers also means that customers tend to stay with the company for a long time (some since the beginning) and that showcases the good quality of a product. These customers also tend to give good and honest feedback and also speak up if something is not up to standard which helps with improving the products and services in the long run. „
New Vintage by Kriss, a jewellery company, Estonia

Increase in number of users
„OmaPosti users increased by 50% during its first six months, and this number continues to increase."
Posti, Finland

Increasing customer satisfaction
„The number of complaints was reduced to minimum."
PkHome Kft, Hungary

Professional recognition
„We have gained wide professional recognition nationally and internationally."
IFresco, Hungary

Increasing revenues number of costumers
„More customers due to a buzz marketing.."
Stolmar Zbigniew Marchwiak, Poland
„More customers and increasing revenues.."
ZPHU DARMEX Dariusz Wójtowicz Poland

Positive feedback from other customers can in many cases motivate new customers, increasing confidence regarding the product/service and the company itself.

Putting positive feedback as reference
„The feedback GAIA receives from customers is sometimes put as a reference on their website or social media. Feedback is put publically on website and serves as a reference. Overall, the customer innovation methods go hand in hand with marketing and outreach strategies. Furthermore, this has huge impact on the market acceptance."
GAIA, Germany

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The positive impact of social media can not only be direct, it can also have indirect benefits.

Indirect benefit of social media

„It is interesting to point out that GAIA has a lot of followers on Instagram (29.700) but only few of them actually purchase their products online. Many of them are following the GAIA account for lotteries and to receive something for free. However, the social media is still highly valuable for customer feedback and market acceptance purposes, although the followers might not be the main purchasing power. When GAIA reached out to collaborate with a local supermarket, they could show that they have an impressive amount of Instagram followers, for example, which was very attractive for the supermarket."

GAIA, Germany

In addition to market benefits, a company can also increase operational efficiency by learning about and using consumer feedback.

Increase of customer satisfaction and performance

„The company has also been publishing reports on customer-centric innovation practices and has reported a huge increase of both customer satisfaction and their on-time delivery performance. „

DHL, Germany

„Thanks to the involvement of customers at every stage of the design process, we are sure that the final product will be best suited to the customer's expectations and will meet his expectations to the greatest extent."

AJ PROJEKT MEBLE, Poland

Simplifying and rationalizing industrial production

„User involvement in TI is often about simplifying and rationalizing industrial production for the customer, but also about contributing to the customer's development of new products. The typical pattern of user involvement in TI is based on continuous dialogue with their main customers, where the customer's needs can be expressed and understood. Sometimes this becomes simpler projects that TI solves on its own, while other times it becomes a joint development run through several phases."

TINE, Norway

Improving customer experience and efficiency

„We have faith in digitalisation and new technologies in improving customer experience and efficiency as well as seeking growth through agile innovation."

VR Group, Finland

Gaining knowledge, experience

„The advantage of W.UP also lies in the diversified experience and knowledge that our colleagues have gained over the years in the field of banking IT and customer service. Much of this knowledge is gained by actual customer feedback as well as our comprehensive market knowledge, which complements the results of the above methodologies and research."

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W.UP

Gaining knowledge, experience
„Do the customers, guest brings new ideas to us? Yes, if the requirements grow, more and more people are in search of a new type of service. For example, straightening the hair, and my colleagues learnt it. And I purchased the necessary tools. I will have more customers, I will earn more money. And the chances will be higher that my good employees will not leave me.„ **Berendi Hair @ Academy, Hungary**

However, the benefits in terms of market and operational efficiency are also realized in the long run in terms of financial benefits.

Increase in total turnover - maintain leading position
„For the past 15 years, the company has included innovation as an increasingly important part of its overall strategy, both to promote a stagnant market for traditional dairy products, and to meet increasing national and international competition. Despite declining sales of milk from the 1990s until now, TINE has increased its total turnover every year, mainly due to continuous product development. TINE thinks strategically about product development and innovation at all levels in the organization. Thus, despite declining sales volumes, TINE has managed to increase its financial turnover and maintain its position as the leading (dominant) supplier of food in Norway. Internationally, TINE has had considerable success in exporting Jarlsberg cheese and has had to set up production facilities in Ireland and the USA as well." **TINE, Norway**

Better results – saving time and money
„This together: builds better products as DEWALT better understands how its products fit and function in the lives of their customers, provides better service, and delivers better results." *"While traditional market research can be impersonal, time consuming and expensive, the DEWALT Insights Forum creates relationships with members and saves the company time and money. The company saved more than $1 million in research costs in 2016 and almost $6 million since establishing the Insight community. DEWALT can now use one resource for the entire lifespan of a project and once products have launched they can follow up easily with satisfaction and quality surveys (Dewalt, 2016)."* **DEWALT, USA**

More income and more investment into development
„Thanks to digitalisation, my company can use the time available for work much better, can provide the services for more customers simultaneously, thus has more income and thus invest more into development." **Földvári, self-employed, Hungary**
More orders from clients - increase in consumer confidence - increase in revenue
„One of our large clients worked with an external UX company on the projects, but as the workshops saw that our team understands the problems of the users better than the team they employ, they terminated the contract and we continued to do so. This change meant approximately a 5-10% increase in revenue over projects depending on the exact scope of the project.

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For our other important customer, UX was not considered in an implementation project. We stressed the importance of this throughout the project and dripped them down from our expertise in this direction. For the customer, these ideas proved to be so good that UX elements were already ordered in the following projects in all cases, which also meant a 5-10% increase in revenue, depending on the exact scope of the projects."
W.UP, Hungary

Reduction in resource need and costs – faster processes
„Benefits for the company: administrative costs have been significantly reduced, labour savings were realized, faster process turnaround time, there are no administrative errors."
Bionika, Hungary

It is important to mention that the benefits of customer-centric innovations also apply to customers, as the products better meet their needs and they are tailor-made.

Benefits also at the partners of the company
„Benefits for the company: Revenue growth, market expansion, entering new markets, new customers. Benefits at our partners: administrative costs have been significantly reduced, efficient processes, utilization of the workforce's knowledge in other areas, faster turnaround times, fewer errors, more efficient use of working time."
FlexInform Kft., Hungary

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Conclusions and recommendation notes

Based on the questionnaire survey and the results of the best practices, we can conclude that small and medium-sized enterprises operating in different fields use very different ways to involve customers in customer-centric innovation. Relatively simpler engagement methods are common, such as questionnaires, surveys, group or in-depth interviews, product career tracking, social media tools, various loyalty programs, or community-based experience gatherings. This is supported by the fact that both in the questionnaire survey and in the collection of best practices, more than fifty percent of the responding companies use these methods. While more serious customer involvement methods used for customer innovation, such as simulation, living labs, diary studies, are used by only a few companies, where the scope of activity is also based on more advanced technology.

		Survey	Best practices
	Total respondetsv(SMEs)	**37**	**37**
1	Surveys, questionnaires	19	15
2	Interviews	21	23
3	Focus groups	3	11
4	Brainstorming	10	4
5	Observations (of customers in daily life)	16	12
6	Test groups	7	5
7	Field test (testing products and/or services in real life circumstances)	10	12
8	Simulations, visualizations	2	3
9	Living labs (workshops with customers in company's laboratories)	4	4
10	Diary studies (target groups write about product and/or service experiences in a pre-structured online diary)	1	2
11	Social media tools		19
12	Loyality program, building community		16

We also tried to draw conclusions whether a difference can be found in the customer engagement methods based on the scope of activities of the companies. We were able to identify five main groups of best practices among small and medium enterprises such as construction, IT services, manufacturing industry, services, trade. But there is no significant difference in the field of customer involvement methods used. In each area of activity the methods used for customer involvement appear in different forms and mixed. There were about 6 SMEs in the field of IT services, manufacturing industry, services, where more serious methods also occur than in Observations (of customers in daily life), Field test (testing products and/or services in real life circumstances), Living labs (workshops with customers in company's laboratories), Simulations, visualizations.

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Field of activity	Main used methods for involving customers
Construction industry	Interviews, loyality program, building community
IT services	Surveys, questionnaires Interviews, Focus groups, Observations (of customers in daily life), Field test (testing products and/or services in real life circumstances), Living labs (workshops with customers in company's laboratories)
Manufacturing industry	Surveys, questionnaires Interviews, Focus groups, Observations (of customers in daily life), Simulations, visualizations, Living labs (workshops with customers in company's laboratories) Diary studies (target groups write about product and/or service experiences in a pre-structured online diary) social media tools, loyality program, building community
Services	Field test (testing products and/or services in real life circumstances), Surveys, questionnaires, Interviews, Focus groups, Observations (of customers in daily life), Simulations, visualizations, Living labs (workshops with customers in company's laboratories), Diary studies (target groups write about product and/or service experiences in a pre-structured online diary), social media tools, loyality program, building community
Trade	Interviews, Field test (testing products and/or services in real life circumstances) social media tools, loyality program, building community

- Customer-centric innovation can be applied for companies independently from size. There are many ways to involve customers in innovation processes, from simple to more complex, more expensive solutions. Even the smallest companies can find the right and accessible methods.
- Customer-centric innovation can be successfully applied in almost any field. From manufacturing companies to service providers, we have found many examples of customer engagement and successful innovation. In high-tech sectors, or in areas where there is greater importance of tailor-made products, customer-driven innovation can be created easily.
- There are several options for mapping customer opinions/experiences/needs. The use of digital solutions, social media platforms, and data analysis tools greatly facilitates the collection and processing of customer feedback.
- Consciously learning about customer feedback and accurately identifying customers and their needs is helpful in developing a marketing strategy and product innovations.
- Getting to know customer feedback is not a customer-centric innovation itself. The knowledge and experience gained in this way must be integrated into the process of product development to be able to talk about innovation.

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- The lack of motivation and interest of customers in the field of feedback makes it difficult to create customer-centric innovations. It is advisable to increase the willingness of customers to provide feedback and to create motivation. This could be, for example, the creation of a "sense of community", the impact on customers 'emotions, or the creation of customers' financial interest, for example with coupons, discounts, loyalty programs, and idea competitions.
- Through customer-oriented innovations, companies can realize several benefits, that comes directly from the market position and operational efficiency, which also provide financial benefits to companies in the longer term.
- SMEs have little or no knowledge at all regarding customer-centric innovation and the digital opportunities that support it. Based on this, there is a great need for training that develops the knowledge and skills of SMEs in this field.
- From a management point of view, there is less bureaucracy for SMEs, quick decision-making and risk-taking due to entrepreneurial management, and an organic leadership style. At the same time, entrepreneurs often do not have formal management expertise, in which trainings like ours can be the solution.
- SMEs are fast and efficient in communication, have good informal contacts, but may lack time and resources, which may prevent them from developing an appropriate science and technology network. The creation and development of these types of networks and the involvement of SMEs can go a long way in overcoming time and resource problems.
- SMEs can respond quickly to the changing market requirements, they can effectively fill market gaps close to their activities through their innovations, while at the same time facing barriers to starting a foreign business due to high costs. The solution for this problem could be the development of (European) level support system for foreign market entry.
- The innovation advantage of SMEs is that they can employ technical staff in several company departments, but at the same time they have often lack of core technical expertise (it may be necessary to use external technical specialists) and miss the benefits of diversification of research and development.
- From financial aspect, lower innovation costs and higher R&D efficiency are possible for SMEs. At the same time, they face the risk of not being able to spread the high financial risks of innovation over several areas of activity, the difficulty of accessing external capital and the high risk of the cost of capital.

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- SMEs can boldly take advantage of the sub-strategy (growth strategy based on specialization) (within a differentiation strategy), but growth can mean a difficulty by the use of external capital and entrepreneurs are often unable to manage growth properly.
- A major advantage for SMEs is that the regulations that apply to them are often less strict, but nevertheless, they are often unable to cope with the complexity of regulation, high adaptation and patenting costs mean difficulty.
- Many government programs support the innovation activities of small and medium-sized enterprises, although access to government programs and access to information can often be difficult. Due to the high costs, they may also have difficulties with cooperation programs.
- One of the key innovation benefits of SMEs is their ability to learn quickly, adapt and develop routines.
- The generally simple and centralized, organic form of SMEs should also be considered among the innovation benefits.
- SMEs can be attractive partners for innovation-oriented joint ventures/strategic alliances, especially if they are at the forefront of technology. However, the scarce management experience and subordinate position of power in cooperation with large companies are disadvantages in this respect.

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Best practices - appendix

Information about the company

Country: Germany, Hamburg

Name of enterprise: Mamiblock Shop by wow yes products UG

Sector: Trade

Activity: E-commerce

Website: https://mamiblock-shop.de/

Examples of products or services co-created with customers:

Recipes, DIY-story cards, calendar, meal planner

Methods of customer's involvement in innovation processes:

Social media, Instagram, YouTube

Digital tools used to support customer centric innovation:

Instagram, YouTube

Benefits realized as a result of customer innovation:

We receive suggestions as to which products and aspects of the products are particularly important to the customers. Thanks to the direct and rapid feedback, these are actually incorporated into product development. In addition, this also increases the acceptance of the products by the customers and thus sales and brand loyalty.

Information about the company

Country: Germany, Hamburg

Name of enterprise: Gaia

Sector: Trade

Activity: Multichannel commerce/e-commerce of organic, plastic-free household products

Website:

Examples of products or services co-created with customers:

One example of a product that was innovated or rather iterated through the input of customers are the beeswax wraps. After GAIA had received comments on their Instagram profile that the wraps size should be bigger repeatedly (10 comments), they actually changed the size.

Methods of customer's involvement in innovation processes:

GAIA is applying various methods to engage with their customers and to achieve customer innovation through that. They are doing a combination of offline and online strategy. Their offline strategy includes a little leaflet that is added to the customer's purchase with the call "we want to learn from you", so basically an invitation to give feedback on the shopping experience and the product. To motivate the customers to actually give feedback and reviews, they receive a voucher of 15€ for their next purchase. This strategy plays into a lesson learned by GAIA – a company should not only focus on the acquisition of new customers but really invest in the relationship with the already established customers.
GAIA also reports that it is hard to receive feedback without any incentive (e.g. a voucher for example) – as an example: in their mailing list they have registered 22.000 email addresses and have send a feedback survey to all of them with the call "we want to learn from you - #gaialernt. From these 22.000, 18.000 actually received the email. 500 opened the email and 300 read the email. Only 6 people answered the survey.
GAIA mostly works with standardized questionnaires to collect customer feedback. Another method in order to receive customer feedback for innovation is the offer to apply to become a product tester for GAIA's products.

Digital tools used to support customer centric innovation:

Data analysis, Asking for feedback during the online purchase at checkout, When purchasing online, 14 days later an email newsletter asking for feedback is sent, Social media (Facebook, Pinterest, Instagram (Instagram by far being the most valuable platform for feedback)), Newsletter, Google ads, Instagram ads

Benefits realized as a result of customer innovation:

Through the various channels in place for customer feedback and innovation through customers, GAIA has grown a sustainable customer community. With the help of data analysis, GAIA knows exactly who the customers are and what kind of people are reached through their online marketing strategies. It is interesting to point out that GAIA has a lot of followers on Instagram (29.700) but only few of them actually purchase their products online. Many of them are following the GAIA account for lotteries and to receive something for free. However, the social media is still highly valuable for customer feedback and market acceptance purposes, although the followers might not be the main purchasing power.
When GAIA reached out to collaborate with a local supermarket, they could show that they have an impressive amount of Instagram followers, for example, which was very attractive for the supermarket.
The feedback GAIA receives from customers is sometimes put as a reference on their website or social media.
Overall, the customer innovation methods go hand in hand with marketing and outreach strategies. Furthermore, this has huge impact on the market acceptance.
Feedback is put publically on website and serves as a reference. GAIA has formulated a clear target group which helps them deciding on different marketing and customer strategies. Furthermore, they aim to keep their already established customers instead of focusing only on new customer acquisition.

Information about the company

Country: Germany

Name of enterprise: DHL (big company)

Sector: Services

Activity: DHL is one of the biggest courier, package delivery and express mail services.

Website: www.dhl.de

Examples, methods, digital tools and benefits of products or services co-created with customers:

The company established a "Customer Solution and Innovation (CSI)" system which is both a primary contact for customers and additionally also closely analyses and monitors customers' needs and satisfaction. On top of that, the company has three innovation centres: one in Germany, one in Singapore and in the USA (Illinois) where customers can discover new trends and innovations and engage with them, but also present their own, personal challenges and issues. It is also important to highlight, that DHL is aiming to receive feedback and customer inputs at a variety of locations to enable a diverse customer group to be involved in the innovation process. The company has also been publishing reports on customer-centric innovation practices and has reported a huge increase of both customer satisfaction and their on-time delivery performance. In terms of social media presence, DHL is active on several platforms (e.g. Facebook, Instagram, Twitter) and shares a mix of personal stories from employees and new products and services, but also offers quick and simple customer service through a customer support account on twitter, for instance (@DHLPaket, @DHLexpress, @DHLPaket).

Information about the company

Country: Estonia

Name of enterprise: New Vintage by Kriss

Sector: Manufacturing industry

Activity: New Vintage by Kriss is a small company that was founded in 2012 which designs jewellery for women, men, and children. The company tries to keep the production as much as possible in Estonia. The company sells its products both locally and internationally through its online shop.

Website: https://nvbyk.com/

Examples of products or services co-created with customers:

Being a small company means that Kriss can accommodate clients' wishes better and sometimes, for example, can add a specific symbol or engraving to her design. These custom-made items often also make their way into the wider collection and are then sold as 'regular' products. Often, designs come out of personal conversations with customers and the small size means that Kriss has the time to connect to different people on a more personal level.
Another example where the customers were heavily involved was the redesign of her web shop. The layout and categories were completely restructured due to customer feedback to accommodate their needs and wishes. For instance, the products were restructured according to the product type, rather than according to collections as it had been the case prior to the redesigning process. Another change happened to the check-out process where customers can now add personalised features separately which makes the check-out process easier. The company continuously asks customers for feedback to be able to offer the best possible products and services.
Due to the increasing international demand for her products, the company reached out to DHL to add another, faster delivery option especially for international customers.

Methods of customer's involvement in innovation processes:

Kriss believes that owning a small company is an advantage for customer contact and customer-centric innovation as it makes direct contact to customers easier. She is often able to meet customers in person at her design studio or on sales trips. Another way of reaching out to her customers is through social media. For instance, the company often uses Instagram to receive quick and direct feedback from customers, e.g. in the form of short question and answer options on Instagram, or through short questionnaires. This way she involves her customers in the design of a product or, more recently, in the design of the company's website. She also engages with customers via email and in her store.

Digital tools used to support customer centric innovation:

Additionally to completely redesigning and restructuring the web shop, Kriss also engages with customers through Instagram. She encourages customers to share pictures of the jewellery and shares the stories behind certain pieces of jewellery on the company's Instagram and her website. Another way in which Kriss uses social media to engage her customers in the design process is by giving the customers a few options in a product's design and letting them vote on which one they like best or encouraging them to name a product, which is always a fun process for all involved.

Benefits realized as a result of customer innovation:

Kriss believes that the more customers are part of the creative process, the more the product becomes personal and gets a community feel. The storytelling aspect of her jewellery design connects the customers to a product and the company and creates relationships to a piece. The community feeling is also increased by the fact that customers from all over the world, from very different countries, all have similar stories and experiences which people share across cultures and borders and a piece of jewellery can connect them and can thus feel very personal. Connecting to customers during the design process also makes Kriss feel like she can give something back and does more than 'just create a piece of jewellery' which is incredibly rewarding.
On top of that, engaging directly and continuously with the customers also means that customers tend to stay with the company for a long time (some since the beginning) and that showcases the good quality of a product. These customers also tend to give good and honest feedback and also speak up if something is not up to standard which helps with improving the products and services in the long run.

Information about the company

Country: Italy

Name of enterprise: La Rinascente

Sector: Trade

Activity: La Rinascente is a high-fashion clothing store chain in Italy. It is a collection of high-end stores with Italian and international brands in fashion, accessories, beauty, homeware, design and food.

Website: https://www.rinascente.it/en/

Examples, methods, digital tools and benefits of products or services co-created with customers:

Customers are involved by using mainly digital tools through which the company collects customer feedback. This is done, for example, through social media and in stores. The company also has a loyalty programme for its customers which they use as a means to stay in touch with their customers. Additionally, they offer the option of a personal shopper where a customer can get help with the purchase of a product.
Through these various interactions with their customers, the company collects data on the customers' needs and wishes and adapts its services and product range accordingly.
"Over the last few years laRinascente has carried out a progressive restructuring of the shops in the name of design, with the opening of new avant-garde stores and a continuous updating of the product offer."
"The customer must be given a high-level service in terms of efficiency, accessibility of the various payment methods and customer recognition. Finally, ICT supports the marketing-oriented activities that come into play when the customer is not inside the store and that are used to communicate and let him know what is happening inside our stores. This is why we are committed to carrying out a customer loyalty program, through action on the checkout, CRM and data analysis, to give the consumer an integrated and personalized communication based on his interests."

Information about the company

Country: Denmark

Name of enterprise: Lego (big company)

Sector: Manufacturing industry

Activity: The Danish company designs and produces construction toys.

Website: www.lego.com

Examples, methods, digital tools and benefits of products or services co-created with customers:

LEGO is a leading company in the area of customer-centric innovation. The company is making the most of being able to connect to their customers online by providing them with an online community. Customers and fans can submit their own design ideas which then get voted on and if a design receives enough support, the company reviews the design and may turn it into a product. The designer receives a percentage of the sales and is heavily involved in the whole process, thus rewarded for being innovative and for sharing their ideas and design with the company.
LEGO uses a mix of social media customer mechanisms, such as highlighting customers' ideas and reposting their social media posts, offering competitions, and replying to customers in a personal matter (e.g. @LEGO_Group, @LEGOIdeas).

Information about the company

Country: Denmark

Name of enterprise: Nøie

Sector: Services

Activity: Nøie is a Danish company that sells customised and sustainable skin care. The company offers a customised subscription service to its customers.

Website: https://noie.com/

Examples, methods, digital tools and benefits of products or services co-created with customers:

Nøie allows customers to subscribe to a customised skincare subscription service. Customers do the "Skin Test" and create a unique skin profile which is then analysed and matched with the best skincare routine and products from Nøie's range. The company has accumulated data from over 60,000 people and has created an algorithm based on the skin profiles and customers' feedback. Customers are further able to adjust their skin profile and thus their products and skincare routine any time and have the chance to get their money back should they be unhappy with the results.
The company relies on customers to continuously provide them with data which is then reflected in the offered products and services. Most of the company's communication with its customers is done online through its website and the personal customer profiles. Additionally, the company offers a "Refer a friend" option which allows both the exciting and the new customer a €14 discount on their next shop.

Information about the company

Country: Lithuania

Name of enterprise: Pixelmator

Sector: Services

Activity: Pixelmator is an image design editor which can be customised by its users. It offers a free and a paid version.

Website: https://www.pixelmator.com/pro/

Examples, methods, digital tools and benefits of products or services co-created with customers:

Pixelmator allows customers to customise the programme according to their needs. It can be used for photography, design, illustrations and painting and easily adjusted.
On top of that, Pixelmator has an online community, where customers can discuss the product, as well as "image editing, share tips & tricks, tutorials, and other useful resources, or just chat with other Pixelmator users". Users can also request new features which are then taken into consideration and may be added to the editor.
The company also has a strong social media presence where it interacts with its customers and regularly shares tips on how to use its editor.

Information about the company

Country: Lithuania

Name of enterprise: Manilla

Sector: Trade

Activity: Manilla is a sustainable cosmetic company which sells eco-friendly and sustainable products. The company allows you to create a personalised skincare routine according to each customers' skin type.

Website: www.manilla.lt

Examples, methods, digital tools and benefits of products or services co-created with customers:

The company offers a skin test where customers can find out their specific skin type through a personalised online test. Additionally, they also advertise their products according to different "general" skin types which makes it easier for customers to choose the products that fit their skin type best. The company also offers skin care sets which allow customers to save money.
In addition to their online skin test, the company also offers personal online chats on their website and video call consultations to provide each customer with the best personalised shopping experience and best suitable product.

Information about the company

Country: Germany

Name of enterprise: Soul Bottles

Sector: Manufacturing industry

Activity: Soul Bottles is a company that produces sustainable water bottles.

Website: https://www.soulbottles.de/

Examples, methods, digital tools and benefits of products or services co-created with customers:

The company allows customers to add personalised inscriptions and prints onto their water bottles. The customers can also add personalised product packaging if their order a certain amount of bottles.
The personalised print options allow customers to choose between over 2000 colours, with the possibility of mixing up to three colours (one customised colour from orders of 100+ bottles onwards, up to three colours on orders of 200+ bottles). The inscription service is offered on orders of 25+ bottles.
Additionally to their individual design process, the company engages with its customers through social media. The company regularly hosts design contests and allows customers to pick their favourite design from a range of choices which are then added to the collection. The company also runs a blog on social and sustainability issues and topics and posts about these on their social media platforms, as well.

Information about the company

Country: UK

Name of enterprise: MADE.com

Sector: Manufacturing industry

Activity: MADE.com is a design online design homewares and furniture retailer that sells its products primarily online.

Website: www.made.com

Examples, methods, digital tools and benefits of products or services co-created with customers:

The company relies on customers to showcase its products through its Made Unboxed campaign which allows customers to share photos of a product in their home which then gets uploaded to the company's social media and online presence.
The company also has an online platform called the TalentLAB where customers can put down a deposit on an design idea they are interested in and if the design receives enough funds, the company will produce it and the customer who put down a deposit on the design will receive the finished product once it's being produced.
Additionally, the company has an annual design competition, the Made Emerging Talent Award, where anyone can submit a design idea and upload it to the TalentLAB platform. A panel of experienced designers then shortlists six products which are then voted on by the public, the customers. The design that wins the contest is produced and sold on Made.com within 12 months and the company publicizes the design, giving the designer exposure, a career boost and royalties.

Information about the company

Country: Sweden

Name of enterprise: Teamtailor

Sector: Services

Activity: Teamtailor is a fast-growing platform from Sweden, which develops new add-ins in collaboration with their clients. They have a big variety of customers and helps them with their recruitment process by developing individual features for each company.

Website: https://www.teamtailor.com/en/

Examples, methods, digital tools and benefits of products or services co-created with customers:

The company offers individual meetings with potential customers and "[a] tailor-made demo showing you how Teamtailor can help you grow your business". They work with companies with 1-5 employees up to over 1000 employees in multiple countries. The customers can create their own recruitment website with personally chosen ad-ins and personal support to help them create their perfect product (their recruitment or campaign website) for their needs.

Information about the company

Country: Norway

Name of enterprise: Tine (big company)

Sector: Manufacturing industry

Activity: Norway's largest food producer owned by approx. 17,400 farmers.

Website: https://www.tine.no/

Examples, methods, digital tools and benefits of products or services co-created with customers:

"In an industrial enterprise like this, there are a number of fairly common methods used to obtain information about customers and markets. Surveys and focus groups are often used to get feedback from customers. Perhaps more interesting is the combination of these methods with direct involvement of users, for example:
- focus groups where participants get to taste and evaluate new products, and where they can also be asked to explore new products in use in the kitchen
- taste panels in sensory laboratory for scientific testing of users' response to different product variants
- survey / home testing of new products to learn how consumers use new products, and how the product fits into the consumer's cooking and eating habits
In addition, professional and industrial partners and customers are often involved in several phases of the innovation process:
- Chefs, as an important group of «leading users», from the Department of Gastronomy (now the Culinary Institute) and from various renowned restaurants, as well as experts from Matforsk and the university community at Ås, are often used for advice and participation in product development.
- Industrial partners and customers, from retail chains to industrial producers of ready-made food and other foodstuffs, often participate in the formulation of new needs and in the development of new concepts, products and technical solutions."
"Although they also have a portfolio of standardized off-the-shelf products, TI is increasingly defining its competence to be collaborating with individual customers to solve the challenges they have. This is done both by TI's own specialists in various areas, such as sausage makers, bakers, confectioners and other food subjects, and through active dialogue and collaboration with the customer. User involvement in TI is often about simplifying and rationalizing industrial production for the customer, but also about contributing to the customer's development of new products. The typical pattern of user involvement in TI is based on continuous dialogue with their main customers, where the customer's needs can be expressed and understood. Sometimes this becomes simpler projects that TI solves on its own, while other times it becomes a joint development run through several phases."
"Data collection was done in several rounds. Early in the project, the team conducted a study trip to potential market regions. Italy, Belgium, Korea, Japan, etc. were visited to learn about their food cultures, market and distribution structures, etc. Later, when the technology was better developed, they conducted more conventional market studies, using focus groups and home testing of the product in a number of Norwegian home. Finally, a number of marketing and sales promotions provided important learning in direct interaction with potential customers."

Information about the company

Country: Germany

Name of enterprise: Werte Freunde

Sector: Trade

Activity: Werte Freunde is a small business which sells sustainable cosmetics, fair fashion and living accessories in Hamburg.

Website: www.wertefreunde.de

Examples, methods, digital tools and benefits of products or services co-created with customers:

The company makes an effort to engage with its customers through several means, both online and in person. The company regularly holds events (during non-pandemic times) on a variety of topics that are of interests to its customers.
The store also offers personalised makeup and cosmetics consultations in their store and, due to the pandemic, also online through video calls or photos. This allows them to provide the customers with the best possible shopping experience and product choice. The company also runs an online shop and tries to adjust their collection according to customer demands.
A big part of their business strategy is using social media to interact with their customers. The company is very active on Instagram and regularly does live streams where they present new products and sales and interact with their customers. They also offer services such as customised advent calendars.

Information about the company

Country: USA

Name of enterprise: Dewalt

Sector: Manufacturing industry

Activity: DEWALT is an industrial tool company which manufactures power tools and hand tools for the construction, manufacturing and woodworking industries.

Website: https://www.dewalt.com/en-us/company-info

Examples, methods, digital tools and benefits of products or services co-created with customers:

DEWALT launched the DEWALT Insights Forum, which offers customers the opportunity to provide feedback and to submit ideas for products. The community has over 12,000 members and is made up of its partner Vision Critical, as well as, customers, partners, employees, fans, donors, and alumni.
"Using a Insight community, DEWALT gets rapid and ongoing feedback that allows them to make easier business decisions. More specifically, the insight community allows DEWALT to engage with customers in an ongoing dialogue that respects members individuality and their humanity, and which complements other data sources, like Big Data, CRM, and social media analytics. This together: builds better products as DEWALT better understands how its products fit and function in the lives of their customers, provides better service, and delivers better results."
"While traditional market research can be impersonal, time consuming and expensive, the DEWALT Insights Forum creates relationships with members and saves the company time and money. The company saved more than $1 million in research costs in 2016 and almost $6 million since establishing the Insight community. DEWALT can now use one resource for the entire lifespan of a project and once products have launched they can follow up easily with satisfaction and quality surveys (Dewalt, 2016)."

Information about the company

Country: Finland

Name of enterprise: VR Group

Sector: Services

Activity: "VR Group is a Finnish state-owned company operating in the field of travel, logistics and rolling stock maintenance. The group primarily operates in Finland, but it also has operations abroad, especially in Russia VR's passenger services offer transport services in long-distance and commuter traffic with trains and buses. VR Transpoint offers logistics services in rail and road logistics. VR FleetCare maintains, repairs and manufactures rolling stock and provides expert services related to rolling stock technology. VR Group employs 6,000 professionals, with annual net sales of approximately one billion euros."

Website: https://www.vrgroup.fi/en/vrgroup/

Examples, methods, digital tools and benefits of products or services co-created with customers:

The company made significant changes to the ways it interacts with customers to improve the overall customer experience and to help improve the business operations as a whole. Thus, it redesigned, restructured and modernised "all passenger traffic ticket sales systems and channels for both commuter and long-distance travel". The company made the conscious shift to become more customer-centric and at the same time aimed to modernise its system. Due to the increased modernisation and digitalisation, the company can now continuously collect data on its customers and how they use its services which then helps with improvements and innovations.

"Our strategy is built around customers. We want to meet our customers' needs and wishes – and exceed expectations. Success comes from good team spirit. We believe that investing in good employee experience also produces the best customer experience and end results. We draw on our extensive expertise as we head towards the future. We continuously reform and develop ourselves while listening to customers. At the same time, we make sure that we have a solid foundation, which includes punctuality, delivery reliability and safety. We have faith in digitalisation and new technologies in improving customer experience and efficiency as well as seeking growth through agile innovation. We see new potential for growth in urban traffic, door-to-door trip chains, new additional services, broader logistics solutions and the maintenance of various kinds of rolling stock. We are also looking at opportunities for international growth, especially in the Nordic countries. Through growth, our operations will have a bigger impact. While making sustainable rail traffic and public transport more popular, we are able to reduce the emissions of our customers and society as a whole."

Information about the company

Country: Finland

Name of enterprise: Posti

Sector: Services

Activity: "Finland's national postal service, Posti Group Oyj, is today the leading postal and logistics company in Finland. Their core business includes postal, freight and logistics services. Posti has the widest network coverage in Finland and visits about three million households and companies each weekday. In 2017 Posti had net sales of EUR 1,647 million. The company has operations in 11 countries and employs approximately 20,000 people."

Website: https://futurice.com/case-studies/oma-posti

Examples, methods, digital tools and benefits of products or services co-created with customers:

The company made an effort to make its services and products more customer-friendly and accessible, while at the same time moving its services to the digital level. This way, customers can access Posti's services more easily online instead of having to go to an in-person point of contact.
"The OmaPosti concept is based on a comprehensive user survey that interviewed over 50 users, charted their aspirations, and learned about their real needs. The service is constantly being developed and validated according to the needs of the users so that each new concept and feature will provide the best possible user experience. The number of OmaPosti users increased by 50% during its first six months, and this number continues to increase."

Information about the company

Country: Hungary

Name of enterprise: PkHome Kft

Sector: Construction industry

Activity: Purchase property, refurbish and sell, Home-flipping.

Website: https://pkhome.hu

Examples of products or services co-created with customers:

Every customer relations starts with so-called home-staging, meaning that we prepare the apartments for sale and we refurbish apartments. They should know what is marketable. When I build a house, first I try to gather customer information on the Internet, I check investment and location statistics on the sites of real estate companies. I have extensive relations with real estate dealers, I select the property I want to invest in, check the property sales data in Budapest to know which type of apartments/houses are in search, and in this phase I mostly use the sales data of real estate agents. Since I am a premium category customer, I receive all these information on where and what is worthy to purchase. I do not pay for these data and information. The real estate dealers provide me these data in the hope that I will make my purchase from them. When I sell my apartments, I contact them and use their services for sale. I have dedicated contact persons, from whom I receive business information.

Methods of customer's involvement in innovation processes:

When I receive a concrete order from a client, when I make and/or refurbish an apartment for a customer, I create an electronic drive interface for each of my future apartment owners where I upload the apartment layout, photos, the electricity and furniture I recommend, together with the recommended tiles, doors, windows, lamps, etc. thus the customer can choose from them. All the respective information is on a dedicated drive library specific to the property.

Digital tools used to support customer centric innovation:

On the one hand, I correct and change the structure of my offer on the basis of the information and experiences received and gained from the customers. My customer is not only the person who wants to buy the apartment, but also the store where the tiles, furniture, etc. are sold not to speak about the building contractor. I share the data on the drive also with them. I would not be able to exist without this digital support, background. There is no need to look at catalogues. Everything is on the drive.

Benefits realized as a result of customer innovation:

The number of complaints was reduced to minimum.

Information about the company

Country: Denmark

Name of enterprise: Kvanto Payment CVR

Sector: Bank sector

Activity: Kvanto is a Payment Service Provider (PSP) holding PCI/DSS approval since 2007. Their aim is to optimize the clients' payment solutions using the best gateway technologies and world class acquirers, along with in-depth payment knowledge and professional services. All around the world.
Every payment solution Kvanto offer provides market requested approvals and fraud detection techniques. The gateway is a white-label solution, meaning it has the potential to be embedded into existing customer applications, ensuring the safest and most reliable transactions for the customers business.
Kvanto has high skilled employees with several decades of experience in the payment and financial industries and placed in Hellerup/Copenhagen.

Website: https://www.kvanto.com/

Examples, methods, digital tools and benefits of products or services co-created with customers:

MPOS - (mobile point of sale) – a handless / no-touch system.
MPI - (3DS) – an individual SCA (Strong customer Authorization) make for outside EU.
IVR (interactive Voice Response) – travel industry

Information about the company

Country: Hungary

Name of enterprise: IFresco

Sector: Construction industry

Activity: Special wall and ceiling decoration. Digital wallpaper design activities.

Website: http://www.ifresco.hu/

Examples of products or services co-created with customers:

Our highlighted groups of clients are The Church, museums and exhibitions.
As for cathedrals, we must mention the Saint Sophia's Cathedral in Kyiv, which is a coronation cathedral from the 11th century. Now the interior place is divided into two parts: one of them is for the traditional liturgy, while the other part is a museum where it was planned to organize an exhibition of painters from Nagybánya. They wanted to brighten up the exhibition somehow, so finally, we were asked to design one of the most famous paintings onto the ceiling using IFresco technology. Ceiling scaffold took a week to be constructed. Placing the decoration onto the wall took another day, then, dismantling of the scaffold took another week again. The painting has been there since then. And for the next 20 or 30 years, it will be being there on the ceiling in its original quality.
As for churches, we must mention the church in Ipolynyék, Slovakia. A local painter had been instructed to paint the church, so the interior decorations were made by him. But the dome seemed to be a bit more difficult. So, I modelled it on a gym ball. Here we also carried out a 200m2 ceiling design. Incidentally, this work has brought a new product to be sold in the market soon, yet, I have had no time to introduce it to the market.
We continually face with new demands of the clients. They wish to have this technology used in places where there's a high level of strain or even in their bathroom. This has made us find out new solutions. There are clients who wish to have certain decorations outside, on the walls of their houses. This is a new demand and we try to find a suitable technology to satisfy it. Outside, UV-rays make the decoration less durable. In general, it is hard because most clients involving interior architects as well, and don't know exactly what they really want.

Methods of customer's involvement in innovation processes:

How popular is it among the population? Well, we don't really advertise it to them. We sale our services to luxurious properties in cooperation with interior architects. They find out something unique and if they can't find a solution, but would like to carry it out either way, then they call us. For example, somebody wished to see the map of Greater Hungary on their wall. There are interior architects who search for pictures on Pinterest and accordingly, we have to carry out the design. Generally, Pinterest pictures are small enough so we need a graphic artist who designs the pictures digitally, afterwards, we carry out other operations.
At the moment we are working at the National Gallery. There is a company for vehicle rescue services which is planning to have an office in a container. I will decorate it. The price will be set to be available for an average household. We have got a catalogue and clients can choose from that. My goal is to make this product available for the average thus for the population, as well.

Digital tools used to support customer centric innovation:

We haven't changed our website for 5 years. We have had no time for that. But now, thanks to our new products, we will have to make some changes. I am planning my new idea to be sold with minimal profit, but in significant quantities, which may also be ordered in a web shop on the Internet. On the website, I'm planning to have an own stock of photos, furthermore, another part of the website would be available for artists who make digital pictures which I print. This part of the website would be operated by these artists.

Benefits realized as a result of customer innovation:

We have gained wide professional recognition nationally and internationally. We are constantly faced with professional challenges. For example, with the help of a new innovation, we can create contours of a photo or picture, which, after sticking it to the wall, may be painted by any other person manually. Modern technology meets handcrafts, where clients will be able to paint their pictures chosen, thus, they can take pleasure in creating.

Information about the company

Country: Hungary

Name of enterprise: Földvári Nagy Sándor, self-employed

Sector: Bank sector

Activity: Special professional activties, instalation of gas, water pipelines and heating and airration devices

Website:

Examples of products or services co-created with customers:

Based on the orders from the customers, my company is confronted and familiarised with the new technologies. These have to be improved, programmed and installed. In general, in the area of services, we contact the customers on the phone, via email, but above all in person. Based on the orders we can receive information, again electronically, about the products, spare parts, and the necessary new tools. Customers represent one of the most important driving forces for me, to be able to keep pace with modernisation. Otherwise I would not be able to keep my market position.

Methods of customer's involvement in innovation processes:

In order to facilitate for the company to keep pace with technological development, I regularly take part at the presentations, training courses held by the distributors and also at the programmes and professional fairs organised by professional organisations. During the last period it became common that these training courses and professional programmes are organised online. Based on what I hear there, I can also inform my customers, if necessary digitally, about the new means and tools and methods used. Nowadays, without the use of the Internet it is impossible to have an insight about the market in the area of available spare parts and programming technologies. Based on the orders received from the customers I am forced to learn the programming of digital tools.

Digital tools used to support customer centric innovation:

One of the biggest sources of customer-centric innovations is to perform high-quality work and the customers can spread the good news about me and recommend my services to others. For the purpose to be customer-centric, I try to be at the disposal of my customer as much as possible on Facebook. Without the use of digital tools, I would not be able to react to the customers' requirements fast enough.
It should be noted, that since I am small self-employed, and I have a lot to do in my area of service, I have very little free time to deal with digital innovations.

Benefits realized as a result of customer innovation:

Thanks to digitalisation, my company can use the time available for work much better, can provide the services for more customers simultaneously, thus has more income and thus invest more into development.

Information about the company

Country: Latvia

Name of enterprise: Crassula

Sector: Bank sector

Activity: Crassula is a Latvian start-up. It is an API platform that allows to build customized payment solutions. It is a White Label Cloud Banking software that helps companies to build and launch Banking projects, PSPs, NEO-banks, Wallets, FX services and other FinTech products in a cloud in days, not months.

Website: https://crassula.io/

Examples, methods, digital tools and benefits of products or services co-created with customers:

The company offers personalised online banking solutions to businesses. The customers can choose from a variety of options to design their personalised banking software. Customers will get a completely personalised and unique product within 5 days which allows them to run their business without major interruptions.
The company constantly collects data and feedback from its customers who already use its products and services: „Crassula is constantly developing, growing and improving. We rely on the features and integrations that are desired and requested by our clients and their users - this helps Crassula to move and be a live ecosystem in an always-changing environment."

Information about the company

Country: Denmark

Name of enterprise: Bleshøy Optik

Sector: Trade

Activity: Bleshøy Optik* is a small modern retailshop placed in Sønderborg/Denmark with 6 employees and a close partnership with an eye-doctor/specialist. The retailshop is 4th generation (Jes Bleshøy) and all the employees are all very close to the organisation. The 5th generation is doing his education with specialist as an optican – a 3,5 years program in Denmark.
The products are glasses, (star) binoculars, control/eyes check, contact lenses and can offer services from an eyes-doctor. It is special that Bleshøy Optik has some of the most modern equipment in Denmark for checking the eyes – actualy better equipments than the hospitals.

Website: www.bleshoy.dk

Examples of products or services co-created with customers:

The services that Bleshøy offers are all „push"-products – so there are no coorperation with customers.

Methods of customer's involvement in innovation processes:

We, as a retalishop, do not have any innovative processes with our customers, but together with our suppliers we normally have a close relationsship. We do not call it innovation – more product and service development.

Digital tools used to support customer centric innovation:

We do not use digital tools, either to the customers side or suppleiers side. (upstreame/downstreame)

Benefits realized as a result of customer innovation:

We have no realized results to the customer-side. But we would like to.

Information about the company

Country: Hungary

Name of enterprise: W.UP

Sector: Informatics, software development

Activity: A digital banking software company that delivers modern products and services to financial institutions. Their products help bridge the gap between banking software and customer expectations.

Website: https://wup.digital/

Examples of products or services co-created with customers:

During product and service developments, W.UP focuses on understanding the needs of its customers and end users, thus help to find the right solutions for the actual customer needs in each case. A few examples without claiming completeness:
- Fundamenta eBanking Frontend: Public customer self-care solution, within the framework of which the customer can access their savings, view and modify them, report data changes, upload and download documents, and conclude a new product contract.
- MKB Mobil- and Internet bank: A complete e-channel solution that serves customers as an omnichannel. In addition to classic banking functionalities, it also includes customer-specific solutions.
- Erste Bank Mobile and Internet bank: Mobile and internet banking application with classic banking functionalities and customer-specific solutions.
- Budapest Bank Mobile Application: Modern mobile banking interface for fast and efficient management of daily finances.

Methods of customer's involvement in innovation processes:

We use several methods to involve customers, depending on the expectations of our customers. Most often, we use UX research methods, which are performed either by our company or by the customer, otherwise by a third party. During the developments, in addition to the research, we also got our own and our acquaintances' experiences, on the basis of known user market knowledge, and on opinions available on freely available social media interfaces
Also a few examples without claiming completeness:
- UX Research: Knowledge of the operation of the market, users and competitors, collection of information and adaptation of this information in the design phase.
Examples of solutions used include user interviews based on online research, ethnographic research and market research methodologies, the main purpose of which is to understand the real needs and difficulties of end users during design, to understand their thinking and to be able to design a solution to them.
- Service Design: Optimizing the usefulness of the service for the user by involving the customer. This optimization feeds on UX research, user reviews, and marketing research to deliver the most optimal solution for the customer. Solutions used include service scope and customer journey map.
- User Experience Design: Maximize the usability of the service for the user, with the goal of achieving a perfect user experience that is mapped based on UX research. In each case, the completed sub-plans are tested with different user groups, the results of which are continuously traced back during the development process. Examples of solutions used are information architecture, user personas and usability testing.

- User Interface Design: User Interface (UI) Design - Facilitate the user-friendliness of the service by using the appropriate design elements based on the above research and current trends. Solutions used include emotion design and design guideline.
In addition, it is important to highlight the use of ideas within your own team as customer needs. We are all users of such applications in our private lives, so ideas within a team are customer-side innovations, with the difference that perhaps our ideas and opinions are not typical customer opinions, as we look at these products with a slightly different eye due to our work. .

Digital tools used to support customer centric innovation:

Nowadays, there are plenty of suitable tools available during development to learn about end-user needs, of which perhaps the following 3 applications are what we come across often in our projects:
- Zeplin: Zeplin is a designer tool that facilitates group work within the company between the designer and the development team, as well as common processes and communication with the customer (viewing visuals, commenting). The finished design plans can be placed in the Zeplin, which is easy to comment on, so even selected end-user groups can be easily involved in the design process.
- Figma: Figma is also a designer tool whose best function is to allow live, real-time collaboration with a selected group of customer representatives and even end users, thus speeding up and facilitating the implementation of appropriate user needs and opinions during development.
- Invision: Invision is the perfect tool for putting together validated design elements to build a workable MVP (Minimum Valuable Product) that allows you to initiate approval processes and test finished user interface designs for either the customer or end users without starting application development. would be.

Benefits realized as a result of customer innovation:

In general, in all projects, our customers welcome our ideas and methodologies for product development, as they are also aware that the broader the scope of a given problem using the right methodologies, the better the solution.
The advantage of W.UP also lies in the diversified experience and knowledge that our colleagues have gained over the years in the field of banking IT and customer service. Much of this knowledge is gained by actual customer feedback as well as our comprehensive market knowledge, which complements the results of the above methodologies and research.
A few examples without claiming completeness:
- One of our large clients worked with an external UX company on the projects, but as the workshops saw that our team understands the problems of the users better than the team they employ, they terminated the contract and we continued to do so. This change meant approximately a 5-10% increase in revenue over projects depending on the exact scope of the project.
- For our other important customer, UX was not considered in an implementation project. We stressed the importance of this throughout the project and dripped them down from our expertise in this direction. For the customer, these ideas proved to be so good that UX elements were already ordered in the following projects in all cases, which also meant a 5-10% increase in revenue, depending on the exact scope of the projects.

Information about the company

Country: Hungary

Name of enterprise: FlexInform Kft.

Sector: Informatics, Software development

Activity: Informatics, software development

Website: https://www.flexinform.hu/

Examples of products or services co-created with customers:

The company is engaged in software development. Nowadays, optimizing processes and thus increasing cost efficiency is important for every company. For a significant part of the companies, traditional automation has already been solved with enterprise management systems and software-supported solutions. During software development work at several companies, the need arose that in the case of repetitive work processes with many cases, an innovative method covering several areas and a higher level of automation would be required. Based on customers' experiences, there is a need for our company to develop a completely new search and process robot based on innovative technology, which can:

- the use and management of standard and highly repetitive, structured electronic data,
- to implement workflows,
- launch applications,
- to create structured data sets.

With the new technology, "robots" use predefined rules to perform actual user activities in business processes more efficiently and with fewer errors than if they were performed by a single person. "Robots" use human interfaces and applications like humans, but all these 24 hours a day without making mistakes singing.
The companies approached us for the purpose of process development and based on the experience gained together during this time, we recognized this market need, an innovative idea. Demand process solutions from different fields could be standardized and synthesized into one software and we can sell this to other companies in the market.
Steps of the customer-driven innovation process:

1. Situation analysis of previous clients, identification of processes
2. Defining automated processes
3. Define user requirements
4. Based on the user requirement, the requirement of the new IT system is created
5. Software development
6. Sales of software supporting standardized processes
7. Software adaptation for the new customer

Methods of customer's involvement in innovation processes:

Brainstorming, in-depth Interview, customer satisfaction questionnaire, testing the software with the help of customers, test group, simulation, gaining application experience, living labs.

Digital tools used to support customer centric innovation:

Chatbot
Content marketing strategy (e.g., forums, blogs), Email, newsletter, Google form, Interactive corporate website, Mobile and banner ad, Online advertising tools (e.g., Google Ads, Facebook/Instagram ads), Support group, WEB 2.0 tools (e.g., Wikis, community tagging, crowdsourcing)

Benefits realized as a result of customer innovation:

Revenue growth, market expansion, entering new markets, new customers. At our partners: administrative costs have been significantly reduced, efficient processes, utilization of the workforce's knowledge in other areas, faster turnaround times, fewer errors, more efficient use of working time.

Information about the company

Country: Hungary

Name of enterprise: Bionika Medline Ltd.

Sector: Manufacturing industry

Activity: Manufacturing of medical devices

Website: https://www.bionika.hu/

Examples of products or services co-created with customers:

We conduct a direct clinical trial involving partners who use the product and services. These data are collected under the supervision of an external CRO (Clinical Research Organization). The CRO plans of what factors (complications, implant loss) we will take into consideration during the research. Then a bio-statist will determine how many people need to be involved in the process. The research leader collects the data and writes the research report. If there are any problems, we will incorporate the solution into the improvements. Doctors are approaching the company with the intention of development, they have an idea and would like us to implement these, which will happen based on the following process.

1. Defining user requirements
2. the system requirement is created based on the user requirement (technical-engineering data)
3. product design
4. prototype production + verification
5. series production + verification
6. validation before the product goes on the market.

Methods of customer's involvement in innovation processes:

Focus group, in-depth Interview, brainstorming, customer satisfaction questionnaire, product lifecycle monitoring, simulation, collaboration with external laboratories to perform tests, recording a complaint, recording unexpected events, gaining application experience, equivalence test

Digital tools used to support customer centric innovation:

Email, newsletter
Google forms, Social media platforms, CRO-powered software applications for collecting feedback, They are part of CRM and the corporate governance system, project management tools, digital manufacturing, KMS, AI

Benefits realized as a result of customer innovation:

Administrative costs have been significantly reduced, labour savings were realized, faster process turnaround time, there are no administrative errors

Information about the company

Country: Hungary

Name of enterprise: Solymosi József, self-employed

Sector: Construction industry

Activity: Producing furniture and design planning

Website:

Examples of products or services co-created with customers:

The company is engaged in the production of high quality and tailor-made furniture. The scope of activities includes software design. The customer has the opportunity to design furniture and elements to be installed in furniture according to their own needs, with the help of it, we can fulfil the widest range of consumer needs. After the individual request is made, the furniture is pre-designed with the software, then we negotiate with the customer and we plan/make the furniture based on it. After individual needs and ideas, we try to standardize ideas that can be used in practice and incorporate them into our future services.

Methods of customer's involvement in innovation processes:

- Personal interviews
- Conversations with loyal customers
- Social media
- Email
- Webdesign softwares and simulation
- Customer satisfaction online questionnaire
- Product lifecycle monitoring

Digital tools used to support customer centric innovation:

- Content marketing strategy (e.g., forums, blogs)
- Email, newsletter
- Google form
- Online advertising tools (e.g., Google Ads, Facebook/Instagram ads)

Benefits realized as a result of customer innovation:

Revenue growth, market expansion, entering new markets, new customers

Information about the company

Country: Hungary

Name of enterprise: Berendi Hair @ Academy

Sector: Services

Activity: Operation of hairdresser saloon

Website:

Examples of products or services co-created with customers:

We have a digital guest book and write into it the date and the type of hairstyle we made to the customer. We have been keeping this digital guest book for years now, thus we know about each of our customer when we dyed her/his hair, what type and colour of dye we used and what was the hairstyle. This way we become familiar with the customs of our clients, the materials used in his/her case. It is also beneficial for us because this way I can avoid buying paints and materials that nobody wants

Methods of customer's involvement in innovation processes:

Social media, Tik-Tok, Facebook, this is what the youngest generation does. For me the best publicity is my customer, because one guest brings the other. Quality is what matters! If I do not work well, the clients will not return and will not recommend me to the others. The money other saloons spend on publicity we spend on training ourselves and our staff. What do average people think if somebody uses too much PR? They think that a lot of PR is needed because the person or business does not work well and thus they need advertisements. Instead of spending money on PR we spend money on training. We take part at training courses. The distributor companies deliver training courses on haircut, hair dying and new techniques. If I use their products, the training courses are free.

Digital tools used to support customer centric innovation:

Knowledge and information is distributed electronically, online. We receive emails about the locations and topics of the training courses. Hairdressers are familiar with the companies, go on their websites and check the dates of trainings. Another option is when the company uses its list of hairdressers and send invitations to them to the training courses. Hairdressers also talk to each other about what should be developed. We take part at domestic and international competitions, and we also organise competitions. There are many online training courses as well, but these are not efficient enough. In our profession it is necessary to ask what and how should be done. Face-to-face trainings are better than the online ones. We advertise ourselves in professional magazines that make films as well, for example, small films on weddings and how to appear at weddings. We make these films in cooperation with other professionals, like make-up experts, designers, shoe-makers, musicians, and jewellery makers. Thanks to these films, we shall work in the countryside also during the week-end, we shall make the bride's hair.

Benefits realized as a result of customer innovation:

Do the customers, guest brings new ideas to us? Yes, if the requirements grow, more and more people are in search of a new type of service. For example, straightening the hair, and my colleagues learnt it. And I purchased the necessary tools. I will have more customers, I will earn more money. And the chances will be higher that my good employees will not leave me.

Information about the company

Country: Poland

Name of enterprise: OMEGA

Sector: Production

Activity: Footwear production

Website:

Examples of products or services co-created with customers:

We are a small footwear trader for specific consumer groups. Our products are aimed mainly at people with foot health problems as well as for the elderly, who often suffer from degeneration and deformity of the feet. Thus, it is difficult for them to buy shoes in ordinary stores. We are very committed to engaging consumers in the development of our products, because thanks to this we become more competitive and customers are more likely to come back to us. The products co-created with customers are: footwear for children with flat feet problems and footwear for the elderly with bunions.

Methods of customer's involvement in innovation processes:

As part of our website, we provide a product comparison website, health tips, inspirations, applications to measure the size of the shoe. On our website, users also have the option of submitting complaints, opinions, proposals, and we follow the process of order fulfillment by customers. We also operate in social media: Facebook, YouTube, Instagram, where we conduct surveys, show videos with our products, encourage consumers to take specific activities, e.g. submit ideas, answer questions, participate in discussions, competitions. Here we also often express appreciation and thanks for customer activity. We also have a blog where opinions are exchanged and ideas are obtained from customers, we provide various links, recommendations, tips and interesting information.

Digital tools used to support customer centric innovation:

To cooperate with consumers in the field of innovation, we primarily use: Website, Facebook, You Tube, Instagram, Blog, E-mail communication.

Benefits realized as a result of customer innovation:

Thanks to the commitment of our customers, we become more competitive, our products are better, the opinions of our customers help other people with foot problems and difficulties in choosing shoes. The blog is the most valuable for us, as it is our most active place for exchanging and obtaining information.

Information about the company

Country: Poland

Name of enterprise: AJ PROJEKT MEBLE

Sector: Production

Activity: Interior design and furniture production

Website:

Examples of products or services co-created with customers:

We can say that in our business each product is an innovation because it is made to order of a specific customer. The ordering process always starts with a customer visit. We have both individual and business clients. In both cases, the arrangement is individual because each room is different. As part of the business, where the client participates in the creation of products / services, there are the following services: interior arrangement of a house or apartment, production of custom-made furniture for offices, design and manufacture of kitchen furniture, advice on the selection of interior colors, furniture renovation, consultancy in the field of selection of fabrics (curtains, window blinds).

Methods of customer's involvement in innovation processes:

Our clients are involved from the very beginning of the sales process. During the first visit to the client, we carefully describe the rooms and then go to the interview with the client to learn about his preferences, expectations and habits. Then we try to involve our customers mainly in the innovation process by providing product personalization at the sales stage, the so-called "sale configuration". Thanks to this tool, consumers can compose a product according to their needs from ready-made modules. It is mainly the stage when the client has already received the first proposal for the arrangement of the room and knows what components can be used to furnish the interior. A similar activity is the introduction of product personalization at selected stages of the production process, which we call the product creator. In this case, the customer can design some elements of the product himself, eg the color of the walls, selected accessories.

Digital tools used to support customer centric innovation:

- Website
- Configurator / Product specifier
- Product wizard
- E-mail communication
- Project development software
- Platform with photos and customer reviews
- Fanpage on FB

We are currently working on a solution for the use of VR and AR to increase the reality and the client's imagination of space.

Benefits realized as a result of customer innovation:

Thanks to the involvement of customers at every stage of the design process, we are sure that the final product will be best suited to the customer's expectations and will meet his expectations to the greatest extent. It can be said that we create a joint product from beginning to end. Often, customers have their own specific preferences, small elements that make the interior the "dream" for them. For us, it is also a great advantage that by involving our clients in creating new innovative solutions, we are constantly up-to-date with changes in market trends.

Information about the company

Country: Poland

Name of enterprise: EXYTE

Sector: Construction

Activity: Global engineering and project company offering include full integrated services for technology facilities including Photovoltaic, Semiconductor, Life Science, Data Centre, Medical Devices, research and production space throughout the world.

Website:

Examples of products or services co-created with customers:

An innovative modular system for the construction of facilities for the pharmaceutical and biotechnological industries, based on the experience of large investment projects of global pharmaceutical companies.
The system shortens the project schedule, ensures higher quality of installation through standardization and prefabrication in the production plant. Prefabricated modules are assembled like Lego blocks, creating a uniform production building after final assembly.

Methods of customer's involvement in innovation processes:

The client actively participates in the design of the production facility, technology / process installations at every stage of the project, from the conceptual design to the basic design, ending with the detailed design. At each stage, the client participates in meetings with all industry designers, starting with arrangements with the process department. After determining the details of technology, room layout, technological line, the media and architecture are adjusted. The construction process itself is shortened thanks to the production of modules and their quick delivery and assembly.

Digital tools used to support customer centric innovation:

For designing, programs such as AutoCad, Revit and others are used. File sharing: In order to ensure easy access to documents, the DCS system and the "Exyte LINK" platform are used.

Benefits realized as a result of customer innovation:

By using modular technology, the client shortens the investment process, thanks to which he can introduce an innovative drug to the market faster, which gives him an advantage over the competition.

Information about your company

Country: Poland

Name of enterprise: Accounting Office Monika Pietrzak

Sector: Accounting

Activity: Comprehensive accounting and payroll services for companies

Examples of products or services co-created with customers:

Keeping records of income, settlements with Tax Authorities, Social Insurance Institution, Customs Office, assistance to clients in preparing business plans and financial analyses.

Methods of customer's involvement in innovation processes:

Consumer-innovators are people who are interested in new technologies, like comfort, high level of service which is a frequent reason for seeking new solutions. They agree on details, get involved, get to know the service offer in detail.

Digital tools used to support customer centric innovation:

Telephone calls, online calls, e-mail

Benefits realized as a result of customer innovation:

Customers become attached to the company and on the basis of On the basis of positive experiences, they guarantee constant demand and thus high profitability of the company

Information about your company

Country: Poland

Name of enterprise: ELEKTA -Tadeusz Kobus Services Trade Import Export

Sector: Crafts

Activity:ELECTRICAL INSTALLATION SERVICES

Examples of products or services co-created with customers:

Our company provides electrical services, installation, assembly, repair and maintenance of electrical installations. We comprehensively perform electrical installations of traditional and intelligent in newly constructed buildings and we modernize and replace electrical installations in renovated facilities. We offer our services to individual customers, as well as companies and institutions.

Our activities are tailored to individual customer needs, so that they meet his expectations. We assist in the selection of electrical equipment, in our installations we offer only proven solutions using products of recognized domestic and foreign companies. We focus on efficiency and reliability, conscientiously and professionally perform every order.

Methods of customer's involvement in innovation processes:

Consumer-innovators are people who are interested in new technologies, like comfort, high level of service which is a frequent reason for seeking new solutions. They agree on details, get involved, get to know the service offer in detail.

Digital tools used to support customer centric innovation:

Telephone calls, online calls, e-mail

Benefits realized as a result of customer innovation:

Customers become attached to the company and on the basis of On the basis of positive experiences, they guarantee constant demand and thus high profitability of the company

Information about your company

Country: Poland

Name of enterprise: Office of Legal Advisers Robert Pożarski

Sector: legal services, training

Activity: Representation of clients in court proceedings, consultancy, opinions, training

Examples of products or services co-created with customers:

Professional training courses created according to customer demand, focusing specifically on health and safety in the company. Training delivered online using digital tools.

Methods of customer's involvement in innovation processes:

Consumer-innovators are people who are interested in new technologies, like comfort, high level of service which is a frequent reason for seeking new solutions. They agree on details, get involved, get to know the service offer in detail.

Digital tools used to support customer centric innovation:

Telephone calls, online calls, e-mail, multimedia presentations, online conferences

Benefits realized as a result of customer innovation:

Customers become attached to the company and on the basis of On the basis of positive experiences, they guarantee constant demand and thus high profitability of the company

Information about your company

Country: Poland
Name of enterprise: ZPHU DARMEX Dariusz Wójtowicz
Sector: tailoring
Activity: services only for men – custom-made sewing of suits, trousers, shirts, ties and alterations.
…

Examples of products or services co-created with customers:

Custom-made suits or any other parts of men wardrobe based on customers' projects.

Methods of customer's involvement in innovation processes:

My customers try to know all fashion news, they have ever greater knowledge about fabrics (for example they try to choose natural fabrics, I can even say vegan fabrics).

Digital tools used to support customer centric innovation:

Online sales.

Benefits realized as a result of customer innovation:

More customers and more money for me.

Information about your company

Country: Poland
Name of enterprise: Stolmar Zbigniew Marchwiak
Sector: carpentry
Activity: services, production/installation/slae of furniture
…

Examples of products or services co-created with customers:

Products: bookcases, tables, wardrobes, kitchen cabinets, cupboards etc.

Methods of customer's involvement in innovation processes:

They search for projects and inspirations in the Internet and they want to know more about materials or technology. Customers increasingly try to be much more aware of production process or materials, for example they prefer furniture made of natural materials.

Digital tools used to support customer centric innovation:

The ability to use the Internet and awereness of specialistic web portals.

Benefits realized as a result of customer innovation:

More customers due to a buzz marketing.

Information about your company

Country: Poland
Name of enterprise: Kono Media Sp. z o.o.
Sector: editorial sector
Activity: publishing of books, the press, services of range of PR
…

Examples of products or services co-created with customers:

LAJF – the Lublin lifestyle magazine

Methods of customer's involvement in innovation processes:

They want to have their own commercial in the Internet and they want to acitvely participate in the process of project their image on my magazine.

Digital tools used to support customer centric innovation:

The ability to manage my team online.

Benefits realized as a result of customer innovation:

More readers and more people who know my brand.

Part B
Results of an Empirical Research

Customer-centric Innovation in SMEs

Results of an Empirical Research

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Introduction

This report is prepared within the framework of the EU Program *Erasmus + Key Action 2: Cooperation for innovation and the exchange of Good Practices* funded project **"Digital methods, toolbox and trainings for increasing customer innovation in SMEs"**. (ICIinSMEs, Project NO 2020-1-DE02-KA202-007397).

The aim of the project is to strengthen the innovation capacity of SMEs in Eastern Europe. Thereby, the central problem of resource scarcity in SMEs is explicitly addressed, which causes difficulties in the integration of a customer-centric innovation approach within SMEs. To address this problem, this report provides an insight into aspects of the use of digital methods for the identification, processing, and implementation of customer-centric innovations in SMEs. In addition, selected best practices of customer-centric innovation activities are elaborated.

The aim of this research was to study how SMEs create and implement customer-based innovations, which digital technologies they use to support them, what kind of benefits and barriers the company realizes while involving customers in innovation processes. Best practices were also collected, while real-life experiences of SMEs are very valuable for developing specific training and education measures for SMEs.

This is what we understand as "customer-centric innovation":

In the customer-centric innovation approach innovation is done with customers – companies and customers create innovation together. "In customer-centric innovation the customer takes an active role in innovation processes and becomes the primary source of ideas to initiate innovation activities. By integrating the customer-centric innovation philosophy, companies open their research and development activities, meaning that the innovation process happens with input from inside and outside of the company. Customers are involved in all stages of the innovation process." (Desouza et al. 2008; Steinhoff & Breuer, 2009; Zajkowska, 2017)

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Research Methodology

The research aim was to analyse how SMEs implement customer-based innovations and which digital technologies they use. Regarding the research method, a questionnaire survey was conducted to achieve the research goals and answer to the research questions. A literature review regarding customer-centric innovation, and the available ICT and digital solutions for companies served as a professional basis for the questionnaire.

The questionnaire contains the following main topics:

- Company data,
- Level of consumer involvement in innovation processes,
- Which stages of product innovation are consumers involved in,
- How the consumers are involved,
- What digital tools, ICT are used in consumer-centric innovation,
- What digital devices are normally used during business operation,
- What benefits have companies realized from using customer-centric innovations supported by digital tools,
- What are the obstacles and difficulties of using digital devices in the company.

The marketing research was conducted online (used Survey Monkey). The interview took place between 7 April and 8 June 2021. During this period, the questionnaire was started by 101 respondents, but only 95 was evaluable answer from 11 different countries. The most responses originated from Germany, Hungary, Poland, and Denmark. The target group was clearly micro, small, and medium-sized enterprises, but large companies also appeared among the respondents. (Their responses were not excluded during the analysis but were considered as a control group.) As the data collected during the fieldwork cannot be considered representative, the findings obtained during the data analysis cannot be generalized, i.e., the results are valid only for the sample.

Data analysis was performed with IBM SPSS Statistics 26 software package, in which mainly univariate analysis were performed (descriptive statistics, frequency tables, means, standard deviations), but some bivariate analysis were also conducted in the form of cross-tabulation averages and correlation analysis.

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Results of the Empirical Research - Customer-centric Innovation in SMEs

Information about Companies

Country

The survey received 95 evaluable responses. The largest proportion of respondents are from Germany (28.4%). 82% of the respondents have jurisdiction in Germany, Hungary, Poland, or Denmark. Other countries participating in the research are Lithuania, Belarus, Estonia, Finland, Bulgaria, Latvia, and Russia. The number of respondents is two-two for Belarus, Estonia, and Finland, and one-one for Bulgaria, Latvia, and Russia. Based on the proportions of respondents leaving the participating countries and the number of respondents, the research cannot be considered representative. (Figure 1.)

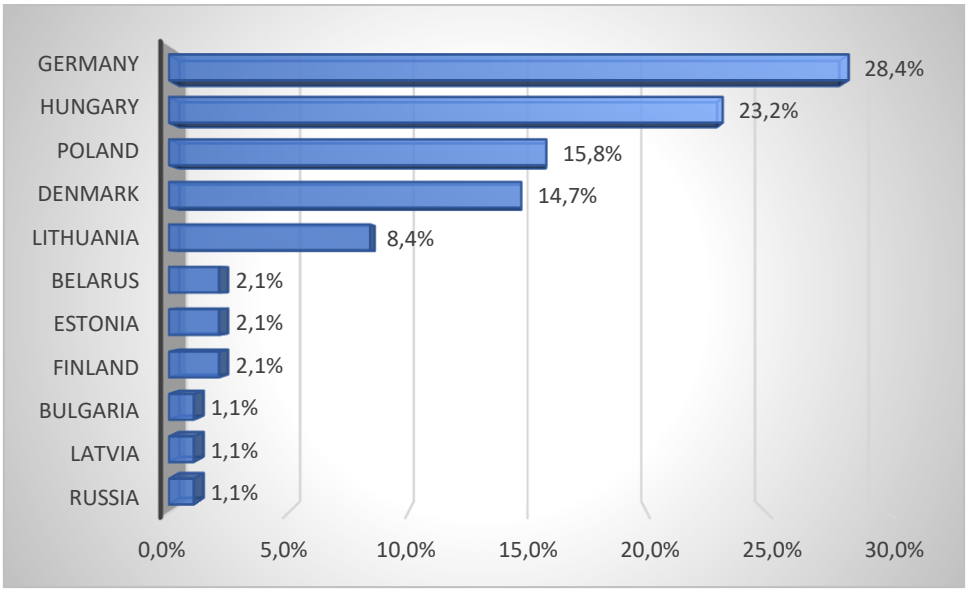

Figure 1 Seat of the responding organizations

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Sector

Most of the respondents can be related to education and training (13.7%). Half of respondents work in the following sectors: education; construction; manufacturing; agriculture, forestry, and fishing; wholesale and retail trade, repair of motor vehicles and motorcycles. Two-two respondents from the areas of accommodation and food service activities, financial and insurance activities, and human health and social work activities were included in the sample; one-one respondents from the areas of public administration and defense (compulsory social security), transport and storage, water supply; sewerage; waste management and remediation activities were sampled. Of the 95 respondents, nineteen identified an economic sector other than the sectors surveyed as to their area of activity. They had to specify the sector in the text. Other such areas are audit, animal welfare, other services, information technology, translation and interpretation, car dismantling. Some of the respondents indicating the other category answered incorrectly because the list registered included the sector they should have chosen. Examples are manufacturing, wholesale, info-communication (Figure 2.).

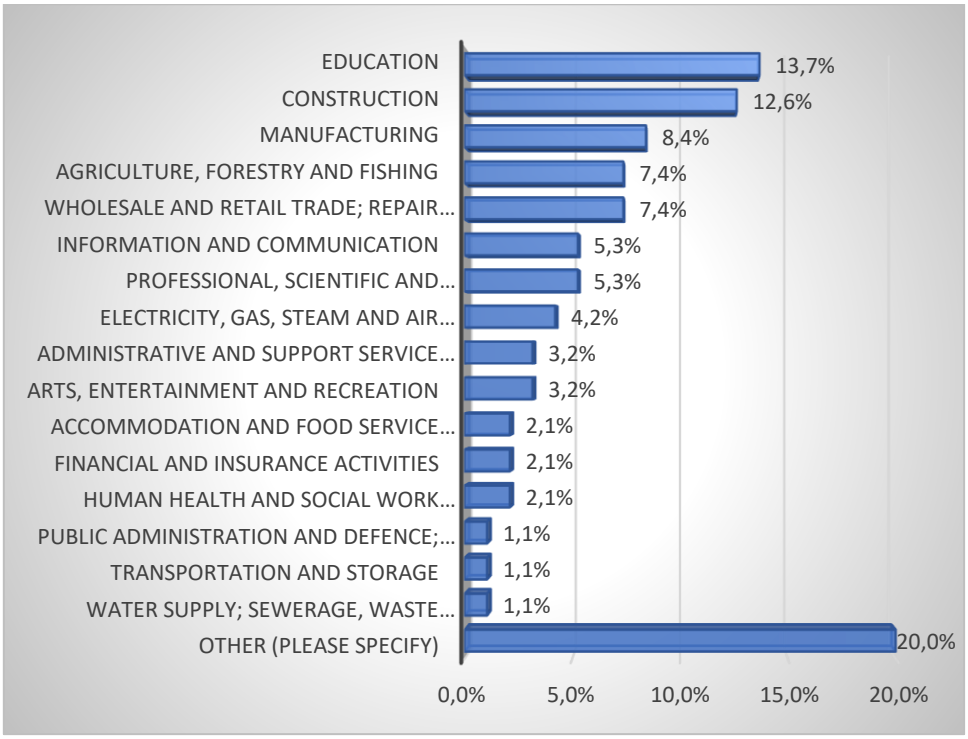

Figure 2 Main profile of responding organizations

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In the countries that accounted for 82% of respondents, the following sectors were identified most frequently (excluding the other category). Three-three of the German respondents work in the fields of info communications, trade and vehicle repair, and construction. Two-two respondents in the fields of agriculture, manufacturing, and hospitality. Of the Hungarian respondents, five indicated the construction industry, two-two the trade and vehicle repair, and the scientific and technical activities. Of the Polish respondents, five indicated education and training, 2.2 administration and construction. Of the Danish respondents, three indicated education and training and two agriculture. Out of a total of 19 respondents in other sectors, eighteen were sampled from the above four countries.

Based on the sample distribution of economic sectors, the survey cannot be considered representative.

Number of employees

The number of employees was surveyed as a characteristic of the company size (Figure 3). Of the respondents, fifty-seven (60%) indicated less than ten employees. 12.6% of the respondents have more than two hundred and fifty employees. Based on the number of employees, the survey cannot be considered representative because the proportions in the sample do not match the proportions in the total population.

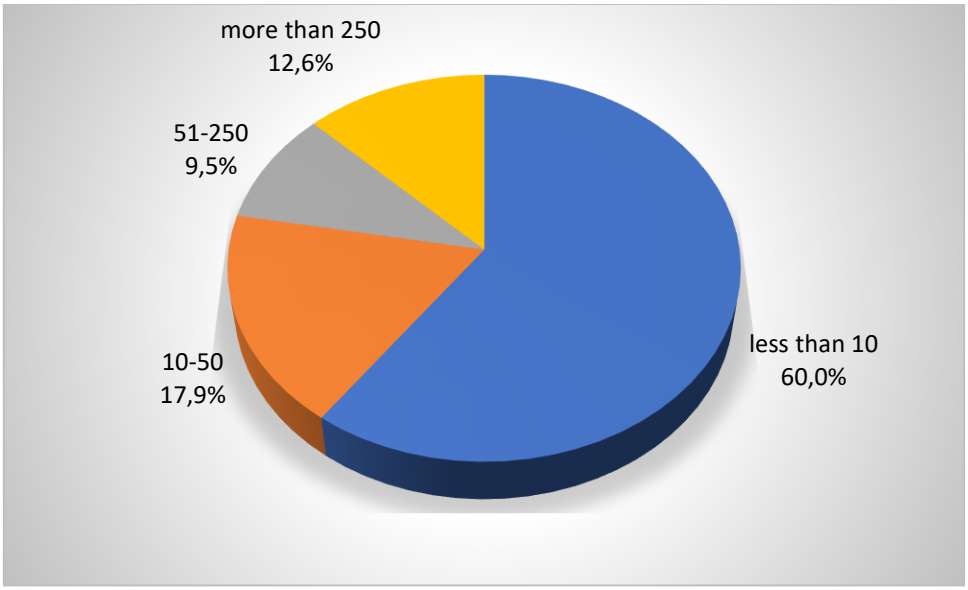

Figure 3 number of employees in responding organizations

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Age of company

82% of the companies/organizations surveyed have been established for more than five years (Figure 4). We examined the relationship between company size and operating time. Fourteen of the companies/organizations with less than ten employees (fifty-seven) have been operating for less than five years. In the case of organizations belonging to the categories of ten and fifty, fifty-one and two hundred and fifty, and more than two hundred and fifty, one respondent indicated that the company/organization had been established less than five years ago.

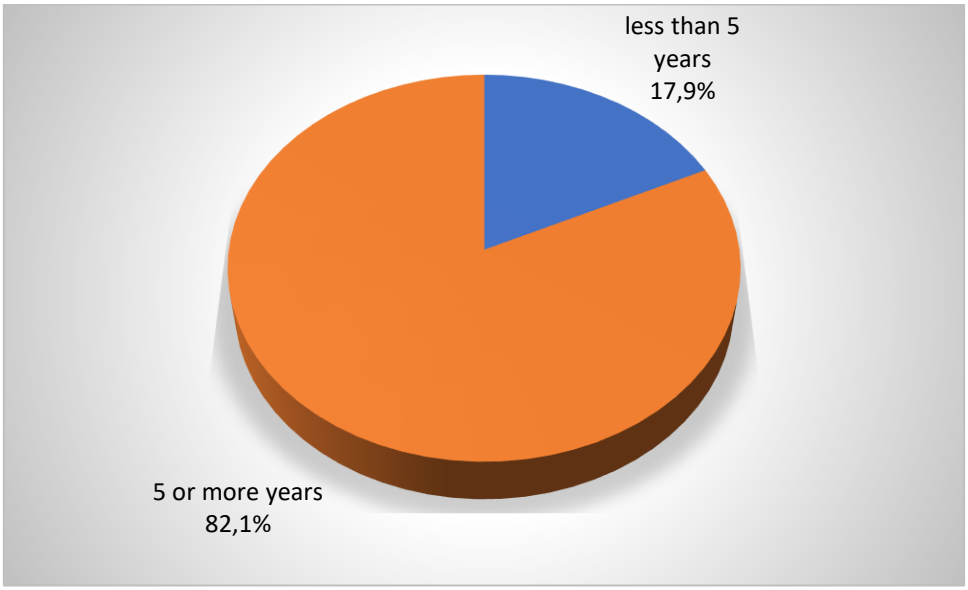

Figure 4 Age of responding organizations

The main customers of the company

Several of the answers (B2C, B2B, B2G) to the question could be marked at the same time. Ten respondents did not indicate either option. Of the remaining eighty-five respondents, twenty-eight indicated two options and eight respondents indicated all three.

In fifty-seven cases (67%) of the responses, the customers are mostly individuals, in fifty-six cases (66%) other companies, organizations, and in fifteen cases (17.6%) governmental or public institutions.

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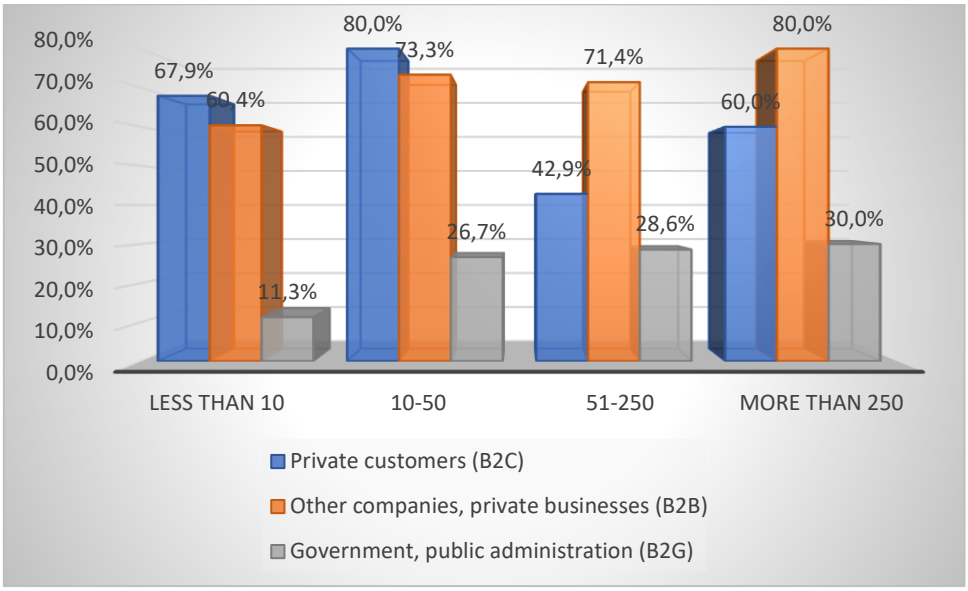

Figure 5 Main customers of companies according to size

We examined the relationship between the customer and the company size (number of employees) (Figure 5). Of the fifty-three organizations with less than ten employees, thirty-six are individuals, thirty-two are companies, and six are government and public institutions. Of the fifteen organizations that employ between ten and fifty people, twelve are private individuals, eleven are companies, and four are government or public institutions. Of the seven organizations employing between fifty-one and two hundred and fifty people, three are individuals, five are companies, and two are government or public institutions. Of the ten organizations with more than two hundred and fifty employees, six are individuals, eight are companies, and three are government or public institutions. It can be stated that in the case of the number of employees with less than fifty-one persons, the customers of the examined organizations are mostly private individuals and the number of companies in these organizations is 7-8% points less than the number of customers. In larger organizations, companies appear as buyers for the most part. Government and administrative organizations appear as customers in 11-30%.

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Applied info-communication tools and technologies supporting business processes in SMEs

Using digital technologies and tools, respondents were able to mark multiple options at the same time. Nine of the ninety-five respondents did not indicate any options for using the listed tools and technologies. Sixty-three respondents indicated Internet use and fifty-nine marked the corporate website. Internet use is a general category, but it includes some other options (e.g., corporate website, cloud-based solutions). There were respondents who marked the latter while not using the Internet. This indicates that full, accurate information on the listed options has not yet been developed. The following technologies and tools are present in a relatively large number of responding organizations (20-28%): cloud-based solutions, digital platforms, project management tools, mobile banking, customer relationship management systems (Figure 6).

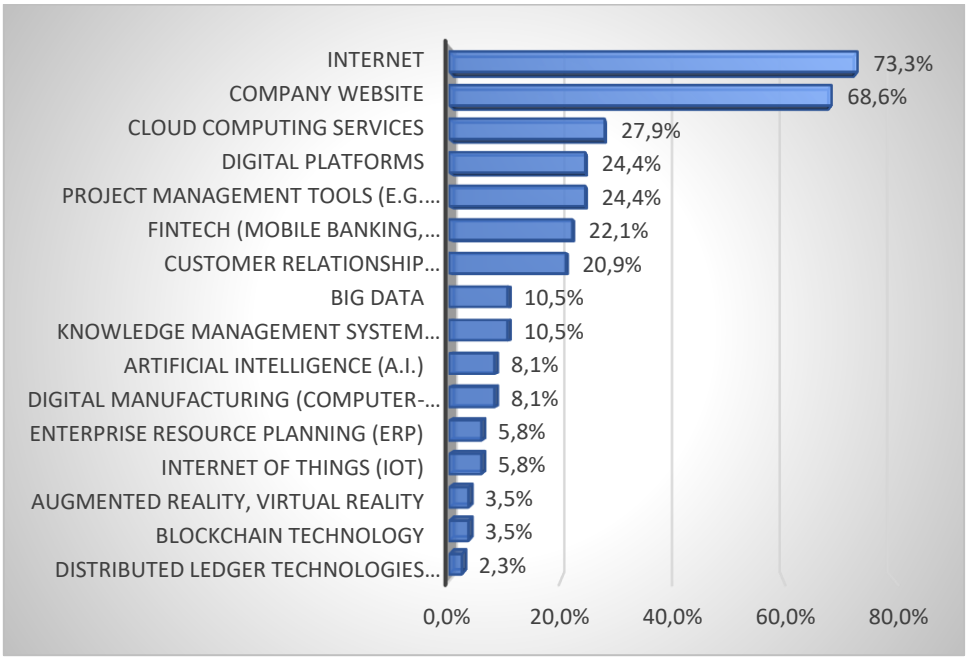

Figure 6 Applied info-communication tools and technologies supporting business processes

Correlations between the number of employees and the tool and technology used were examined. The proportions are similar to those for the whole population. Of the fifty-three organizations with less than ten employees, thirty-eight indicated Internet use and thirty-one indicated the corporate website. IoT and virtual solutions did not appear in either case. For organizations with ten to fifty employees, twelve out of fifteen respondents and nine indicated Internet use as the corporate

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website. IoT, blockchain technology, and shared accounting are not at all typical of these organizations. For organizations with between fifty-one and two hundred and fifty employees (eight), they use 100% of the Internet and the corporate website. Organizations that employ more than two hundred and fifty people (ten), these two tools appear in eight cases.

Big data, knowledge management systems, artificial intelligence (digital manufacturing), enterprise resource planning, the Internet of things, augmented reality, virtual reality, blockchain technology, and distributed ledger technologies have appeared in two to nine cases for all responding organizations, which means small proportions overall, but draws attention to the fact that there are also some relatively new and/or specialized solutions. demand in most sectors and company sizes.

Table 1 Info-communication tools and technologies used by countries

	Denmark	Germany	Hungary	Poland
Internet	61.5%	72.0%	89.5%	84.6%
Company website	84.6%	96.0%	31.6%	38.5%
Cloud computing services	23.1%	44.0%	21.1%	0.0%
Digital platforms	69.2%	24.0%	15.8%	7.7%
Project management tools (e.g., Slack, Microsoft 365)	38.5%	40.0%	10.5%	0.0%
Fintech (mobile banking, crowdfunding and online payments)	23.1%	32.0%	10.5%	15.4%
Customer relationship management (CRM)	38.5%	24.0%	0.0%	7.7%
Big data	15.4%	12.0%	5.3%	0.0%
Knowledge management system (KMS)	7.7%	24.0%	0.0%	0.0%
Artificial intelligence (A.I.)	0.0%	8.0%	5.3%	7.7%
Digital manufacturing (computer-controlled manufacturing processes, 3D printing, robot technology)	7.7%	12.0%	0.0%	0.0%
Enterprise resource planning (ERP)	0.0%	12.0%	0.0%	0.0%
Internet of things (IoT)	7.7%	12.0%	0.0%	0.0%
Augmented reality, virtual reality	7.7%	4.0%	0.0%	0.0%
Blockchain technology	15.4%	0.0%	0.0%	0.0%
Distributed ledger technologies (DLTs)	0.0%	0.0%	5.3%	0.0%

We analysed the country data for the four most respondents regarding the technologies used (Table 1). The colours used in the table were designed according to the following frequencies: 0%; 0-6%; 6.1-11%; 11.2-25%; 25.1-35%; 35.1-45%; 45.1-65%; 65.1-85%; 85.1-100%. The use of the Internet is the most typical in Hungarian and Polish organizations, and the corporate website in German

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and Danish organizations. Low-frequency devices and technologies (e.g., IoT, digital production, virtual reality) are more present in German and Danish organizations, their frequency is typically 0% in Hungarian and Polish organizations.

Digital communication channels used for communicating and collaborating with customers

Respondents could also mark more of the digital communication channels used at the same time. The highest proportion was indicated by e-mail use (sixty-five out of seventy-seven respondents). This was followed by the use of social media (thirty-two of seventy-seven respondents). In addition, the use of online advertising, an interactive website, and Q&R are medium (> 20%). The use of novel tools such as chatbots, support teams, or gamification tools is present, but in a rather minor proportion (Figure 7).

Figure 7 Means of communication used

Similar to general information technologies and tools, the widespread nature of the use of communication solutions is typical of German and Danish organizations (e.g., support team, content marketing, gamification). Of these, six and five tools do not appear at all for Hungarian

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and Polish respondents, respectively, while only two-two tools do not appear for German and Danish respondents (Table 2).

Table 2 Communication tools used by countries

	Denmark	Germany	Hungary	Poland
E-mails, newsletters	76.9%	85.7%	94.4%	81.8%
Social media platforms (e.g., Facebook, Instagram, LinkedIn)	53.8%	42.9%	33.3%	36.4%
Online advertising tools (e.g., Google Ads, Facebook/Instagram Ads)	30.8%	28.6%	11.1%	27.3%
Interactive company website	23.1%	38.1%	16.7%	18.2%
Questions and request	7.7%	19.0%	16.7%	9.1%
Mobil apps	38.5%	9.5%	27.8%	9.1%
Google forms	23.1%	4.8%	22.2%	18.2%
Content marketing strategy (e.g. forums, blogs)	23.1%	23.8%	5.6%	0.0%
Mobile and banner advertising	15.4%	0.0%	5.6%	18.2%
Chatbot	7.7%	19.0%	0.0%	9.1%
Google My Business	0.0%	28.6%	0.0%	0.0%
App Store	23.1%	4.8%	0.0%	0.0%
Support team	15.4%	9.5%	0.0%	0.0%
Gamification tools	0.0%	0.0%	0.0%	0.0%

Distribution of the used communication tools was examined in the grouping according to the number of employees. It is not possible to establish a clear pattern in terms of the tools used.

Involvement in customer-centric innovation

Eighty-six responses were received to the presence of customer-centric innovation (Figure 8). Overall, forty-six organizations employ customer-centric innovation and forty do not. In organizations with less than ten employees, the proportion of users and non-users is almost the same. In organizations with ten to fifty employees, the number of non-users is 50% higher than the number of users. In organizations with fifty-one to two hundred and fifty employees, the number of non-users is 40% lower than that of users. Organizations with more than two hundred and fifty employees use customer-centric innovation in four times as many organizations as they

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do not. Summarizing, there is no clear relationship between the number of users and the application of customer-centric innovation.

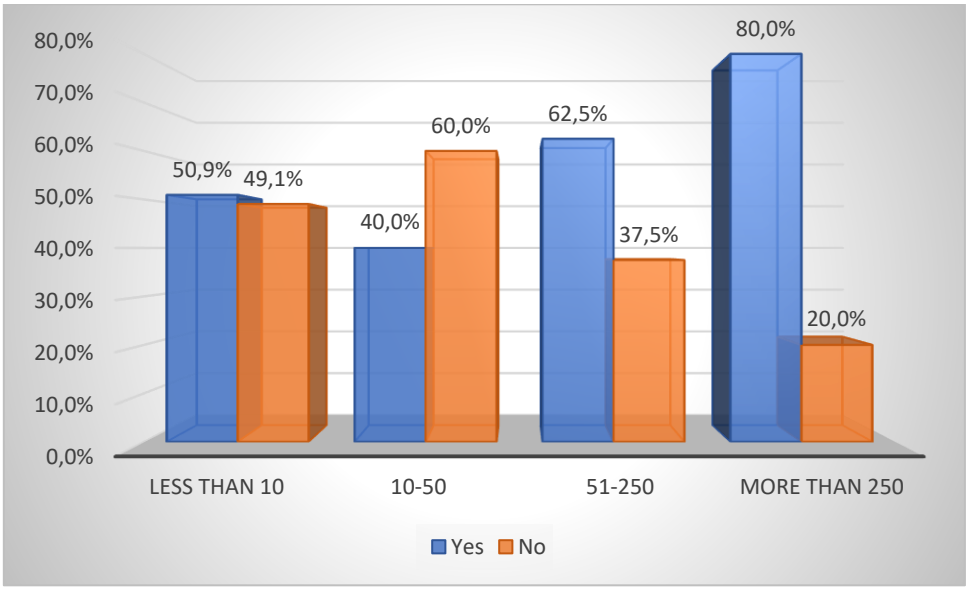

Figure 8 Existence of customer-centric innovation

Distribution of responses sampled from the four countries with the most responses was also examined (Figure 9). For Danish respondents, the number of organizations using customer-centric innovation is slightly more than twice as high as it is not. In case of Hungarian respondents, this ratio is nine times. For German respondents, customer-centric innovation is not used in three times as many organizations as to where it is used. According to data from Poland, the difference between the presence and absence of application is minimal (7 percentage points).

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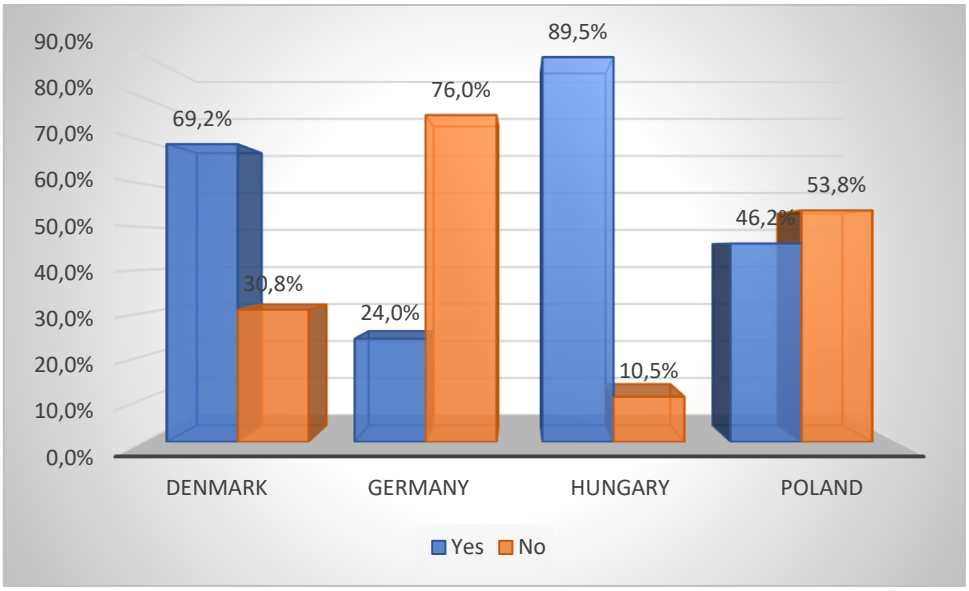

Figure 9 Existence of customer-centric innovation by countries

Reason for the lack of application of customer-centric innovation

Eighty-six (Q4, Question 8) answered the (previous) question on the application of customer-centric innovation. After that, the series of questions went in two different directions. If customer-centric innovation is not used, the reason for this had to be specified by answering the present question (questions k5, 9 *). If applicable, the following questions (questions k6, 9; questions k7, 10;…) had to be answered. However, the total number of respondents for questions k5 and k6 is seventy-seven, which is different from the number of respondents for question k4. This means that biased results should be expected for the answers to question k4.

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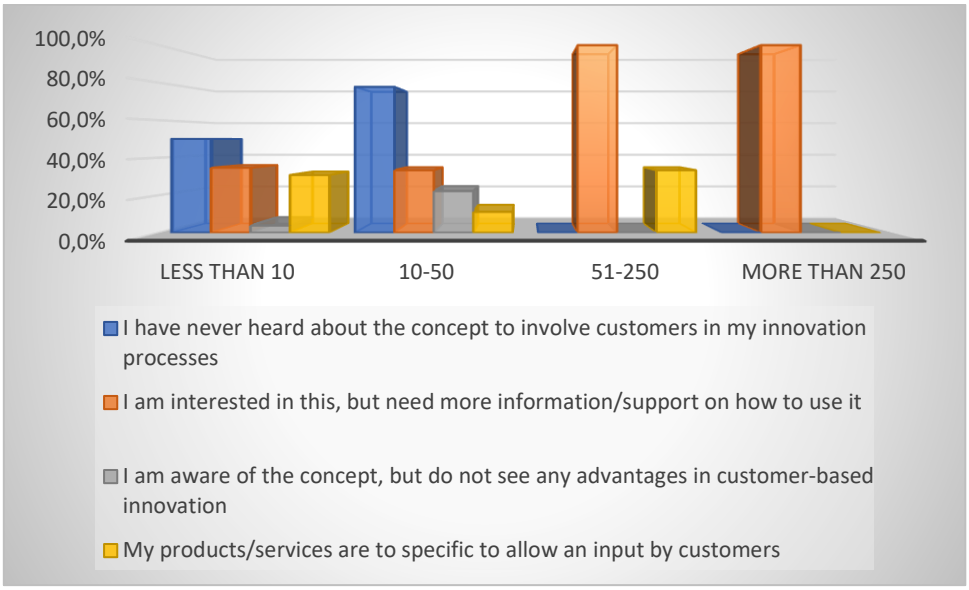

Figure 10 Reason for the lack of application of customer-centric innovation

Thirty-nine respondents were asked, "why does the organization not engage in customer-centric innovation" (Figure 10). Organizations with fewer than fifty employees typically are unfamiliar with the concept of customer-centric innovation. And those who employ more than fifty-one people are typically considered insecure. Most indicated a second response that they had heard of customer-centric innovation, but would need more knowledge, information, or support for the application. Fewer than ten employees indicated that although they were familiar with customer-centric innovation, they did not think they could reap its benefits. In the case of slightly more organizations employing less than two hundred and fifty people, the respondents indicated that their product or service is not suitable for the application of customer-centric innovation. It should be noted that although the response options are more alternative, there were some respondents who indicated several options at the same time, which may skew the results.

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Table 3 Reason for the lack of customer-centric innovation application by countries

	Denmark	Germany	Hungary	Poland
I have never heard about the concept to involve customers in my innovation processes	75.0%	63.2%	0.0%	0.0%
I am interested in this, but need more information/support on how to use it	25.0%	47.4%	50.0%	16.7%
I am aware of the concept, but do not see any advantages in customer-based innovation	0.0%	5.3%	0.0%	33.3%
My products/services are too specific to allow an input by customers	0.0%	26.3%	50.0%	50.0%

Distribution of responses for the four largest sampled countries was also examined (Table 3). The reason for the lack of application in Danish and German organizations is mainly that the respondents did not hear about the concept and, to a lesser extent, that they are uncertain about the application due to lack of information. 26% of German organizations reported that their product or service was not suitable for customer-centric innovation. None of the respondents from the Hungarian and Polish organizations indicated the possibility that they do not know the essence of the concept. Half of the Hungarian respondents are unsure or uncertain due to the relatively little information available, and the other half said that the product or service is not suitable for the application of the concept. For half of the Polish respondents, the product or service is incompatible with customer-centric innovation, and for the rest of the respondents, there is little information available for the application (17%) or the benefits of using the concept are unknown (33%). It is clear from the data that the German respondents indicated several options at the same time so that a small distortion of the answers can be attributed to this.

The level of involvement of customers in the following types of innovation

Thirty-eight answered the question which types of innovation involve customers (Figure 11). In the case of question k4, forty-six stated that there was customer-centric innovation, which means

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that eight people did not comment at all on the question of specifying the innovation and did not indicate the possibility that they had no information.

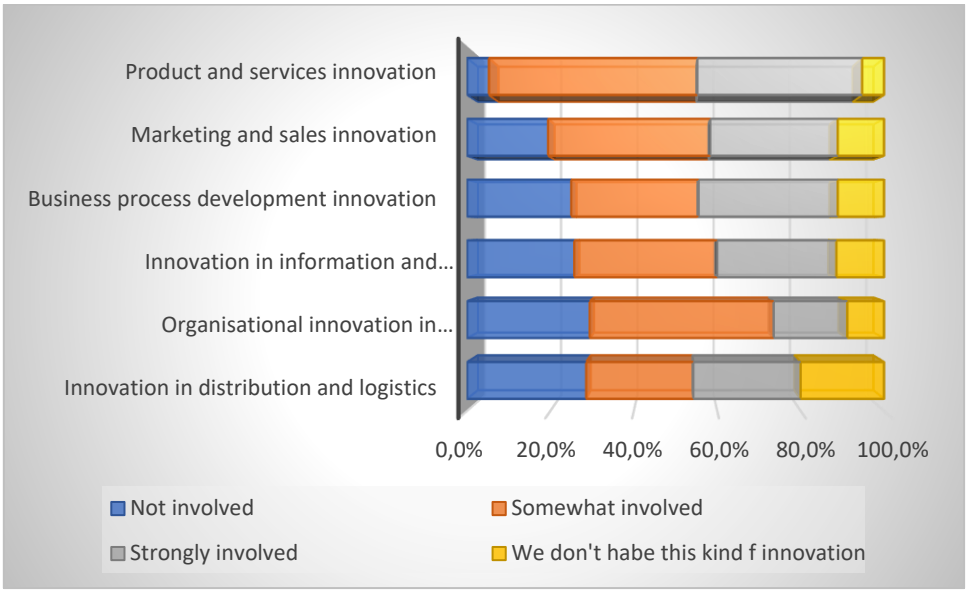

Figure 11 Involving customers in different types of innovation

According to 36 respondents, customers are involved in some extent in case of product and service innovation, twenty-nine respondents in case of marketing and sales innovation, twenty-seven in case of business process innovation, twenty-six in case of info communication systems innovation, twenty-four in case of organizational innovation and logistics, in case of innovation according to thirty-five respondents.

90% are involved in product and service innovation, 69% in marketing and sales innovation, 34% in business process innovation, and 63% in info communication systems innovation, 62% for organizational innovation and 51% for logistics innovation.

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Table 4 Involving customers in different types of innovation in each countries

		Denmark	Germany	Hungary	Poland
Product and services innovation	Not involved	14.3%	0.0%	0.0%	0.0%
	Somewhat involved	42.9%	80.0%	33.3%	66.7%
	Strongly involved	42.9%	20.0%	58.3%	16.7%
	We do not have this kind of innovation	0.0%	0.0%	8.3%	16.7%
Marketing and sales innovation	Not involved	28.6%	40.0%	0.0%	0.0%
	Somewhat involved	42.9%	40.0%	10.0%	66.7%
	Strongly involved	28.6%	0.0%	70.0%	16.7%
	We do not have this kind of innovation	0.0%	20.0%	20.0%	16.7%
Innovation in information and communication systems	Not involved	14.3%	40.0%	22.2%	16.7%
	Somewhat involved	42.9%	40.0%	22.2%	50.0%
	Strongly involved	42.9%	20.0%	22.2%	16.7%
	We do not have this kind of innovation	0.0%	0.0%	33.3%	16.7%
Organisational innovation in administration and management	Not involved	14.3%	80.0%	33.3%	0.0%
	Somewhat involved	57.1%	20.0%	33.3%	60.0%
	Strongly involved	28.6%	0.0%	11.1%	20.0%
	We do not have this kind of innovation	0.0%	0.0%	22.2%	20.0%
Business process development innovation	Not involved	28.6%	40.0%	10.0%	16.7%
	Somewhat involved	42.9%	60.0%	20.0%	16.7%
	Strongly involved	14.3%	0.0%	60.0%	33.3%
	We do not have this kind of innovation	14.3%	0.0%	10.0%	33.3%
Innovation in distribution and logistics	Not involved	42.9%	60.0%	11.1%	0.0%
	Somewhat involved	28.6%	0.0%	11.1%	33.3%
	Strongly involved	14.3%	0.0%	55.6%	33.3%
	We do not have this kind of innovation	14.3%	40.0%	22.2%	33.3%

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The country distributions for the countries with the highest numbers were analysed in the four samples (Table 4). On average, 47% of German respondents, 68% of Hungarians, and 72% of Danish and Polish involve their customers in some type of innovation process. Danish respondents are most involved in product and service, info communication, and organizational innovation (86-86%). For the other types, these values range from 43 to 72%. German respondents are most involved in product and service innovation (100%), and involvement in innovation in info communications and business processes is relatively strong (60%). Other values range from 0 to 40%. Hungarian respondents mostly involve their customers in product and service innovation (92%) and innovation in marketing and business processes (80-80%). For the other types, the values are between 44-67%. Polish respondents mainly involve their customers in product and service innovation, marketing and sales innovation (83-83%), and organizational innovations (80%). For the other types, the values range from 50 to 67%. On the one hand, based on this relatively mixed picture, it can be concluded that no sharp pattern can be detected between types of innovation and involvement; on the other hand, involvement in product and service innovation is relatively strong everywhere.

Degree of involvement of customers in the product and service innovation phases

In this question, we examined which customers are specifically involved in which process phase of the product and service innovation most affected by customer engagement (Figure 12). The degree of involvement had to be given on a scale of one to five, where the value of five means: strongly, the value of one means: not at all.

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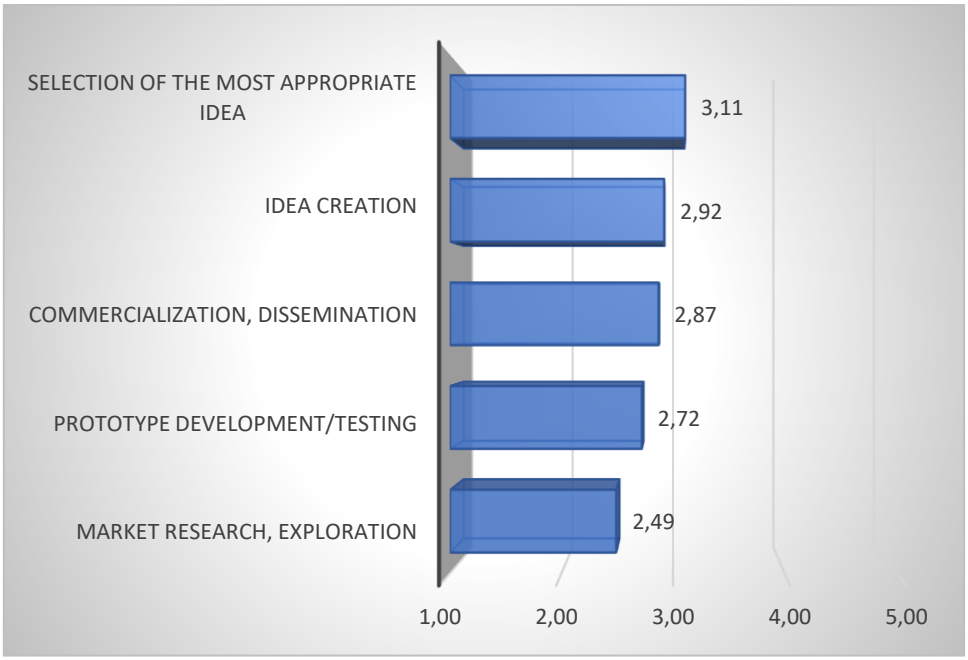

Figure 12 Degree of involvement in the product and service innovation phases

Companies primarily involve their customers in the brainstorming phase (3.11) and as we move forward in the innovation process, this value continues to decline. In case of organizations with less than fifty-one employees, the three stages of innovation, commercial introduction, are contrary to this finding, the degree of involvement in this stage is higher than in the case of the second stage (idea implementation). For organizations with more than fifty employees, involvement is strongest in prototype development and testing. Employers with more than two hundred and fifty people also strongly involve customers in the implementation phase of the idea (Table 5).

Table 5 Degree of involvement in the product and service innovation phases by number of employees

	less than 10	10-50	51-250	more than 250
Selection of the most appropriate idea	3.30	2.83	2.50	3.00
Idea creation	3.15	2.17	2.33	3.14
Commercialization. dissemination	3.32	2.33	2.33	2.14
Prototype development/testing	2.70	2.00	3.00	3.29
Market research. exploration	2.71	2.00	1.33	2.71

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The extent of involvement for the four countries sampled in large numbers was also examined (Table 6). In case of Denmark. the involvement is strongest in the idea implementation phase (2.71). followed by the ideation phase and then the prototype development phase. For commercial and marketing activities. involvement is minimal (2.0). In Germany. the implementation of the idea and the development of the prototype has a strong involvement (2.6) and are followed by the ideation phase (2.4). Like Denmark. involvement in the innovation phases of commercial and marketing activities is minimal (1.8-2.0). In Hungary. the involvement is strong in case of commercial activities (4.25). followed by the brainstorming (3.9) and then the marketing (3.73) phases. The involvement is also strong in the implementation phase of the idea compared to the above two countries (3.6). The value of prototype development and testing is 3.2. but this is higher than the highest values in the previous two countries. In Poland. involvement in the brainstorming phase is maximal (3.33). followed by the next three phases with 2.67-2.83 and then the last phase with 1.83. No clear regularity can be detected between the phases when examining the countries.

Table 6 Degree of involvement in product and service innovation phases by countries

	Denmark	Germany	Hungary	Poland
Selection of the most appropriate idea	2.57	2.40	3.90	3.33
Idea creation	2.71	2.60	3.60	2.83
Commercialization. dissemination	2.00	1.80	4.25	2.67
Prototype development/testing	2.43	2.60	3.20	2.83
Market research. exploration	2.00	2.00	3.73	1.83

Methods for engaging consumers in customer-centric innovations

In the next question, we sought answers to what methods companies use to engage their customers in their innovation processes. The following methods were included in the response options:

- Surveys/questionnaires
- Interviews
- Focus Groups

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- Brainstorming
- Observations (customers are observed in daily life personally)
- Test Groups
- Field Test (testing products and/or services in real life circumstances)
- Simulations and visualizations
- Living Labs (Cooperation with customers in company's laboratories and workshops)
- Diary Search: (target groups are asked to write the product and/or service experiences in a pre-structured online diary)
- others

37 evaluable answers were received to this question from the 46 companies involved in customer-centric innovation (8 large companies, 5 medium-sized companies, 6 small companies, 27 micro-companies). The most common method of involving customers is conducting interviews, surveys and questionnaires. (Figure 13) More than half of the respondents (21 and 19 respondents) use these methods, which are relatively easier to implement and better known, especially among SMEs. Besides, observing customers in their daily lives plays an important role in supporting innovation processes. 43 % of companies involved in customer-centric innovation (and answering this question) use the observation method. Brainstorming was indicated by more than a quarter of respondents (27%). The same proportion is included in case of the Field Test, in which products and/or services are tested under real conditions. Seven companies (19%) use Test Groups to explore and incorporate their customers 'opinions and experiences. In the case of the most common methods, the sectoral classification of companies shows a varied picture, no clear conclusion can be drawn regarding the specifics of the sector. A similar proportion of users came from the industrial-construction and commercial-service sectors. We did not find any significant differences in frequently used methods in terms of company size too.

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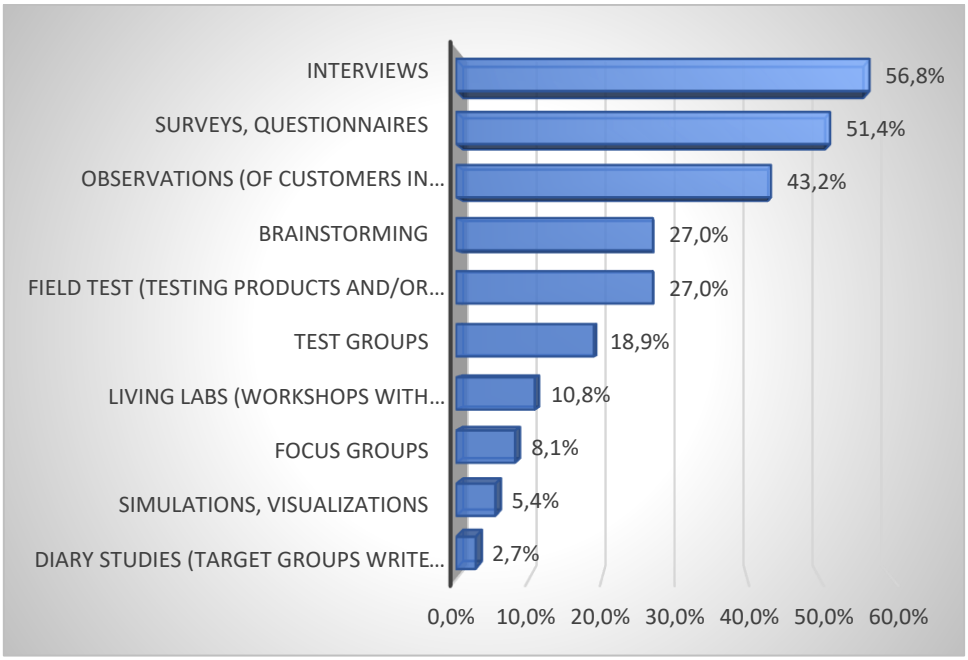

Figure 13 Methods used for involving customers in innovation processes

Less commonly used methods of customer engagement include (Figure 13):

- Living Labs (Cooperation with customers in the company's laboratories and workshops): four companies use the method to engage customers. Two companies are active in the manufacturing industry, two in the field of education. These are companies operating in four different countries. Three companies have more than 250 employees and the fourth company has 10 to 50 employees. Apparently, this method is typical for larger company sizes. Each company has been operating for more than 5 years. All four companies sell in the B2B market, B2C customers have three companies. Two companies are also active in the B2C, B2B, and B2G markets.

- Focus Groups: three companies use the method to engage customers. One company is active in the manufacturing industry, one in the field of education, one in the field of other services. These are companies operating in three different countries. Two companies have more than 250 employees and one company has less than 10 employees. Apparently, this method is also more typical for larger company sizes. All three companies have been operating for more than 5 years.

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- Simulations and visualizations: Only two companies use this method to engage customers. One company is active in the construction industry, one in the field of education. These are companies operating in two different countries. One company has more than 250 employees and one company has 51-250 employees. Apparently, this method is also more typical for larger company sizes. Both companies have been operating for more than 5 years.

- Diary Search: (target groups are asked to write the product and/or service experiences in a pre-structured online diary): Only one company uses this method to engage customers. The Danish company is active in the field of education. The company has more than 250 employees and has been operating for more than five years.

Although no general conclusions can be drawn, the results of our survey show that more complex, organized solutions for customer involvement are typically used by larger (primarily large and medium-sized companies) and more mature companies.

Fourteen companies also identified three or more ways to engage their customers. Most of them (ten companies) operate in the service sector. Companies in the field of education (six companies) should be highlighted in terms of the variety of methods used.

Methods for engaging consumers in customer-centric innovations by countries

The frequency of the methods application was examined by country. 4 countries (Germany, Hungary, Poland, and Denmark) were chosen from which the most evaluable responses were received. The data of the previously mentioned countries were compared to explore whether there are similarities or significant differences between companies in each country.

Only those companies were examined that have been involved in customer-oriented innovation and have provided answers to this question. Thus, Germany (five), Hungary (eleven), Poland (six), and Denmark (six) are included in the analysis.

The most commonly used methods are marked in green, the medium frequently used methods are marked in yellow, and the less frequently used methods are marked in red. Darker colours have the highest frequency for green and red for the lowest frequency. (Table 7)

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Table 7 Methods for engaging consumers in customer-centric innovations by countries

	Denmark	Germany	Hungary	Poland
Interviews	50.0%	60.0%	50.0%	33.3%
Surveys, questionnaires	50.0%	80.0%	25.0%	66.7%
Observations (of customers in daily life)	33.3%	60.0%	66.7%	33.3%
Brainstorming	50.0%	0.0%	8.3%	50.0%
Field test (testing products and/or services in real life circumstances)	0.0%	60.0%	41.7%	0.0%
Test groups	33.3%	20.0%	8.3%	16.7%
Living labs (workshops with customers in company's laboratories)	16.7%	20.0%	0.0%	0.0%
Focus groups	16.7%	20.0%	8.3%	0.0%
Simulations, visualizations	16.7%	0.0%	0.0%	0.0%
Diary studies (target groups write about product and/or service experiences in a pre-structured online diary)	16.7%	0.0%	0.0%	0.0%

The results are similar in each country as we saw in the overall sample. The most common used methods are Interviews, Surveys, Questionnaires, and Observations. The least commonly used methods are Living labs (workshops with customers in the company's laboratories), Focus groups, Simulations, Visualizations, and Diary studies.

Remarks regarding countries:

- In Denmark, in addition to Interviews and Surveys, Questionnaires, the use of Brainstorming is the most popular. Test groups are also given more weight than in other countries and in the overall sample. However, no company indicated the Field test method for customer involvement. Denmark had the most varied range of methods used to engage customers.

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- For German companies, the three most common methods are the same as in the whole sample. However, the higher rate of Field test use among respondents is noteworthy.
- In case of Hungarian respondents, the observation of consumers in their daily lives received the highest proportion. This was followed in the order of the application by the interviews and the Field test. Surprisingly, Surveys, questionnaires, which are popular elsewhere, are not among the most common solutions. More complex, organized solutions (Living labs, Simulations, Visualizations, and Diary studies) are not typical for responding companies.
- For Polish companies, Surveys, Questionnaires, and Brainstorming methods were the most common methods to engage customers. Overall, Polish respondents indicated a narrower range of methods used.

Low sample sizes are not suitable for drawing general conclusions, they are only valid for the analysed sample.

Categorizing consumers based on their needs and expertise

The next question was whether companies categorize their customers based on their needs or expertise when involving them in the innovation process. This was considered to be an important issue because different types of feedbacks and experiences can be incorporated in case of different customers. Different kind of information can be obtained from lay customers and from professional users in the product development process. Both kind of information are extremely useful.

Those companies were analysed and examined that are involved in customer-centric innovation and answered for this question (38 companies). Overall, slightly more than half (52.6 percent) of respondents categorize their customers based on their needs and expertise.

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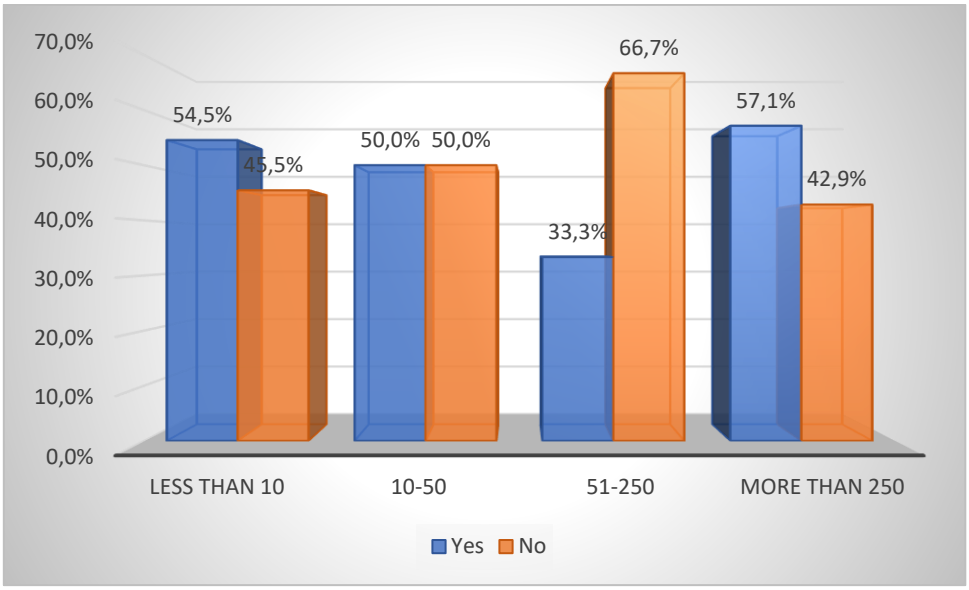

Figure 14 Categorizing consumers based on their needs and expertise by company size

The distribution by the company size is as follows in the sample: seven large companies, three medium-sized companies, six small companies, twenty-two micro-companies. In almost all size categories, at least half of the companies strive to differentiate their customers according to their needs and expertise. The rate was lower for medium-sized companies, but this reflects the responses of only 3 companies. (Figure 14)

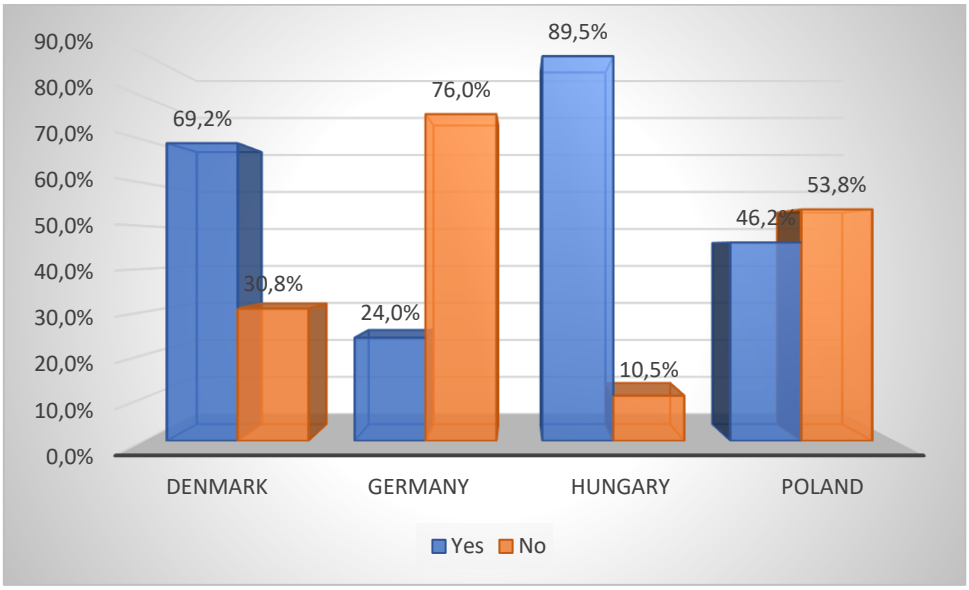

Figure 13 Categorizing consumers based on their needs and expertise by countries

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The analysis by country shows a more interesting picture (Figure 15). Thirty responses to this question were received from the four countries selected. Denmark is represented on the chart based on seven companies, Germany five, Hungary twelve and Poland six. Accordingly, the differentiation and categorization of customers based on their needs and expertise is much more typical in the case of Danish and Hungarian companies. A smaller half of Polish companies apply this distinction. German companies make the least use of categorization.

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Difficulties in involving customers

When implementing customer-centric innovations, companies face with several difficulties in engaging customers. We examined which factor means the greatest difficulty in exploring the needs and experiences of customers and in communicating with customers.

The following difficulties could be identified:

- Involving consumers is time consuming
- Consumer involvement requires financial resources
- Involving consumers allocates resources, is resource-intensive (Infrastructure, technology, IT)
- It is difficult to identify customers who can provide innovative ideas during the innovation process
- It needs Know how
- Others

Based on the responses of thirty-five companies, the biggest difficulty proved to be time requirements as well as the need for financial resources (Figure 16). Based on this, it seems that the issue of getting to know consumer opinions and involving consumers is mostly a matter of time and money. More than half of the companies had difficulty with these two factors. This is presumably related to the fact that human resources are scarcer in the case of SMEs, there is no person who could deal with this separately at the company. And hiring another employee would incur additional costs for them.

The identification of consumers with innovative ideas and the technical and infrastructural conditions did not prove to be a difficulty among the responding companies.

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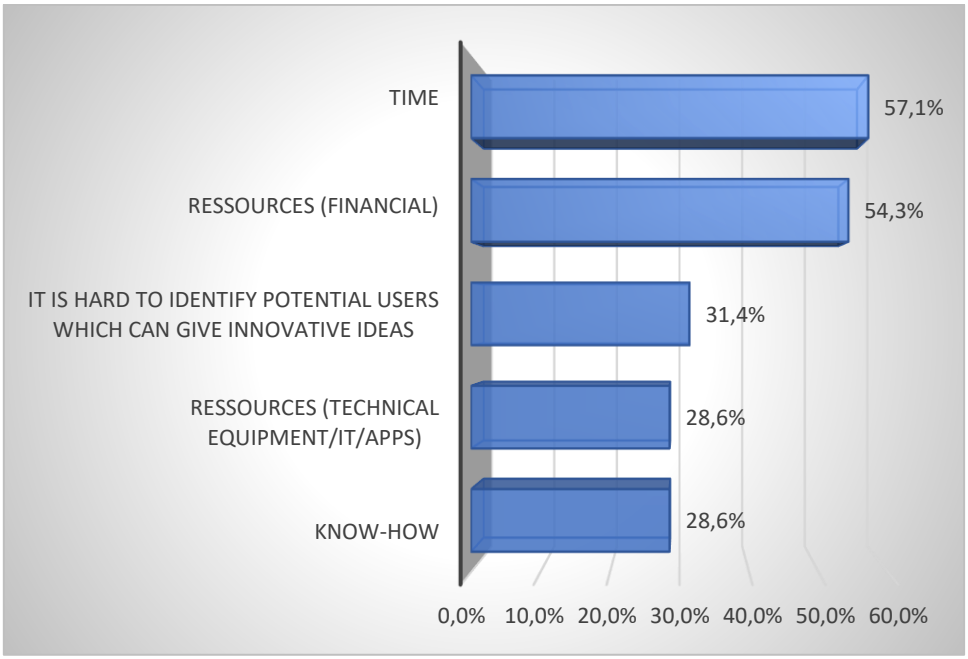

Figure 16 Difficulties in involving customers

The existence of a marked difference was examined among countries in perceiving difficulties in engaging consumers. (Table 8) As before, data from Germany, Hungary, Poland, and Denmark were compared. In the examination only those companies were studied that have been involved in customer-centric innovation and have answered that question. Thus, Germany is included in the analysis with five companies, Hungary with eleven companies, Poland with five companies and Denmark with six companies.

The most frequently marked difficulty was marked in green, the moderately marked methods in yellow, and the less frequently marked methods in red. Darker colours have the highest frequency for green and red for the lowest frequency.

Table 8 Difficulties in involving customers by countries

	Denmark	Germany	Hungary	Poland
Time	66.7%	60.0%	45.5%	40.0%
Resources (financial)	50.0%	20.0%	54.5%	80.0%
It is hard to identify potential users which can give innovative ideas	16.7%	60.0%	36.4%	20.0%
Resources (technical equipment/IT/apps)	16.7%	20.0%	45.5%	20.0%
Know-How	33.3%	20.0%	27.3%	40.0%

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Remarks regarding countries:

- Two-thirds of Danish companies report that the time required to involve consumers is the biggest challenge, and half of the companies mentioned the need for financial resources to involve consumers as a difficulty. The Danish experience is in line with the results of the analyses based on the whole sample.
- In case of German companies, financial factors meant less of a difficulty, the time required to involve consumers and the identification of consumers with innovative ideas were more often among the difficulties. German respondents indicated the least impediment.
- More than half of the Hungarian companies identified the financial factor as an aggravating circumstance. In addition, other resources as well as the need for time were among the more frequently mentioned difficulties.
- In case of Polish companies, the financial factor was predominantly highlighted as a difficulty for companies.

Low sample sizes are not suitable for drawing general conclusions, they are only valid for the analysed sample.

Benefits from customer-centric innovations

In the survey, was examined the kind and extent of benefits reached by companies through the introduction of customer-centric innovations. The available benefits are divided into five major groups:

- Financial benefits (increased sales revenue, profitability, cost reduction)
- Growing operation effectivity (increased sales volume, product and service portfolio, productivity, product and service quality, speed and reliability of communications and transactions, positive change in business model and business practice)

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- Market benefits (increased number of customers and potential clients, market position, market share, entering of new markets, global trade, geographic expansion, business linkages, competitiveness)
- Increasing customer satisfaction (increased understanding and response to customer needs, tailor-made/customised product development, better and faster communication with the customers)
- Improving organizational image, reputation

Respondents were able to rate on one to five Likert scale, the extent to which each benefit came to their company through the introduction of customer-centric innovation. The numerical values have the following meanings: 1: not beneficial, 2: slightly beneficial, 3: somewhat beneficial, 4: moderately beneficial, 5: strongly beneficial.

For each benefit, 34-36 reviews were received. The arithmetic mean of these responses is shown in Figure 17.

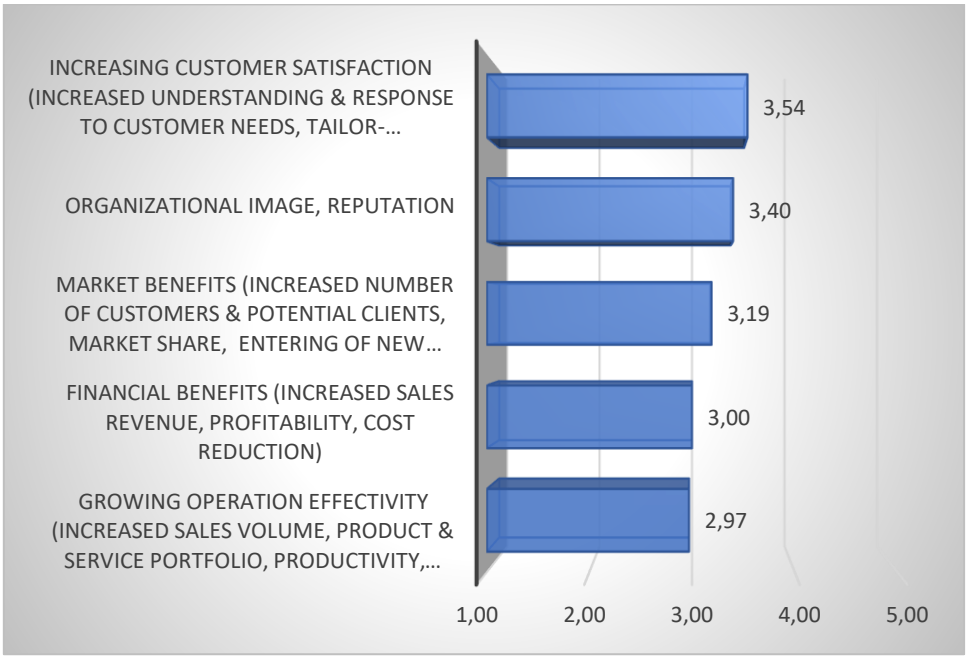

Figure 17 Benefits realised from customer-centric innovations (arithmetic mean of the answers in a 1 to 5 Likert scale)

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Through the introduction of customer-centric innovations, companies have reached an advantage in all areas, albeit to varying degrees. The lowest mean value was 2.97, which has a somewhat beneficial, somewhat advantageous meaning. The greatest (medium) benefits were seen by companies in terms of increasing customer satisfaction, which goes hand in hand with an increase in the image of the organization. They perceived these benefits the least on the financial side and in terms of their operational efficiency. Based on these, they seem to have been less able to monetize the results of innovations involving customers, but customer satisfaction and the strengthening of the company's reputation also pay off financially in the long run.

If we examine the realization of the advantages according to the size of the company, the advantages occurred to different degrees in each size category. (Table 9) Thirty-six companies answered the question, of which twenty were micro-enterprises, six small enterprises, three medium-sized enterprises, seven large enterprises.

Table 9 Benefits realised from customer-centric innovations by size of companies (arithmetic mean of the answers in a 1 to 5 Likert scale)

	less than 10	10-50	51-250	more than 250
Increasing customer satisfaction (increased understanding & response to customer needs. tailor-made/customised product development. better and faster communication with the customers)	3.55	3.00	4.33	3.57
Organizational image. reputation	3.26	3.50	4.00	3.43
Market benefits (increased number of customers & potential clients. market share. entering of new markets. global trade. geographic expansion. business linkages)	3.30	3.00	2.67	3.29
Financial benefits (increased sales revenue. profitability. cost reduction)	3.00	2.50	3.00	3.43
Growing operation effectivity (increased sales volume. product & service portfolio. productivity. quality. speed. reliability)	2.89	2.80	2.67	3.43

In general, in most cases a value between 3-4 can be found, which indicates a small to medium advantage. Financial benefits and operational efficiency benefits were perceived the least by companies. The colours in the table mean: green: higher than average. yellow: average. red: below

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average. Based on this, it can be clearly seen that large companies have on average achieved greater benefits in all areas through their customer-centric innovation. While in the case of the responding small companies in almost all cases the benefits were perceived to be below average. Microenterprises were closer to the mean values, which is not surprising since they were overrepresented in the sample.

If the realization of benefits by countries are examined, benefits have occurred and/or perceived to different degrees in each country (Table 10). Thirty-six companies answered the question, of which seven companies in Denmark, five companies in Germany, eleven companies in Hungary and five companies in Poland. (A further eight responses were received from four additional countries, which are ignored here.) The green fields in the table indicate above-average values, and the red fields indicate below-average values.

An interesting result is that Danish companies rated the benefits of customer-centric innovations more pessimistically than average in all areas. Polish companies rated the financial benefits as the smallest, but also found the increase in customer satisfaction to be smaller than average. German and Hungarian companies perceived the benefits in all areas more than average.

Table 10 Benefits realised from customer-centric innovations by countries (arithmetic mean of the answers in a 1 to 5 Likert scale)

	Denmark	Germany	Hungary	Poland
Increasing customer satisfaction (increased understanding & response to customer needs. tailor-made/customised product development. better and faster communication with the customers)	3.14	3.60	4.18	3.00
Organizational image. reputation	2.57	3.60	3.70	3.60
Market benefits (increased number of customers & potential clients. market share. entering of new markets. global trade. geographic expansion. business linkages)	2.43	3.80	3.64	3.40
Financial benefits (increased sales revenue. profitability. cost reduction)	2.57	3.60	3.30	2.80
Growing operation effectivity (increased sales volume. product & service portfolio. productivity. quality. speed. reliability)	2.43	3.60	3.20	3.00

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Barriers to the introduction of customer-centric innovations supported by digital tools

Finally. it was examined what companies see as key barriers to the introduction of customer-centric innovations supported by digital tools. Obstacles were classified into six major groups:

- Financial barriers (high cost and investment needs regarding hardware. software. networks. trainings. organisational changes)
- Unclear return of investment (difficult to measure the added value. lack of objective information regarding the benefits and costs of ICT. too much risk)
- Lack of information. knowledge. and digital skills (lack of professional human resources)
- Lack of corporate resources (lack of appropriate knowledge-based assets. technological capabilities)
- Lack of trust in the use of ICT (Risks in protection of intellectual property and digital rights. challenges in terms of digital security and privacy)
- Lack of organizational ICT culture
- Lack of willingness to use digital tools by our target group

Respondents were able to rate on a Likert scale of one to five, the extent to which each factor hindered the implementation of customer-centric innovation. Numeric values have the following meanings: 1: not challenging. 2: slightly challenging. 3: somewhat challenging. 4: moderately challenging. 5: strongly challenging. For each barrier 34-35 ratings were received. The arithmetic mean of these responses is shown in Figure 18.

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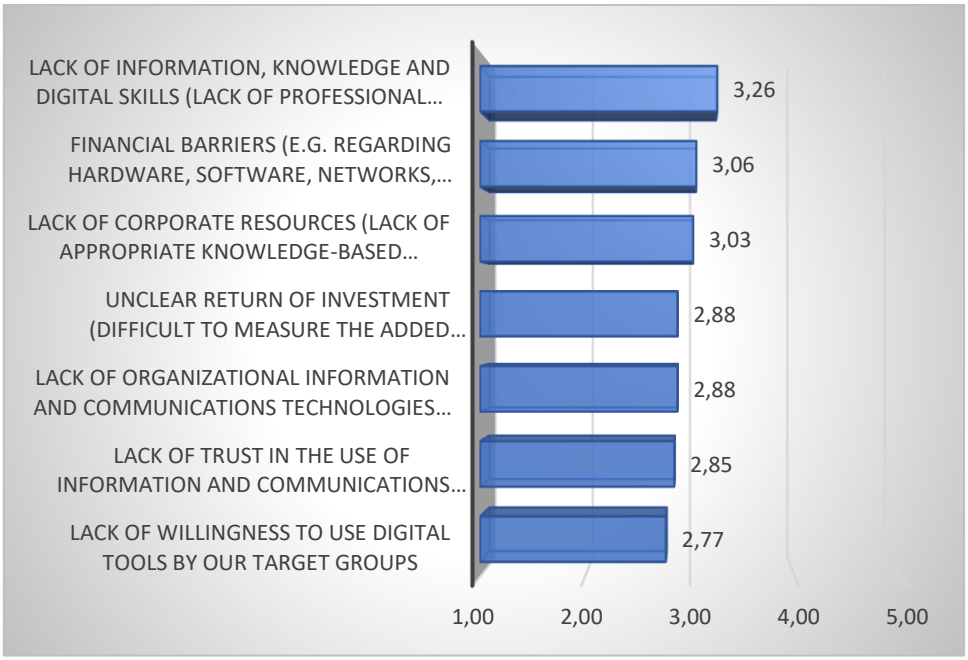

Figure 18 Barriers to the customer-centric innovations (arithmetic mean of the answers in a 1 to 5 Likert scale)

It is an encouraging result that the implementation of customer-centric innovations supported by digital tools has not encountered any significant obstacles in almost any field. For respondents the lack of digital skills and knowledgeable professionals was the most aggravating factor, but received an average score of 3.26, which is a less than moderate challenge. Financial and resource barriers followed in the order of their strengths. These results confirmed our expectations. In many cases, SMEs face with the problem of insufficient resources and financial resources. Uncertainty on return on investment, organizational ICT culture, mistrust of digital solutions, and customer acceptance of digital solutions were less problematic among responding companies.

The difference in perceived barriers by firm size were examined (Table 11). Thirty-six companies answered the question, of which twenty were micro-enterprises, six small enterprises, three medium-sized enterprises, seven large enterprises.

In general, in most cases a value between 2-3.6 can be found, which is a small to medium value in judging the challenges. The colours in the table mean: green: below average, yellow: around average, red: above average. Based on this, surprisingly, it appears that large companies in all areas have on average faced greater challenges in implementing customer-centric innovations. These challenges were also better perceived by micro-enterprises, which in turn could be expected. Small and medium-sized companies were more positive about the challenges.

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Table 11 Barriers to the customer-centric innovations by size of the company (arithmetic mean of the answers in a 1 to 5 Likert scale)

	less than 10	10-50	51-250	more than 250
Lack of information. knowledge. and digital skills (lack of professional human resources)	3.44	2.67	3.00	3.43
Financial barriers (e.g.. regarding hardware. software. networks. trainings. organisational changes)	3.26	2.50	2.67	3.14
Lack of corporate resources (lack of appropriate knowledge-based assets. technological capabilities)	3.22	2.17	2.33	3.57
Unclear return of investment (difficult to measure the added value. lack of objective information regarding the benefits vs. the costs. too much risk)	3.11	2.00	2.33	3.29
Lack of organizational information and communications technologies culture	2.94	2.67	2.33	3.14
Lack of trust in the use of information and communications technologies (risks regarding protection of intellectual property and digital rights. challenges in terms of digital security and privacy)	2.89	2.67	2.00	3.29
Lack of willingness to use digital tools by our target groups	2.84	2.83	1.67	3.00

Table 12 Barriers to the customer-centric innovations by countries (arithmetic mean of the answers in a 1 to 5 Likert scale)

	Denmark	Germany	Hungary	Poland
Lack of information. knowledge. and digital skills (lack of professional human resources)	2.86	3.4	3.7	3.75
Financial barriers (e.g.. regarding hardware. software. networks. trainings. organisational changes)	2.71	2.8	3.5	3.4
Lack of corporate resources (lack of appropriate knowledge-based assets. technological capabilities)	2.57	2.8	3.9	2.75
Unclear return of investment (difficult to measure the added value. lack of objective information regarding the benefits vs. the costs. too much risk)	2.43	2.6	3.3	3.25
Lack of organizational information and communications technologies culture	2.29	3	3.8	2.5
Lack of trust in the use of information and communications technologies (risks regarding protection of intellectual property and digital rights. challenges in terms of digital security and privacy)	2.43	3.2	3.5	2.75
Lack of willingness to use digital tools by our target groups	2.57	3.4	3.09	2.75

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The obstacles to introduction of customer-centric innovation appeared and/or perceived to different degrees in each country (Table 12). Thirty-six companies answered the question, of which seven companies in Denmark, five companies in Germany, eleven companies in Hungary and five companies in Poland. (A further eight responses were received from four additional countries, which are ignored here.) The green fields in the table indicate below-average values, and the red fields indicate above-average values.

Danish companies faced less challenges in implementing their customer-centric innovations supported by digital devices. (It is true that the benefits were also less perceived.) German and Polish companies faced difficulties more than average and partly less than average. It is important to point out that in the case of Germany the order in which the difficulties are rated is different. Based on the respondents' assessment, consumers' ICT receptivity, lack of trust in ICT solutions, and organizational ICT culture were rather challenging than lack of financial resources, uncertainty of return, or companies' resource supply. The implementation of these innovations was the most challenging for Hungarian companies, they considered the obstacles to be stronger than average in all areas.

Limits of the analysis, Future directions of research

After evaluating the research results, it was confirmed that the conclusions that can be drawn from the multi-country sample has its limitations. Namely, that if we want to examine the results on a layer-by-layer basis and compare them with each other, we can only do so without raising the general validity based on the data currently available. The explanation for this is very simple, the size of the sample available is n = 95 companies. If this sample is further subdivided into subsamples, the number of subsamples is reduced so much that it is almost impossible to make reliable and accurate conclusions from them. By subdivision we mean that the results are examined e.g.

- by country (Germany, Hungary, Denmark, Poland, etc.). Such a comparison is not possible because the size of the subsamples is simply so small that the results would contain an unacceptably large (sampling) error.

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- by company size category (micro companies, small companies, medium companies, large companies). It would also be an interesting field of study to determine the research results for each company size category and compare them with appropriate statistical methods. Again, the low number of subsamples does not allow this, so this type of "partial results" should always be treated with strong reservations based on the current sample.
- by sphere of activity (agriculture, industry, trade, services, etc.). Another important and interesting aspect of further research would be the analysis of research results by sector. The online questionnaire included a question to this effect (What is the company's primary operation field?). The available database contains this information. At the same time, it is not possible to perform deeper analyzes and comparisons, at least in a meaningful way (statistically reliable and showing accurate results).

In the light of the above-mentioned facts, we would definitely consider it expedient to continue and extend the research to a wider sample, in order to overcome the aforementioned limitations and to provide an opportunity to examine/compare subpopulations. If it were possible to increase the number of items in the sample (and subsamples) in the future, we could answer the following research questions - which we consider as further possible research directions:

- How can the customer-centric innovation activities of small and medium-sized enterprises operating in each European country be characterized? What similarities and differences can be identified between each nation state?
- Is there a difference in the customer-centric innovation activity of companies according to the different company size categories? How does this activity relate to company size? Rather for smaller companies or more for larger ones?
- Is there a sectoral difference in customer-centric innovation? What are the industries that are at the forefront, and where this approach is still in the background for the time being?

To answer these questions, it would definitely be necessary to expand it so that the number of items in each subsample is at least 100 items. (Ideally, of course, there could be much more than that, e.g., 400.) This, in turn, also means that a total sample of at least 400-500 items would be needed to get started at all to answer the questions raised.

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Part C

Best practices of customer-focused Innovations & Digitalisation and toolbox

Study of applied instruments, methods and procedures for the integration of customer-centric innovation in SMEs

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I List of abbreviations

AI - Artificial intelligence

AR - Augmented Reality

CC-NPD - Customer-centric New Product Development

IoT - Internet of Things

SMEs - Small and medium-sized enterprises

II List of figures

III List of tables

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Introduction to customer-centric innovation

This report is prepared within the framework of the EU Program *Erasmus + Key Action 2: Cooperation for innovation and the exchange of Good Practices* funded project **"Digital methods, toolbox and trainings for increasing customer innovation in SMEs"**. The aim of the project is to strengthen the innovation capacity of SMEs in Eastern Europe. Thereby, the central problem of resource scarcity in SMEs is explicitly addressed, which causes difficulties in the integration of a customer-centric innovation approach within SMEs. To address this problem, this report provides an insight into aspects of the use of digital methods for the identification, processing, and implementation of customer-centric innovations in SMEs. In addition, selected best practices of customer-centric innovation activities are elaborated. Based on this research, a survey will be developed to determine the status quo of customer-centric innovation activities in the 13 associated project countries included in the project and to derive teaching needs and enable a curriculum for the implementation of targeted trainings.

Customer-centric Innovation

In a changing and uncertain world, the alignment of innovation with the current and potential customers' needs is necessary. To meet these challenges and to remain competitive, especially small and medium-sized enterprises (SMEs) must constantly innovate to add value. In other words, they must design, develop and deploy new product and service offerings that meet the needs of the marketplace. In order to do this they must become customer driven (Griffin, 2004; Zahay and Griffin, 2004).

Customer-centric innovation is very different from customer-focused innovation and customer-driven innovation. In customer-centric innovation programs, innovation is done **with customers – organizations and customers create innovation together**. In customer-focused innovation programs, innovation is done by the organization. In customer-driven innovation programs, the customer is the key player – innovation is done by customers, with minimum involvement by the organization. Customers are the primary source of ideas and the customers of new products and services. They can offer ideas without geographic, and time constrains, and the organization must be able to apply those ideas quickly to the development of new products and services. Without the tools to support such dynamic interaction, it risks losing its customer to competitors.

The type of innovation represents the nature of customers' engagement. In customer-centric innovation programs, the engagement can be described as **"open innovation"** (Zajkowska, 2017);

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that is, the innovation program is open to customers and they are allowed to be involved with the process, usually at specific points in time with specific processes. In customer-focused innovation programs, customer engagement can be called "closed innovation"; that is, the innovation process is seen as a black box and customers are not directly involved with the innovation process. In customer-driven innovation programs, in contrast, the customer's engagement is dynamic, providing ideas anytime and anywhere. Customers and organizations interact frequently, sometimes in unstructured ways, and organizations need to serve customers' dynamic needs.

Table 1. Customer-centric innovation compared to other consumer-engaging innovations

	Customer-driven Innovation	**Customer-centric Innovation**	**Customer-focused Innovation**
Central entity	Customer	Customer and organization	Organization
Degree of customer involvement	Innovation by customers	Innovation with customers	Innovation for customers
Role of organization	Coordinator	Communicator	Innovator
Type of innovation	Dynamic innovation	Open innovation	Closed innovation
Degree of control	Impossible to control	Difficult to control	Easy to control
Degree of coordination	Emergent coordination	Difficult to coordinate	Easy to coordinate
Critical innovation stage	Commercialization (Ideas are over-generated and developed, but difficult to commercialize)	Idea development (Ideas are abundant, but difficult to develop)	Idea generation (Ideas are scarce)
Types of innovation to focus on	Products and services, output interaction with products and services	Communication with customers; customer interaction with organization	Customer segmentation and customer analysis
Critical issues with innovation types	"Sticky" and tacit knowledge transfer requires high levels of human interaction Customer must be segmented for proper analysis	Investment in infrastructure High-quality communication needed Risk of copycats	Analysis must be ongoing Systems must be integrated Information overload possible

Source: K. C. Desouza, Y. Awazu, S. Iha, C. Dombrowski, S. Papagari, P. Baloh, J. Y. Kim, Customer-driven Innovation, Research Technology Management, Taylor & Francis 2008, pp. 35-44.

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In customer-centric innovation organizations can control the innovation process, coordination is done by organization and is quite complex, with multiple stakeholders involved. In customer-centric innovation programs, idea development, screening and refinement are central.

With reference to the presented analysis and taking into account the objectives of this project, the following definition of Customer-centric innovation was adopted for further analysis in this report:

> *"Customer-centric innovation describes a change from innovating for customers to innovate with customers. Therefore, the customer takes an active role in innovation processes and becomes the primary source of ideas to initiate innovation activities. By integrating the customer-centric innovation philosophy, companies open their research and development activities, meaning that the innovation process happens with input from inside and outside of the company. Customers are involved in all stages of the innovation process."*
>
> *(Desouza et al. 2020; Steinhoff & Breuer, 2014; Zajkowska, 2017)*

Customer-centric innovation revolves around customers' needs with the goal of designing a new product or service that delivers on these needs and expectations. Customer-centric New Product Development (CC-NPD) can be defined as a multidisciplinary innovation process that puts customer's needs and expectations at the heart of the new product development process (Romero and Molina, 2016). Authors' innovation process puts the customer at the centre of the creative (imagine) development and (early) commercialization stages. Figure 1 illustrates the individual steps within a company that are taken during a customer-centric innovation process.

Figure 1. Customer-centric Innovation Process

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Source: own study based on D. Romero, A. Molina, A Multidisciplinary Framework and Toolkit to Innovate Customer-Centric New Product Development, Proceedings: 21th International ICE-Conference on Engineering, Technology and Innovation – June 2015, www.ice-conference.org, available 19.02.2021

Customer-centric innovation raise a range of critical issues that organizations must consider as they utilize customer innovation. The development of organizational processes around customer innovation demands a new lens through which to assess both innovative processes and organizational mission.

Table 2. Critical Issues, Concerns and Checkpoints of Customer Innovation

Type of Customer Innovation	Critical Issue	Checkpoints
Customer segmentation	Customers and categories are dynamic. Staff must be trained and understand purpose. Right types of innovation must guide segmentation to avoid discrimination.	Are types of customer information prioritized? Are there customer protection guidelines?
Customer analysis	Information overload, particularly from automated systems. Systems must be integrated (i.e., form all types of customer interactions).	Can analyses be traced back to specific customers? Are all systems connected?

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	Privacy and security of customer data must be protected.	
Customer communication	Complex problems and valuable clients require in-person interaction. High-quality communication must be paramount. Many channels and options for communication must exist for "anytime, anywhere" service.	If outsourced, does customer service still understand customers?
Customer interaction with organization	Investment must be made in infrastructure for agility in adapting to environment. Risks with established relationships whenever communication channels changed. Copycats may rapidly duplicate ideas.	Can the organization's structure morph? Has groundwork for change been laid with established suppliers, vendors, customers, etc.?
Customer interaction with products and services	Customers and technicians need a common language. Novice and expert customers need to be handled differently. Channels of communication need to be varied and flexible.	Are customers segmented by need and expertise? Do technicians interact regularly with customers?
Products and services outputs	Requires rich, human-to-human interaction. "Sticky" or tacit knowledge can be difficult to articulate. Feasibility must be carefully analyzed and customer needs, not specific products, should be identified.	Are there protocols for eliciting knowledge form customers? Are there metrics to evaluate the marketability of ideas?

Source: K. C. Desouza, Y. Awazu, S. Iha, C. Dombrowski, S. Papagari, P. Baloh, J. Y. Kim, Customer-driven Innovation, Research Technology Management, Taylor & Francis 2008, pp. 35-44.

This report aims to provide SMEs with an overview of the possibilities offered by digital tools for integrating consumer-centric innovations into their business models. To this end, the digital tools presented in the literature and publicly available sources are analyzed with regard to their applicability against the background of customer-centric innovations in SMEs.

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Methods of customer-centric innovation

Analog methods of customer-centric innovation

Before digitization appeared, companies were already using methods to involve customers in the development of products and services. The following chapter provides an overview of a selection of these methods. Due to the diversity of existing methods, only a selection of them can be presented in this report. As explained later, the methods presented pursue the goal of initiating a change from the question *"What do customers want?"* to "*What should the products do for the customers?"* (Leavy, 2017; Ulwick, 2010).

Lead-User Method:

The lead user method is based on opening up innovation processes of companies in order to promote the development of products and services through the targeted collection of external information. In this process, lead users are specifically sought who can be characterized as advanced users or users. Lead users deal intensively with problems in a field of activity for which the market offers no solution. In order to successfully integrate lead users, it should be ensured that the needs of the lead users are highly likely to mirror the needs of the rest of the market at a later stage. All in all, it can be summarized that lead users have needs that will be found in the market in the future. Lead users often become active themselves and work out solutions for product innovations that meet their needs (Wagner & Piller, n. d.).

Experiments:

Experiments serve to involve different groups and users in the collection of ideas with the help of a concrete question. The results obtained in this process are compared with each other later on. Often, different groups are formed, consisting of experts in the field on the one hand and normal users on the other. This makes it possible to draw comparisons between the group participants and to combine professional and general knowledge and to consider different points of view. This combination of knowledge and application areas generates new ideas that can be incorporated into the development of products and services (Edvardsson et al., 2010).

Living Labs:

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The Living Labs method is used to take customers' ideas, experiences, knowledge and everyday needs as a starting point for innovations. In this context, spaces are often created that are reminiscent of the customer's home so that companies can gather impressions from the real world. In this context, situations are simulated that promote customer-centric innovations (Edvardsson et al., 2010).

Customer Group involvement:

Within the framework of this method, regular meetings with customer groups are arranged in order to learn to understand the needs and application areas of the customers and to jointly develop solutions for existing problems. Here, it is essential to determine the group composition in a targeted manner in order to be able to guarantee the marketability of the product or service to be developed. This method makes it possible for companies to have customers accompany the innovations over a long period of time. Products and services can thus be optimized through recurring design and test phases (Edvardsson et al., 2010).

Outcome based interviews:

This method is used to identify customer needs through targeted interviews. The focus here is on gathering insights into what customers want to achieve with a product or service and thus identifying its purpose. With this method, too, it is particularly important to involve a smaller, targeted group of customers in the innovation process rather than a large number of customers who do not reflect the needs of the market. It also makes sense to use trained personnel in order to generate the highest possible information content in the interview results (Edvardsson et al., 2010; Ulwick, 2010).

Digitalization – new opportunities for customer-centric innovation

Digitalization represents one of the key challenges of our time and is associated with numerous consequences for today's economic players. In addition to the provision of a suitable infrastructure at the macro level, the use of technology for the implementation of innovative business models, entrepreneurial processes, and the shortened communication channels in the context of digitization poses a challenge for many companies (Breuer, 2019). A growing digitization results in the constant availability of countless pieces of information (data), which must be collected, classified, and used efficiently and in a targeted manner according to individual interests. Furthermore, digitalization is also ensuring that spatial distances lose their relevance, which is rapidly increasing international

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competitive pressure for SMEs. Regional companies increasingly find themselves in competition with international monopolies (Breuer, 2019), leading to calls for innovation and individualization of products. The ability to incorporate digital tools into daily work means that entrepreneurial innovations are often initiated or implemented with the help of digital technologies (Accenture, 2015). To provide insight into a selection of existing methods, this report will revisit this topic in Chapter 3.

To connect digital technologies and customer-centric innovation, it can be stated that a globally connected world by digital technologies has changed the role of customers radically over the past decades (Schaubmair, 2017; Steinhoff & Breuer, 2014). Customers have gone from a passive, receiving role to a more active, demanding one in which they are "an active co-designer" (Steinhoff & Breuer, 2014). Eric von Hippel was one of the firsts to realise that companies' profits' increase dramatically compared to their competitors when they engage in more customer-centric innovation activities (Schaubmair, 2017). Not only does customer-centric innovation improve customer satisfaction, but also it also improves the "product quality, [reduces] risk, and [increases] market acceptance" (Zajkowska, 2017a). Innovation itself is about collaborative learning and working to create something (Edgeman & Eskildsen, 2012).

To further define the term, customer-centric innovation is part of the open innovation philosophy, meaning that the innovation process happens with input from inside and outside of the company to develop new products or services. Research has shown that it is vital to involve the customer at all stages of the innovation process (e.g. Steinhoff & Breuer, 2014; Zajkowska, 2017). In order to do this properly, the company has to know its customers well and gather as much knowledge on their lives, work processes, value chains and value systems, in other words the culture they are involved in (Edgeman, 2012; Schaumair, 2017).

Furthermore, customer-centric innovations increase both customer benefits and customer loyalty. Because customers are actively involved in the design of products and services and have them shaped according to their needs, the likelihood that these customers will remain loyal to the company in the long-term increases. Trust relationships are thus strengthened and relationships are built (Hofbauer, 2013).

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Digitalization of customer-centric innovations in SMEs – Framework conditions

The level of analysis considered in this report is small and medium-sized enterprises (SMEs) in the 13 associated project partner countries. According to the official EU definition, SMEs can be identified based on staff headcount and turnover or balance sheet total (European Commission, 2021). Table 3 below provides an overview of the characteristics used to determine the size of an enterprise.

Table 3. Definition of SMEs

Company category	Staff headcount	Turnover	Balance sheet total
Micro enterprise	< 10	Less or equal 2 million Euro	Less or equal € 2 million
Small enterprise	< 50	Less or equal 10 million Euro	Less or equal 10 million Euro
Medium-sized enterprise	< 250	Less or equal 50 million €	Less or equal 43 million €

Source: European Commission, 2021

Benefits and barriers of using digital tools to integrate customer-centric innovation in SMEs

The diffusion of new digital technologies in innovative activities can become a driving force for the development of new ideas. The very characteristic of innovation in accordance with the Oslo Manual indicates many benefits, which, by improving the efficiency of the company's operations, lead to gaining a competitive advantage by shifting the demand curve for the company's products, e.g. increasing the quality of products, offering new products or gaining new markets or customer groups, or the company's cost curve e.g. reducing unit costs of production, purchasing, distribution or transactions, or relating to the company's innovative capacity, e.g. increasing the ability to develop new products or processes or to acquire and create new knowledge (OECD, no date).

The key benefits of applying new technologies to customer-centric innovation are data collection. The benefit of efficient and comprehensive data analysis and collection in innovative activities is related to the acquisition of knowledge resulting from data transformed into information. According to the Report "Measuring the Business Impacts of Effective Data" (*Measuring the Business*

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Impacts of Effective Data, no date), increasing the efficiency of data processing by just 10% can increase productivity by up to 49% in retail sales and by 39% in consulting services. In other sectors, growth of up to 20% can be expected.

Effective data analysis allows you to get to know your customers better, their needs, purchasing habits and preferences in the first place. Thanks to the use of modern cloud solutions and data storage, it is possible to store large collections, which allows constant access to a comprehensive history of customer relationships and analysis of their purchasing behavior. Enterprises see the advantages of data analysis in terms of customer segmentation and matching strategies to deal with each of them. Thanks to this, it is possible to reveal patterns of behavior and dependencies that are visible only after creating a full picture that combines, for example, the customer's activity on social media with his place of residence (geolocation) and a promotional campaign at a given time for a specific product.

Another benefit of using digital technologies is the ability to immediately react in real time and communicate with the customer, e.g. when making a purchase decision and launching an automatic search of internal resources about previous customer behaviors to check if they already have a purchase history or use external sources to supplement his profile.

Effective use of digital tools will allow you to identify the real demand for new products and services on the market, get to know the opinion of consumers about different versions of one article or improve its functionality. As a result, it will translate into an increase in the level of customer satisfaction, improvement of the opinion about the brand and an increase in the level of sales, which according to McKinsey report may increase margin by up to 60% (J. Manyika, M. Chui, B. Brown, J. Bughin, R. Dobbs, Ch. Roxburgh, 2011). For entrepreneurs during galloping changes, the speed of reaction is a source of building an advantage over their competitors.

Enterprises undergoing digital transformation may have concerns about applying new technologies to their innovation activities. As outlined by Bank Gospodarstwa Krajowego et al. (2019), SMEs often face a number of obstacles that hinder digitization projects. These include, in particular, IT security issues, as well as insufficient digital skills. In addition, SMEs report that poorly developed infrastructure and associated slow internet connections hinder the implementation of digital methods in their value creation.

Skills to manage digital tools for customer-centric innovation vary from classical ICT skills (Cesaroni & Consoli, 2015; Demary et al., 2016). Therefore, targeted skills need to be developed

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within SMEs to efficiently introduce customer-centric innovation. In addition, unclear responsibilities to manage the collected information hinder innovative activities (Demary et al., 2016). A failure in capturing and processing the collected customer information may lead to incomplete pictures of customer needs, which results in additional effort to introduce customer innovation (Schaubmair, 2017).

Besides required IT skills, companies often face the hurdle of uncertain legal environments with respect to competition and property laws as well as liability regulations when colleting customer data. Especially the collection of personal data and varying regulations in the international context represent obstacles (Demary et al., 2016).

High investment and training costs appear to be one of the key concerns in the implementation of digital solutions in innovation activities. The transition to digital solutions involves costs for the purchase of both new IT infrastructure and software. This often exceeds the development capacity of enterprises, especially smaller ones with limited financial resources. In addition, the introduction of new solutions in the functioning of the enterprise is associated with the change of processes, in particular the need for employees to switch to new tools for the functioning of the organization. This means training employees in new tools and how to use them. It is also possible to employ new specialists with specific competences necessary for the proper functioning of new functionalities or the entire equipment. In the calculation of switching to new operating methods, infrastructure maintenance costs should also be added. As a result, the overall cost of transforming an enterprise may exceed the company's financial capacity. This risk also entails the need for additional equipment (Zajkowska, 2021).

Another barrier is related to the potential misuse of data and manipulation. Enterprises realize, which has repeatedly appeared in the results of this study, that information is currently the greatest value in business. Effective information management starts with establishing an appropriate methodology for its collection. Data can come from many sources - both from inside the organization and from outside.

The inclusion of intelligent technology in the production processes leads to the gradual replacement of the natural strength and abilities of humans with robots. As a consequence, it means the loss of some jobs previously occupied by people.

However, the risk may be the increased dependence of employees on technological support, which makes the company vulnerable to technological failures. In addition, the efficiency savings from

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digital manufacturing require high initial investment and training costs as complex technical equipment and a high level of expertise are required. Likewise, technological limitations in terms of size and production speed must be taken into account, for example the quality of 3D printed products, in particular surface properties, is in constant need of improvement. In addition, digital manufacturing processes can also become targets for abuse and manipulation.

Framework conditions for the implementation of digital customer-centric innovation: Case studies – Germany

When looking at the digital infrastructure in Germany, it can be noted that almost all SMEs in Germany have access to the internet. Only among microenterprises have 3 percent of SMEs and 1 percent of those with 10 to 49 employees stated that they do not have internet access. This means that the biggest external barrier to the realisation of customer innovation via digital tools has been passed (see figure 1). A similar result can be seen for the availability of a fixed broadband connection. Here, too, the proportion of micro enterprises is lowest at 89 percent, followed by the medium size category at 95 percent. 97 percent of SMEs with 50 to 249 employees have a fixed broadband connection. However, SMEs' assessments of the quality of the digital infrastructure point to potential for improvement. For example, the available speed of the broadband connection for the activities of microenterprises is most satisfactory (77 percent rate the speed as sufficient).

Furthermore, the examination of the framework conditions also shows that less than half of the SMEs employ their own IT specialists. There are clear differences between the company size categories. While 43 percent of large SMEs state that they employ IT specialists, this is the case for only 12 percent of SMEs with 10 to 49 employees. The shortage of skilled workers often discussed in the literature is confirmed by SMEs irrespective of employment size classes. 65 percent of SMEs stated that they had experienced difficulties in hiring IT specialists in 2020. While 43 percent of large SMEs were able to compensate for this skills shortage through internal and/or external IT training, only 18 percent of SMEs with 10 to 49 employees had this opportunity to bring the required expertise into the company. Different continuing education formats can serve as a sustainable way to acquire basic knowledge.

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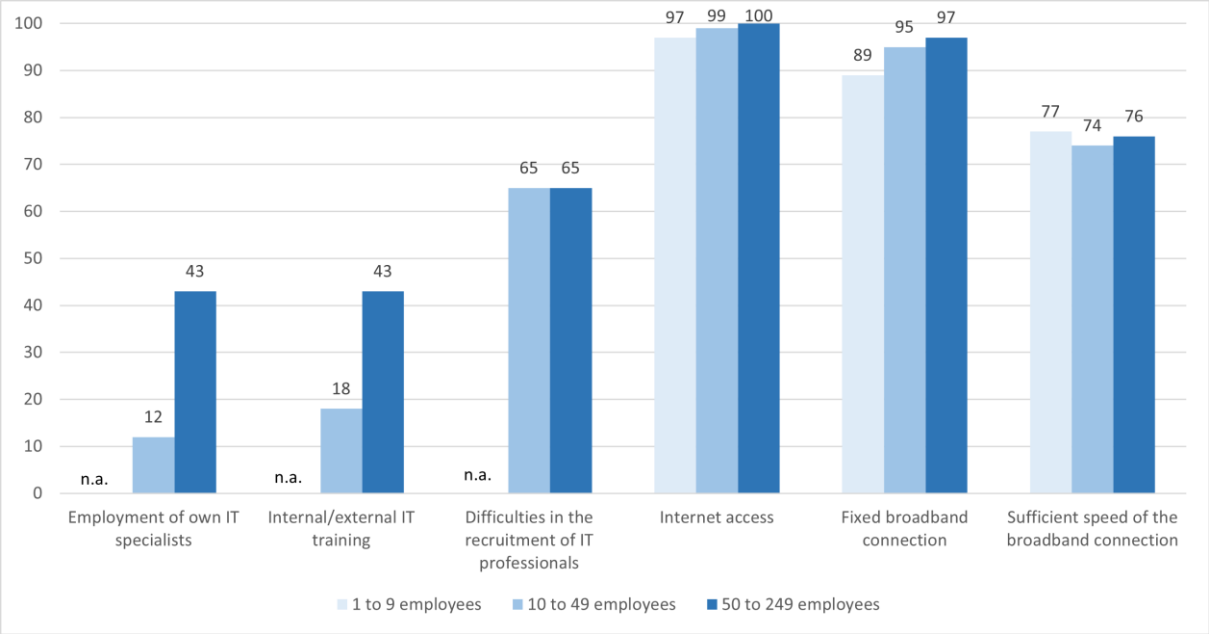
Figure 2 Framework conditions for digital customer-centric innovation in Germany, 2020, in %



Source: Federal Statistical Office (2021) ICT indicators for companies: Germany, years, employment size classes

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Derivation of a digital toolbox for customer-centric innovation in SMEs

The following chapter intends to provide insights into existing digital technologies and tools to realize customer-centric innovation. As mentioned, SMEs often face resource scarcity and therefore may be confronted by a shortage of specific digital skills. While some companies are already familiar with certain digital solutions, this technology may be new territory for other companies (International Chamber of Commerce Argentina, 2020). Moreover, digital technologies cannot be confined to a firmly defined area. Rather, they are embedded in countless processes, marketing or organizational methods and can be individually adapted or expanded to meet the specific SME's needs (Nepelski, 2019). Due to these facts, a broad range of digital tools will be assessed. The following subchapter will provide a thematic introduction to the digital transformation and the new technologies that have emerged as a result. Digital tools that companies can use within the framework of the technologies described to initiate customer-centric innovations are then presented to derive a digital toolbox.

Digital transformation – new technological trends

The digital revolution, leading to a radical reduction in the costs of storing, processing and transmitting information, changes the way the economy functions, especially for SMEs. The environment in which SMEs operate in EU countries is constantly changing. Customer expectations are constantly growing and the future is becoming harder and harder to determine. This means the necessity to constantly monitor and analyze the conditions of business and competition on the market. In addition to focusing on development in the long term, flexibility, speed of action and adaptation to the expectations of buyers, as well as competing in quality are the elements that distinguish digital companies from those with an analog profile. Their market success results from the ability to define ambitious goals and their efficient implementation. Next step for SMEs is to adapt to the ongoing digital transformation and use the right digital tools.

Gartner ('Top 10 strategic technology trends for 2018', 2017) identified three overarching current technology theme trends as the foundation for successful business activities in the digital era: **intelligent, digital and mesh.** It argues that, in order to achieve competitive advantage, firms must search for opportunities along this 'intelligent digital mesh'.

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The first technology trend theme, intelligent, addresses the emergence and spread of **artificial intelligence (AI)** and its applications in analytics and intelligent things. Artificial intelligence (AI) refers to the growing ability of computers to perform activities that previously required the involvement of human intelligence (A. Agrawal, J.S. Gans, 2017). Artificial intelligence can process large amounts of data in less time than the human brain allows (Hoffman, 2016). Opportunities in this topic include the replacement, extension and improvement of activities and efficiency previously performed by human resources.

This topic also covers the possibilities of so-called smart things that combine the **Internet of Things (IoT)** with AI-based analytics. IoT technologies refer to information and communication networks or environments where objects are equipped with sensors that allow them to interact with each other and potentially operate autonomously. As a result of increasing levels of connectivity and interaction provided by IoT technologies, large amounts of data have become available. This gives great opportunities for enterprises, including those less technologically advanced, to carry out Big Data analyzes in order to use them effectively (Picot and Loebbecke, 2015).

Another technological area is the digital trend, which refers to connecting the real and virtual worlds to create a digitally enhanced environment. It covers all forms of integrating digital technologies into manufacturing processes and workflows. Digital manufacturing refers to computer-controlled manufacturing processes such as additive manufacturing and the use of digital twins in the manufacturing process. Additive manufacturing, i.e. **3D printing** (R. Jiang, R. Kleer, 2017), consists in combining materials layer by layer with a solid based on a digital 3D model. The materials used for 3D printing cover a wide range of substances from steel, plastic, cement and even wooden parts. **Digital twins** are virtual replicas of physical objects during the manufacturing process that can help predict key variables and enable fast and inexpensive digital experiments.

In addition, experiences created with the use of **augmented reality (AR)** technology (M.E. Porter, no date) play an increasingly important role in the field of digital technology trends. Augmented reality is about enriching the real world with digital functions in order to provide new forms of perception of the environment. AR technologies also enable users to interact with digital technologies in new forms.

The third technological area relates to the networking trend of connecting people, organizations, and technologies to generate and deliver digital results. Key to this area is **Blockchain technology** (D. Tapscott, 2017), which refers to a peer-to-peer network that enables and records transactions

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based on an open, distributed ledger. Its potential underlying business impact ranges from its original use as the foundation of the Bitcoin cryptocurrency to the overall digitization of transactions. Another type of networking technology is **digital platforms** (M.W. van Alstyne, G.G. Parker, 2016) that aim to create a network of connections. They represent the technological foundations enabling direct communication and interactions between different groups of actors. The platform owner usually controls the operation of the platform and enables interactions and transactions between the manufacturers who make up the platform's offer and the consumers who buy or use these products and services. Platforms have indirect network effects because the more users on the producer or consumer side, the more attractive the platform is to the other side. In addition, a critical mass of actors on each side is critical to the platform's potential success. In the light of the presented considerations, a wide range of digital technologies can be noticed that can be used in innovative activities of enterprises. However, economic practice shows that not all the opportunities offered by new technological trends are used, and the level of their implementation in individual types of innovation varies.

Digital tools for customer-centric innovation

The following subchapter will describe a selection of digital tools to realize customer-centric innovation covered by the literature. As mentioned, the following tools are applicable to be implemented in different stages of the customer-centric innovation process to collect needed customer information.

To begin with, a basic digital tool is the company website. A clearly structured website helps customers to get an idea of the company and its products. By providing a direct contact person, their email address or a clearly accessible contact form, questions and requests from customers or interested parties can be efficiently recorded and processed. The assignment of clear internal responsibilities and the establishment of internal customer management processes, e.g. via customer relationship management tools, support the processing of incoming customer inquiries and helps to capture customer needs on the demand side (Cesaroni & Consoli, 2015; Liang & Tanniru, 2007). Closely related to the website is the use of emails. Emails serve as another basic tool to enable general communication with customers. With the help of emails, customer inquiries as well as newsletters can be used to build a digital network (idid.).

To successfully integrate customer requests that may lead to customer-centric innovations the establishment of suitable communication channels is of particular interest. It is important to ensure

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that the tools used are easy to use for both customers and SMEs. A generally widespread method of integrating consumers into operational processes is the use of social media platforms (e.g. Facebook, Instagram, LinkedIn). The rapid exchange of information taking place in these platforms can both promote collaboration between customers and companies and expand entrepreneurial innovation networks (Deloitte, n.d.). In additions, social media provides access to a new, fast, innovative way of communicating with customers, creating new ways of collaboration, thought sharing and co-creation. Furthermore, products or services can be co-designed, co-produced and enhanced by interaction between companies and customers. Therefore, with the social media revolution, consumers have expanded their role from passive to active consumers (Cesaroni & Consoli, 2015).

It is important for SMEs to be authentic and personal on social media. It is also important for companies to actively use their social media and to engage with both already established and potential new customers through competitions, quick responses or by sharing user-generated content. This can be a photo of a product, an opinion or feedback, or simple open questions to engage with customers and show them that you value their opinion on potential new developments and products (Carter 2019; George 2019). Nevertheless, SMEs can also use social media without a major strain put on their (financial) resources due to its accessibility and little or no monetary investment needed.

Besides the before mentioned channels, social media also offers the opportunity to use forums, blogs or other social media platforms to further establish relationships with customers. These relationships can be used to collecting first-hand information of customers (Cesaroni & Consoli, 2015). In addition, companies can collect data from customers visiting their website and social media presence which can be used to generate more customer-centric innovation. Digitalisation therefore enables companies to perform better in the long run because these companies are usually more connected to their customers and the markets they operate in (Columbus, 2020).

A further integration of digital tools for the realization of customer-centric innovation lies in the use of the web 2.0 in SMEs (Liang & Tanniru, 2006). Web 2.0 describes a socio-technological change in the usage of the internet, from a traditional information sharing and e-commerce to a participation of the web users to generate additional benefits. Therefore, the internet is transformed into a productive platform. The focus lies in gathering different kind of data that is available on the world wide web. As examples of web 2.0 tools, Wikis and social tagging can be named. While wikis enable users to publish information on a specific topic online (so-called crowd sourcing), social

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tagging describes the collection of meaningful, intuitive and high-quality keywords that enable context indexing of information objects and implemented to improve or refine search results (e.g. on a corporate webpage) (Siepermann, 2021).

It can be summarized that the described technological tools can foster the knowledge acquisition, transfer and elaboration for customer-centralized innovation. Customer data can be collected in various ways such as through customer feedback, during transitions or by using cookies and web-server logs (Castagna et al., 2020). Furthermore, the authors emphasize that relational tools such as email, blogs or content management systems enhance communication between companies and customers, while collaborative tools such as social media improve knowledge sharing and relationship building. With respect to a company's marketing activities, digital tools such as mobile and banner advertising or direct email marketing (e.g. newsletter) help to gather customer data and share knowledge.

Applied instruments, methods and procedures of customer-centric innovation in SMEs

Case study Germany

The quantitative study of ICT indicators by the German Federal Statistical Office shows that more than half of SMEs had an internet presence in the form of a company website in 2020 (see Figure 2). SMEs with 50 to 249 employees occupy a pioneering position here with a share of 93 percent, followed by 87 percent of SMEs with 10 to 49 employees. The taillight is the microenterprises, 59 percent of which operate a website. On a positive note, 69 percent of employees in microenterprises have access to the internet. This is true for 57 percent of SMEs in the medium employment size category. SMEs with 49 to 250 employees bring up the rear with a share of 56 percent.

A further, closer look at the use of corporate websites in SMEs shows that large SMEs especially (54 percent) use this opportunity to draw customers' attention to the company's social media channels. This tool offers further opportunities to establish direct contact with customers. This connection is also used by41 percent of SMEs with 10 to 49 employees and 29 percent of SMEs with 1 to 9 employees. Direct opportunities for customers to configure the desired products

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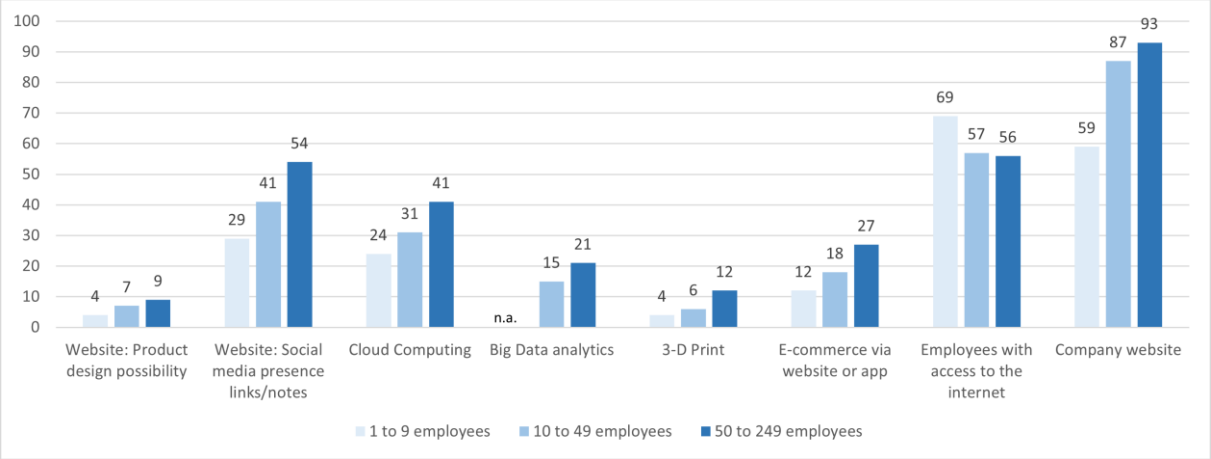
according to their own ideas are not yet widespread in German SMEs. Only 4 percent of small SMEs, 7 percent of medium-sized SMEs and 9 percent of large SMEs offer this option in 2020.

Figure 3 Applied instruments, methods, and procedures to customer-centric innovation in Germany, 2020, in %



Source: Federal Statistical Office (2021) ICT indicators for companies: Germany, years, employment size classes

When considering the use of technologically and time more demanding digital tools, it can be observed that SMEs in the higher employment size categories are more advanced in their use of these than microenterprises. For example, just under a quarter of microenterprises use cloud computing applications to make areas of internal data processing and exchanges with customers more efficient e. g. by using cloud emailing. These digital solutions are integrated in 31 percent of companies with 10 to 49 employees and in 41 percent of SMEs with 50 to 249 employees.

Due to a shortage of data for microenterprises, it is not possible to provide insight into the integration of Big Data analytics methods for these companies. However, it can be seen that the integration of this technology is already taking place in medium-sized SMEs (15 percent) and large SMEs (21 percent). This offers great potential for evaluating the diversity of existing customer data in a targeted manner for the development of products and services.

On the contrary, strong differences can be seen in the use of additive manufacturing technologies in the area of 3-D printing processes. Above all, SMEs with more than 50 employees are using the possibilities of 3-D printing as part of their business activities in 2020. With a share of 12 percent, this digital method is applied two times more frequently in large SMEs than in medium-sized SMEs (6 percent). 4 percent of microenterprises state that they use this technology.

The benefits of e-commerce, such as rapid customer identification and communication, were used by 12 percent of microenterprises in Germany in 2020. With a share of 18 percent of SMEs with

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10 to 49 employees, the influence of company size on the digital integration of e-commerce solutions based on sales via a website or app is not very pronounced. For 27 percent of SMEs with 50 to 249 employees, the use of e-commerce is already part of the business model.

Digital technologies for the realization of customer-centric innovations – Application notes

The following chapter will derive application notes for the described tools and technologies to initiate and to perform customer-centric innovation activities in SMEs. To do so, a comprehensive table will be developed, displaying the technologies and tools described and an assignment to technology types will be made (table 4). Furthermore, the technologies and tools will be matched with a selection of innovation stages in the process of customer-centric innovation activities (table 5). Then, obstacles and benefits of these tools will be assigned (table 5), followed by recommendations for application of customer-centric innovation projects. In general, it needs to be emphasized that this overview of application notes is not final and needs to be enhanced as new tools and technologies develop. Also, the table is not to be interpreted as a ranking of tools or technologies applicable for SMEs, but as a general overview. Since individual SMEs have individual technological or human preconditions, wishes, and aims for the realization of customer-centric innovation, each SME may make us of the technology or tool that fits their needs best and therefore also experiences individual benefits or challenges that might occur along this process.

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Tools for customer-centric innovation by technology type

Table 4 Tools for customer-centric innovation by technology type

	Type		
Tool	**Analog**	**Digital**	**Mesh**
E-Mail		x	
Newsletter		x	
Company website		x	
Chatbot		x	
Mobile & banner advertising		x	
Online advertising		x	
Social Media (passive e. g. forums, blogs)		x	
Social Media (active e. g. LinkedIn, Facebook, Instagram)		x	
Q&A		x	
Customer support			x
Computer-controlled manufacturing		x	
3-D printing		x	
Internet 2.0 (e. g. Wikis, Social tagging, crowdsourcing)		x	
Content marketing		x	
Survey, questionnaires, interviews			x
Focus groups	x		
Brainstorming			x
Observations			x
Test groups			x

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Field tests	x		
Simulations			x
Visualizations			x
Living labs	x		
Diary Search	x		

Tools and technologies for customer-centric innovation by innovation stage

Table 5 Tools and technologies for customer-centric innovation by innovation stage

Innovation stage	Applicable tools & technologies
Market research / Exploration	*Tools:* • Forums, blogs, E-Mail, Social Media (active), Social Media (passive), Interviews, Surveys, Observations, Test groups, Living labs, Diary Search, Crowdsourcing *Technologies* • Web2.0, Knowledge management systems, Enterprise resource planning, Artificial intelligence, Big data, customer relationship management, Digital platforms
Idea creation	*Tools:* • Simulations, Visualizations, Living labs, Support Team, Social Media (active), Social Media (passive), E-Mail, Test groups, interactive company website, Q&A *Technologies:* • Big data, Artificial intelligence, cloud computing, customer relationship management, digital manufacturing,

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	digital platforms, internet, knowledge management, Web 2.0
Prototype development	*Tools*: • Living labs *Technologies:* • Internet of things, Augmented reality, Big data, Digital manufacturing, Digital Twins, Internet of Things
Prototype testing	*Tools*: • Simulations, Visualizations, Social Media (active), Focus Groups, Interviews, Observations, Test Groups, *Technologies:* • Virtual reality, digital twins, Augmented reality, Internet
Product and service development	*Tools:* • Chat bots, Support team, Social Media (active), Social Media (passive), Interviews, *Technologies:* • Internet of things, Artificial intelligence
Commercialization	*Tools:* • Company website, Social Media (active), online advertisement, Field tests, Newsletter, Blogs, Forums, Content marketing, *Technologies:* • Internet, Digital platforms, Cloud computing, Web 2.0

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Benefits of the implementation of tools for customer-centric innovation

Table 6 Benefits of the implementation of tools for customer-centric innovation

	Customer relationship					Market conditions							Organisational aspects				
Tools	Digital network	Quick exchange of information	Understanding of purchasing behaviour	Human interaction	Increased customer satisfaction / loyality	Improved product functionality	Increased market acceptance	Reduction of market risks	Overcoming regional restrictions	Improved competitiveness	Increased customer stock	Expansion of market accessibility	Processing of large data sets	Low financial requirements	Data collection	Improved product & services portfolio	Increased productivity
E-Mail	X	X		X	X			X	X	X	X	X		X		X	
Newsletter	X				X				X	X	X	X		X		X	
Company website	X	X			X		X	X	X	X	X	X		X		X	
Chatbot		X			X	X		X	X	X	X	X				X	
Q&A		X			X	X		X	X	X	X	X		X		X	
Online advertising	X						X	X	X	X	X	X				X	
Content marketing			X				X	X	X	X	X	X				X	
Social Media	X	X	X		X	X	X	X	X	X	X	X		X		X	
Customer support	X	X	X	X	X	X	X	X		X	X	X		X		X	
Computer-controlled manufacturing						X	X	X		X			X			X	X
3D-Printing						X	X	X		X			X			X	X
Internet 2.0			X		X		X	X		X	X					X	
Big Data			X			X		X		X	X		X	X		X	X
Surveys, interviews			X	X	X	X		X		X						X	

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Focus groups			X	X	X	X		X		X						X	
Brainstorming			X	X	X	X		X		X				X		X	
Observations			X	X	X	X		X		X				X		X	
Test groups			X	X	X	X		X		X						X	
Field tests			X	X	X	X		X		X						X	
Simulations			X	X	X	X		X		X						X	
Visualizations			X	X	X	X		X		X						X	
Living labs			X	X	X	X		X		X						X	
Diary Search			X	X	X	X		X		X						X	

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Obstacles for the implementation of tools for customer-centric innovation

Table 7 Obstacles of the implementation of tools for customer-centric innovation

	Financial constrains				Framework conditions			Organisational issues						
Tools	High technological investment	Need of specific hard-ware / soft-ware	Unclear return of investment/ high uncertainty	High training costs	Data security	Internet connection	IT Infrastructure	Need for specialized personnel (e. g. IT)	Need for training	Lack of trust in tool	Shortage of human resources	Risk of information overload	Lack of clear responsibilities	Increased vulnerability to technological failures
E-Mail						X	X						X	
Newsletter						X	X				X		X	
Company website						X	X				X		X	X
Chatbot		X		X	X	X	X	X	X	X				
Q&A						X	X					X	X	
Online advertising				X		X	X	X	X		X	X		
Content marketing				X		X	X	X	X		X	X		
Social Media					X	X	X				X	X	X	
Customer support					X	X	X		X		X	X	X	
Computer-controlled manufacturing	X	X	X	X	X	X	X	X	X	X	X			X
3D-Printing	X	X	X	X	X	X	X	X	X	X	X			X
Internet 2.0						X	X	X	X		X	X		X
Big Data		X	X	X	X	X	X	X	X	X	X	X	X	X
Surveys, interviews				X				X	X		X	X		
Focus groups				X				X	X		X	X		
Brainstorming				X				X	X		X	X		
Observations				X				X	X		X	X		

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Test groups				X				X	X		X	X		
Field tests				X				X	X		X	X		
Simulations				X				X	X		X	X		
Visualizations				X				X	X		X	X		
Living labs				X				X	X		X	X		
Diary Search				X				X	X		X	X		

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Recommendations for the implementation of customer-centric innovation

- Develop protocols to elicit knowledge
- Develop metrics to evaluate marketability of ideas
- Targeted segmentation of customer's involved in innovation process
- Think broad- is your customer private/corporate or a public actor?
- Targeted segmentation of personnel involved
- Prioritization of customer information
- Understand the 'story' of your target customers (e. g. value chains, culture)
- Customers are dynamic, specific training needed to capture desirable information
- Tools should be easy to use by personnel and customers
- Regular interaction with customers
- Align organization structure to fully match needs to customer-centric innovation in all fields
- Development of customer protection guidelines
- Active outreach for external knowledge by the company
- Development of a common language between company and customers
- Lack of general skills for customer-centric innovation might have a negative impact on customer-centric innovation process
- Matching company strategies to meet customer preferences
- Human-to-human interaction fosters the transfer of sticky knowledge
- In-person interaction helps to minimize communication issues

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Part D

Study of applied instruments, methods and procedures for the integration of customer-based innovation in SMEs

Best practices of customer-focused Innovations & Digitalisation

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Introduction

This report is prepared within the framework of the EU Program *Erasmus + Key Action 2: Cooperation for innovation and the exchange of Good Practices* funded project **"Digital methods, toolbox and trainings for increasing customer innovation in SMEs"**. The aim of the project is to strengthen the innovation capacity of SMEs in Eastern Europe. Thereby, the central problem of resource scarcity in SMEs is explicitly addressed, which causes difficulties in the integration of a customer-centric innovation approach within SMEs. To address this problem, this report provides an insight into aspects of the use of digital methods for the identification, processing, and implementation of customer-centric innovations in SMEs. In addition, selected best practices of customer-centric innovation activities are elaborated. Based on this research, a survey will be developed to determine the status quo of customer-centric innovation activities in the 13 associated project countries included in the project and to derive teaching needs and enable a curriculum for the implementation of targeted trainings.

The report is also intended to provide insights to present a detailed description and evaluation of digital technologies with regard to their use for various areas du procedures for obtaining and implementing customer innovations in small and medium-sized enterprises. In addition, guidance and recommendations for the use of these technologies are developed for SMEs on the one hand, and for consultants and teachers on the other.

In summary, the findings there are highlighted to develop the most tangible result possible that serves as a starting point for any stakeholder to use digital methods for customer-centric innovation.

I. Development of new ways of using digital technologies. Evaluation, consulting and guidance for use by SMEs, consultants & teachers

New ways of using digital technologies

As described in the report **Study of applied instruments, methods and procedures for the integration of customer-centric innovation in SMEs**, SMEs in particular are confronted with

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a variety of specific obstacles in using or switching to digital technologies and methods (e.g., lack of financial resources, lack of clear responsibilities, lack of time resources or lack of human capital). This chapter illustrates the extent to which the digital methods and technologies considered in the project address these obstacles and, through targeted training and consulting, suggest to SMEs the opportunities and benefits of digital methods for realizing customer-centric innovations.

The following discussion provides a selection of the extremely diverse world of digital technologies that are available for customer-centric innovations in SMEs. Similar to the term SME, the term digital technologies covers an immense variety of different facets. For example, while the term SME can represent either a small two-man operation or a company with 200 employees, the differences in the technological depth of digital technologies likewise range from e-mails or corporate websites to computer-controlled manufacturing or 3-D printing.

Thus, it should always be noted that the respective technologies require different challenges and prior knowledge in the implementation, so that the use cases and applicability of these in SMEs is very individual and must always be adapted or adjusted to the respective needs and capabilities of the users. Digital technologies and methods considered in the project include: Email, newsletters, company website, mobile & banner advertising, social media (passive e.g. forums, blogs), social media (active e.g. LinkedIn, Facebook, Instagram), Q&A pages, computerized manufacturing, 3D printing, Internet 2.0 (e.g. wikis).

However, since the involvement of customers in the development of processes, products and services was already used by companies to generate competitive advantages before the digital age, it is also worth considering analog methods for customer-centric innovation and, if possible, combining them with the digital methods described. These analog methods include: Living labs, diary search, simulations, field tests, test groups, observations, brainstorming or focus groups. Due to the diverse possibilities of the digital world, it makes sense to combine digital and analog methods with each other (mesh), if necessary, in order to involve customers efficiently and purposefully in entrepreneurial innovation processes.

Combining analog methods for customer-centric innovation with digital methods and tools allows SMEs to incorporate customer knowledge into business processes and the corporate knowledge pool at different stages of innovation. Examples of novel methods would include:

Table 1 New ways of customer-centric innovations

Method	Digital Tool / Technology
Questionnaires	Social media (active)
Surveys	E-Mail / Newsletter / Company Website

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Living lab	Forums, Blogs
Simulations / Visualizations	3-D print, augmented reality, virtual reality, digital twin
Brainstorming	Social media, Cloud Computing, Internet 2.0
Observations	Forums, Social Media, Big Data, Customer Relationship Management, Chatbots

The opportunities presented in Table 1 offer a glimpse of the wide range of possibilities for using digital methods to integrate customers. Depending on their needs and internal capabilities and resources, SMEs have a wide variety of application options at their disposal for implementing customer-centric innovations with the help of digital technologies.

The digital methods and technologies described in detail in the **Study of applied instruments, methods and procedures for the integration of customer-centric innovation in SMEs** offer a wide range of benefits for SMEs. They can support SMEs in establishing or strengthening a relationship with their customers. This is done, for example, through the establishment and maintenance of a digital network or through the rapid exchange of information. This cultivation of customer relationships can lead to a strengthening of the basis of trust between customers and companies, which on the one hand enables companies to get to know their customers better and to assess their needs. On the other hand, customers also build a relationship with the company and feel valued. This relationship can strongly shape customer loyalty and a company's image. And it serves as a basic prerequisite for establishing customer-centric innovations in SMEs.

Once the relationship between customers and SMEs is established, the diverse, individual digital solutions and their integration into individual SMEs help companies to improve their position on the market and overcome regional barriers. Due to the knowledge exchange between demanders and producers, SMEs are enabled to always adapt their products, processes or services in order to remain consistent on the market.

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Evaluation & Guidance for the use of digital technologies for customer-centric innovation in SMEs

As the **Case Study of applied digital technologies in SMEs in Poland, Denmark and Germany** illustrates, there are major differences not only in the individual countries of Europe, but also in the perception of the degree of digitization of different national stakeholders. Thus, it is always of particular importance to assess the individual needs, opportunities and barriers for the establishment and use of digital technologies and methods for customer-centric innovation in SMEs. Due to the immense diversity and the multitude of different framework conditions, both on the infrastructural, on the skilled labor or on the financial level, great differences prevail in the SMEs. The same applies to the individual goals that are to be achieved by means of the use of digital technologies and methods in the involvement of customers. In order to create needs-based training and consulting opportunities, consultants and trainers should analyze the needs individually in order to be able to convey information in a targeted manner and not overwhelm the SMEs with information that may not be able to be processed due to the abundance of information. In addition to these key elements, there are other factors that should be considered in training on digitization and the use of digital technologies for customer-centric innovation:

- Set a common language (technical terms and their objectives should be communicated in an understandable way)
- Identify & engage key people
- Analysis of the framework of the SME
- Identification of the needs of SMEs
- Analysis of organizational processes in SMEs
- Definition of enablers and barriers
- Identify suitable tools & technologies and communicate them in a comprehensible way
- Constant exchange, open speech culture
- Don't be afraid to fail - You learn from your mistakes
- In-person interaction helps to minimize communication issues
- Human-to-human interaction fosters the transfer of sticky knowledge
- Promoting and challenging employee knowledge in a targeted manner
- Tools should be easy to use by personnel and customers
- Suggest tools for analysis & use of external knowledge

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II. Study of applied instruments, methods and procedures for the integration of customer-centric innovation in SMEs

Introduction to customer-centric innovation

The following findings are intended to provide an insight into aspects of the use of digital methods for the identification, processing, and implementation of customer-centric innovations in SMEs. In addition, selected best practices of customer-centric innovation activities are elaborated. Based on this research Chapter III refers a survey will be developed to determine the status quo of customer-centric innovation activities in the 13 associated project countries included in the project and to derive teaching needs and enable a curriculum for the implementation of targeted trainings.

Customer-centric Innovation

In a changing and uncertain world, the alignment of innovation with the current and potential customers' needs is necessary. To meet these challenges and to remain competitive, especially small and medium-sized enterprises (SMEs) must constantly innovate to add value. In other words, they must design, develop and deploy new product and service offerings that meet the needs of the marketplace. In order to do this they must become customer driven (Griffin, 2004; Zahay and Griffin, 2004).

Customer-centric innovation is very different from customer-focused innovation and customer-driven innovation. In customer-centric innovation programs, innovation is done **with customers – organizations and customers create innovation together**. In customer-focused innovation programs, innovation is done by the organization. In customer-driven innovation programs, the customer is the key player – innovation is done by customers, with minimum involvement by the organization. Customers are the primary source of ideas and the customers of new products and services. They can offer ideas without geographic, and time constrains, and the organization must be able to apply those ideas quickly to the development of new products and services. Without the tools to support such dynamic interaction, it risks losing its customer to competitors.

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The type of innovation represents the nature of customers' engagement. In customer-centric innovation programs, the engagement can be described as **"open innovation"** (Zajkowska, 2017); that is, the innovation program is open to customers and they are allowed to be involved with the process, usually at specific points in time with specific processes. In customer-focused innovation programs, customer engagement can be called "closed innovation"; that is, the innovation process is seen as a black box and customers are not directly involved with the innovation process. In customer-driven innovation programs, in contrast, the customer's engagement is dynamic, providing ideas anytime and anywhere. Customers and organizations interact frequently, sometimes in unstructured ways, and organizations need to serve customers' dynamic needs.

Table 1. Customer-centric innovation compared to other consumer-engaging innovations

	Customer-driven Innovation	Customer-centric Innovation	Customer-focused Innovation
Central entity	Customer	Customer and organization	Organization
Degree of customer involvement	Innovation by customers	Innovation with customers	Innovation for customers
Role of organization	Coordinator	Communicator	Innovator
Type of innovation	Dynamic innovation	Open innovation	Closed innovation
Degree of control	Impossible to control	Difficult to control	Easy to control
Degree of coordination	Emergent coordination	Difficult to coordinate	Easy to coordinate
Critical innovation stage	Commercialization (Ideas are over-generated and developed, but difficult to commercialize)	Idea development (Ideas are abundant, but difficult to develop)	Idea generation (Ideas are scarce)
Types of innovation to focus on	Products and services, output interaction with products and services	Communication with customers; customer interaction with organization	Customer segmentation and customer analysis
Critical issues with innovation types	"Sticky" and tacit knowledge transfer requires high levels of human interaction Customer must be segmented for proper analysis	Investment in infrastructure High-quality communication needed Risk of copycats	Analysis must be ongoing Systems must be integrated Information overload possible

Source: K. C. Desouza, Y. Awazu, S. Iha, C. Dombrowski, S. Papagari, P. Baloh, J. Y. Kim, Customer-driven Innovation, Research Technology Management, Taylor & Francis 2008, pp. 35-44.

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In customer-centric innovation organizations can control the innovation process, coordination is done by organization and is quite complex, with multiple stakeholders involved. In customer-centric innovation programs, idea development, screening and refinement are central.

With reference to the presented analysis and taking into account the objectives of this project, the following definition of Customer-centric innovation was adopted for further analysis in this report:

> *"Customer-centric innovation describes a change from innovating for customers to innovate with customers. Therefore, the customer takes an active role in innovation processes and becomes the primary source of ideas to initiate innovation activities. By integrating the customer-centric innovation philosophy, companies open their research and development activities, meaning that the innovation process happens with input from inside and outside of the company. Customers are involved in all stages of the innovation process."*
>
> *(Desouza et al. 2020; Steinhoff & Breuer, 2014; Zajkowska, 2017)*

Customer-centric innovation revolves around customers' needs with the goal of designing a new product or service that delivers on these needs and expectations. Customer-centric New Product Development (CC-NPD) can be defined as a multidisciplinary innovation process that puts customer's needs and expectations at the heart of the new product development process (Romero and Molina, 2016). Authors' innovation process puts the customer at the centre of the creative (imagine) development and (early) commercialization stages. Figure 1 illustrates the individual steps within a company that are taken during a customer-centric innovation process.

Figure 1. Customer-centric Innovation Process

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Source: own study based on D. Romero, A. Molina, A Multidisciplinary Framework and Toolkit to Innovate Customer-Centric New Product Development, Proceedings: 21th International ICE-Conference on Engineering, Technology and Innovation – June 2015, www.ice-conference.org, available 19.02.2021

Customer-centric innovation raise a range of critical issues that organizations must consider as they utilize customer innovation. The development of organizational processes around customer innovation demands a new lens through which to assess both innovative processes and organizational mission.

Table 2. Critical Issues, Concerns and Checkpoints of Customer Innovation

Type of Customer Innovation	Critical Issue	Checkpoints
Customer segmentation	Customers and categories are dynamic. Staff must be trained and understand purpose. Right types of innovation must guide segmentation to avoid discrimination.	Are types of customer information prioritized? Are there customer protection guidelines?
Customer analysis	Information overload, particularly from automated systems. Systems must be integrated (i.e., form all types of customer interactions). Privacy and security of customer data must be protected.	Can analyses be traced back to specific customers? Are all systems connected?

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Customer communication	Complex problems and valuable clients require in-person interaction. High-quality communication must be paramount. Many channels and options for communication must exist for "anytime, anywhere" service.	If outsourced, does customer service still understand customers?
Customer interaction with organization	Investment must be made in infrastructure for agility in adapting to environment. Risks with established relationships whenever communication channels changed. Copycats may rapidly duplicate ideas.	Can the organization's structure morph? Has groundwork for change been laid with established suppliers, vendors, customers, etc.?
Customer interaction with products and services	Customers and technicians need a common language. Novice and expert customers need to be handled differently. Channels of communication need to be varied and flexible.	Are customers segmented by need and expertise? Do technicians interact regularly with customers?
Products and services outputs	Requires rich, human-to-human interaction. "Sticky" or tacit knowledge can be difficult to articulate. Feasibility must be carefully analyzed and customer needs, not specific products, should be identified.	Are there protocols for eliciting knowledge form customers? Are there metrics to evaluate the marketability of ideas?

Source: K. C. Desouza, Y. Awazu, S. Iha, C. Dombrowski, S. Papagari, P. Baloh, J. Y. Kim, Customer-driven Innovation, Research Technology Management, Taylor & Francis 2008, pp. 35-44.

This report aims to provide SMEs with an overview of the possibilities offered by digital tools for integrating consumer-centric innovations into their business models. To this end, the digital tools presented in the literature and publicly available sources are analyzed with regard to their applicability against the background of customer-centric innovations in SMEs.

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Methods of customer-centric innovation

Analog methods of customer-centric innovation

Before digitization appeared, companies were already using methods to involve customers in the development of products and services. The following chapter provides an overview of a selection of these methods. Due to the diversity of existing methods, only a selection of them can be presented in this report. As explained later, the methods presented pursue the goal of initiating a change from the question *"What do customers want?"* to "*What should the products do for the customers?"* (Leavy, 2017; Ulwick, 2010).

Lead-User Method:

The lead user method is based on opening up innovation processes of companies in order to promote the development of products and services through the targeted collection of external information. In this process, lead users are specifically sought who can be characterized as advanced users or users. Lead users deal intensively with problems in a field of activity for which the market offers no solution. In order to successfully integrate lead users, it should be ensured that the needs of the lead users are highly likely to mirror the needs of the rest of the market at a later stage. All in all, it can be summarized that lead users have needs that will be found in the market in the future. Lead users often become active themselves and work out solutions for product innovations that meet their needs (Wagner & Piller, n. d.).

Experiments:

Experiments serve to involve different groups and users in the collection of ideas with the help of a concrete question. The results obtained in this process are compared with each other later on. Often, different groups are formed, consisting of experts in the field on the one hand and normal users on the other. This makes it possible to draw comparisons between the group participants and to combine professional and general knowledge and to consider different points of view. This combination of knowledge and application areas generates new ideas that can be incorporated into the development of products and services (Edvardsson et al., 2010).

Living Labs:

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The Living Labs method is used to take customers' ideas, experiences, knowledge and everyday needs as a starting point for innovations. In this context, spaces are often created that are reminiscent of the customer's home so that companies can gather impressions from the real world. In this context, situations are simulated that promote customer-centric innovations (Edvardsson et al., 2010).

Customer Group involvement:

Within the framework of this method, regular meetings with customer groups are arranged in order to learn to understand the needs and application areas of the customers and to jointly develop solutions for existing problems. Here, it is essential to determine the group composition in a targeted manner in order to be able to guarantee the marketability of the product or service to be developed. This method makes it possible for companies to have customers accompany the innovations over a long period of time. Products and services can thus be optimized through recurring design and test phases (Edvardsson et al., 2010).

Outcome based interviews:

This method is used to identify customer needs through targeted interviews. The focus here is on gathering insights into what customers want to achieve with a product or service and thus identifying its purpose. With this method, too, it is particularly important to involve a smaller, targeted group of customers in the innovation process rather than a large number of customers who do not reflect the needs of the market. It also makes sense to use trained personnel in order to generate the highest possible information content in the interview results (Edvardsson et al., 2010; Ulwick, 2010).

Digitalization – new opportunities for customer-centric innovation

Digitalization represents one of the key challenges of our time and is associated with numerous consequences for today's economic players. In addition to the provision of a suitable infrastructure at the macro level, the use of technology for the implementation of innovative business models, entrepreneurial processes, and the shortened communication channels in the context of digitization poses a challenge for many companies (Breuer, 2019). A growing digitization results in the constant availability of countless pieces of information (data), which must be collected, classified, and used efficiently and in a targeted manner according to individual interests. Furthermore, digitalization is also ensuring that spatial distances lose their relevance, which is rapidly increasing international competitive pressure for SMEs. Regional companies increasingly find themselves in competition with international monopolies (Breuer, 2019), leading to calls for innovation and individualization

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of products. The ability to incorporate digital tools into daily work means that entrepreneurial innovations are often initiated or implemented with the help of digital technologies (Accenture, 2015). To provide insight into a selection of existing methods, this report will revisit this topic in Chapter 3.

To connect digital technologies and customer-centric innovation, it can be stated that a globally connected world by digital technologies has changed the role of customers radically over the past decades (Schaubmair, 2017; Steinhoff & Breuer, 2014). Customers have gone from a passive, receiving role to a more active, demanding one in which they are "an active co-designer" (Steinhoff & Breuer, 2014). Eric von Hippel was one of the firsts to realise that companies' profits' increase dramatically compared to their competitors when they engage in more customer-centric innovation activities (Schaubmair, 2017). Not only does customer-centric innovation improve customer satisfaction, but also it also improves the "product quality, [reduces] risk, and [increases] market acceptance" (Zajkowska, 2017a). Innovation itself is about collaborative learning and working to create something (Edgeman & Eskildsen, 2012).

To further define the term, customer-centric innovation is part of the open innovation philosophy, meaning that the innovation process happens with input from inside and outside of the company to develop new products or services. Research has shown that it is vital to involve the customer at all stages of the innovation process (e.g. Steinhoff & Breuer, 2014; Zajkowska, 2017). In order to do this properly, the company has to know its customers well and gather as much knowledge on their lives, work processes, value chains and value systems, in other words the culture they are involved in (Edgeman, 2012; Schaumair, 2017).

Furthermore, customer-centric innovations increase both customer benefits and customer loyalty. Because customers are actively involved in the design of products and services and have them shaped according to their needs, the likelihood that these customers will remain loyal to the company in the long-term increases. Trust relationships are thus strengthened and relationships are built (Hofbauer, 2013).

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Digitalization of customer-centric innovations in SMEs – Framework conditions

The level of analysis considered in this report is small and medium-sized enterprises (SMEs) in the 13 associated project partner countries. According to the official EU definition, SMEs can be identified based on staff headcount and turnover or balance sheet total (European Commission, 2021). Table 3 below provides an overview of the characteristics used to determine the size of an enterprise.

Table 3. Definition of SMEs

Company category	Staff headcount	Turnover	Balance sheet total
Micro enterprise	< 10	Less or equal 2 million Euro	Less or equal € 2 million
Small enterprise	< 50	Less or equal 10 million Euro	Less or equal 10 million Euro
Medium-sized enterprise	< 250	Less or equal 50 million €	Less or equal 43 million €

Source: European Commission, 2021

Benefits and barriers of using digital tools to integrate customer-centric innovation in SMEs

The diffusion of new digital technologies in innovative activities can become a driving force for the development of new ideas. The very characteristic of innovation in accordance with the Oslo Manual indicates many benefits, which, by improving the efficiency of the company's operations, lead to gaining a competitive advantage by shifting the demand curve for the company's products, e.g. increasing the quality of products, offering new products or gaining new markets or customer groups, or the company's cost curve e.g. reducing unit costs of production, purchasing, distribution or transactions, or relating to the company's innovative capacity, e.g. increasing the ability to develop new products or processes or to acquire and create new knowledge (OECD, no date).

The key benefits of applying new technologies to customer-centric innovation are data collection. The benefit of efficient and comprehensive data analysis and collection in innovative activities is related to the acquisition of knowledge resulting from data transformed into information. According to the Report "Measuring the Business Impacts of Effective Data" (*Measuring the Business Impacts of Effective Data*, no date), increasing the efficiency of data processing by just 10% can

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increase productivity by up to 49% in retail sales and by 39% in consulting services. In other sectors, growth of up to 20% can be expected.

Effective data analysis allows you to get to know your customers better, their needs, purchasing habits and preferences in the first place. Thanks to the use of modern cloud solutions and data storage, it is possible to store large collections, which allows constant access to a comprehensive history of customer relationships and analysis of their purchasing behavior. Enterprises see the advantages of data analysis in terms of customer segmentation and matching strategies to deal with each of them. Thanks to this, it is possible to reveal patterns of behavior and dependencies that are visible only after creating a full picture that combines, for example, the customer's activity on social media with his place of residence (geolocation) and a promotional campaign at a given time for a specific product.

Another benefit of using digital technologies is the ability to immediately react in real time and communicate with the customer, e.g. when making a purchase decision and launching an automatic search of internal resources about previous customer behaviors to check if they already have a purchase history or use external sources to supplement his profile.

Effective use of digital tools will allow you to identify the real demand for new products and services on the market, get to know the opinion of consumers about different versions of one article or improve its functionality. As a result, it will translate into an increase in the level of customer satisfaction, improvement of the opinion about the brand and an increase in the level of sales, which according to McKinsey report may increase margin by up to 60% (J. Manyika, M. Chui, B. Brown, J. Bughin, R. Dobbs, Ch. Roxburgh, 2011). For entrepreneurs during galloping changes, the speed of reaction is a source of building an advantage over their competitors.

Enterprises undergoing digital transformation may have concerns about applying new technologies to their innovation activities. As outlined by Bank Gospodarstwa Krajowego et al. (2019), SMEs often face a number of obstacles that hinder digitization projects. These include, in particular, IT security issues, as well as insufficient digital skills. In addition, SMEs report that poorly developed infrastructure and associated slow internet connections hinder the implementation of digital methods in their value creation.

Skills to manage digital tools for customer-centric innovation vary from classical ICT skills (Cesaroni & Consoli, 2015; Demary et al., 2016). Therefore, targeted skills need to be developed within SMEs to efficiently introduce customer-centric innovation. In addition, unclear responsibilities to manage the collected information hinder innovative activities (Demary et al., 2016). A failure in capturing and processing the collected customer information may lead to

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incomplete pictures of customer needs, which results in additional effort to introduce customer innovation (Schaubmair, 2017).

Besides required IT skills, companies often face the hurdle of uncertain legal environments with respect to competition and property laws as well as liability regulations when colleting customer data. Especially the collection of personal data and varying regulations in the international context represent obstacles (Demary et al., 2016).

High investment and training costs appear to be one of the key concerns in the implementation of digital solutions in innovation activities. The transition to digital solutions involves costs for the purchase of both new IT infrastructure and software. This often exceeds the development capacity of enterprises, especially smaller ones with limited financial resources. In addition, the introduction of new solutions in the functioning of the enterprise is associated with the change of processes, in particular the need for employees to switch to new tools for the functioning of the organization. This means training employees in new tools and how to use them. It is also possible to employ new specialists with specific competences necessary for the proper functioning of new functionalities or the entire equipment. In the calculation of switching to new operating methods, infrastructure maintenance costs should also be added. As a result, the overall cost of transforming an enterprise may exceed the company's financial capacity. This risk also entails the need for additional equipment (Zajkowska, 2021).

Another barrier is related to the potential misuse of data and manipulation. Enterprises realize, which has repeatedly appeared in the results of this study, that information is currently the greatest value in business. Effective information management starts with establishing an appropriate methodology for its collection. Data can come from many sources - both from inside the organization and from outside.

The inclusion of intelligent technology in the production processes leads to the gradual replacement of the natural strength and abilities of humans with robots. As a consequence, it means the loss of some jobs previously occupied by people.

However, the risk may be the increased dependence of employees on technological support, which makes the company vulnerable to technological failures. In addition, the efficiency savings from digital manufacturing require high initial investment and training costs as complex technical equipment and a high level of expertise are required. Likewise, technological limitations in terms of size and production speed must be taken into account, for example the quality of 3D printed products, in particular surface properties, is in constant need of improvement. In addition, digital manufacturing processes can also become targets for abuse and manipulation.

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Framework conditions for the implementation of digital customer-centric innovation: Case studies – Germany

When looking at the digital infrastructure in Germany, it can be noted that almost all SMEs in Germany have access to the internet. Only among microenterprises have 3 percent of SMEs and 1 percent of those with 10 to 49 employees stated that they do not have internet access. This means that the biggest external barrier to the realisation of customer innovation via digital tools has been passed (see figure 1). A similar result can be seen for the availability of a fixed broadband connection. Here, too, the proportion of micro enterprises is lowest at 89 percent, followed by the medium size category at 95 percent. 97 percent of SMEs with 50 to 249 employees have a fixed broadband connection. However, SMEs' assessments of the quality of the digital infrastructure point to potential for improvement. For example, the available speed of the broadband connection for the activities of microenterprises is most satisfactory (77 percent rate the speed as sufficient).

Furthermore, the examination of the framework conditions also shows that less than half of the SMEs employ their own IT specialists. There are clear differences between the company size categories. While 43 percent of large SMEs state that they employ IT specialists, this is the case for only 12 percent of SMEs with 10 to 49 employees. The shortage of skilled workers often discussed in the literature is confirmed by SMEs irrespective of employment size classes. 65 percent of SMEs stated that they had experienced difficulties in hiring IT specialists in 2020. While 43 percent of large SMEs were able to compensate for this skills shortage through internal and/or external IT training, only 18 percent of SMEs with 10 to 49 employees had this opportunity to bring the required expertise into the company. Different continuing education formats can serve as a sustainable way to acquire basic knowledge.

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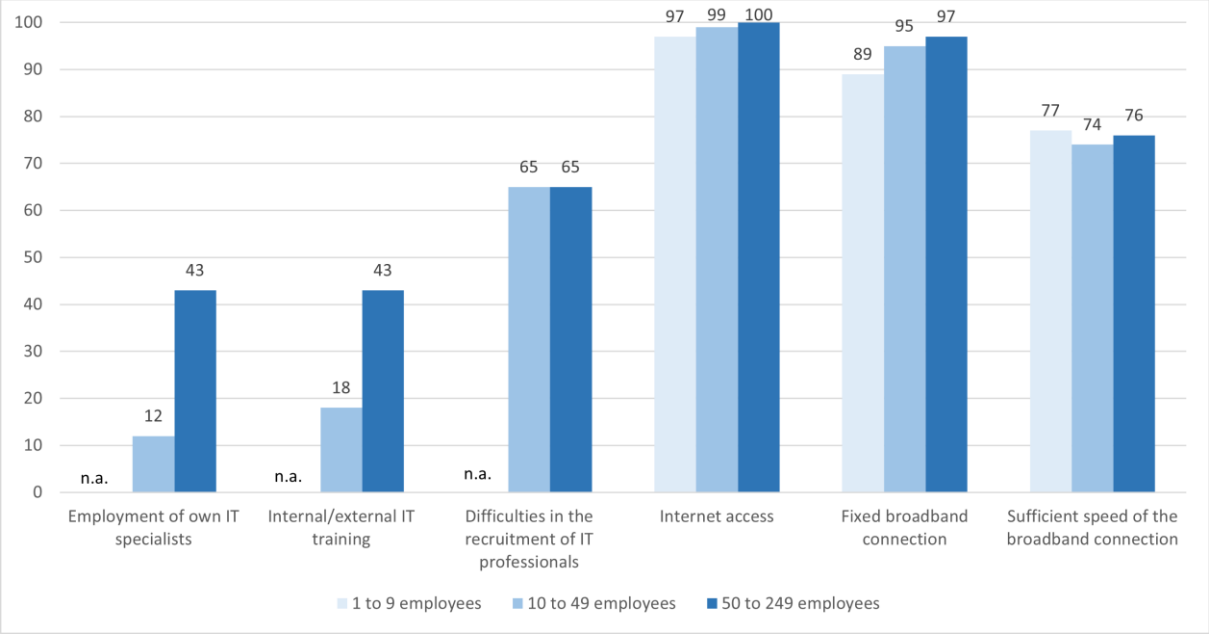
Figure 2 Framework conditions for digital customer-centric innovation in Germany, 2020, in %



Source: Federal Statistical Office (2021) ICT indicators for companies: Germany, years, employment size classes

Derivation of a digital toolbox for customer-centric innovation in SMEs

The following chapter intends to provide insights into existing digital technologies and tools to realize customer-centric innovation. As mentioned, SMEs often face resource scarcity and therefore may be confronted by a shortage of specific digital skills. While some companies are already familiar with certain digital solutions, this technology may be new territory for other companies (International Chamber of Commerce Argentina, 2020). Moreover, digital technologies cannot be confined to a firmly defined area. Rather, they are embedded in countless processes, marketing or organizational methods and can be individually adapted or expanded to meet the specific SME's needs (Nepelski, 2019). Due to these facts, a broad range of digital tools will be assessed. The following subchapter will provide a thematic introduction to the digital transformation and the new technologies that have emerged as a result. Digital tools that companies can use within the framework of the technologies described to initiate customer-centric innovations are then presented to derive a digital toolbox.

Digital transformation – new technological trends

The digital revolution, leading to a radical reduction in the costs of storing, processing and transmitting information, changes the way the economy functions, especially for SMEs. The environment in which SMEs operate in EU countries is constantly changing. Customer expectations are constantly growing and the future is becoming harder and harder to determine.

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This means the necessity to constantly monitor and analyze the conditions of business and competition on the market. In addition to focusing on development in the long term, flexibility, speed of action and adaptation to the expectations of buyers, as well as competing in quality are the elements that distinguish digital companies from those with an analog profile. Their market success results from the ability to define ambitious goals and their efficient implementation. Next step for SMEs is to adapt to the ongoing digital transformation and use the right digital tools.

Gartner ('Top 10 strategic technology trends for 2018', 2017) identified three overarching current technology theme trends as the foundation for successful business activities in the digital era: **intelligent, digital and mesh.** It argues that, in order to achieve competitive advantage, firms must search for opportunities along this 'intelligent digital mesh'.

The first technology trend theme, intelligent, addresses the emergence and spread of **artificial intelligence (AI)** and its applications in analytics and intelligent things. Artificial intelligence (AI) refers to the growing ability of computers to perform activities that previously required the involvement of human intelligence (A. Agrawal, J.S. Gans, 2017). Artificial intelligence can process large amounts of data in less time than the human brain allows (Hoffman, 2016). Opportunities in this topic include the replacement, extension and improvement of activities and efficiency previously performed by human resources.

This topic also covers the possibilities of so-called smart things that combine the **Internet of Things (IoT)** with AI-based analytics. IoT technologies refer to information and communication networks or environments where objects are equipped with sensors that allow them to interact with each other and potentially operate autonomously. As a result of increasing levels of connectivity and interaction provided by IoT technologies, large amounts of data have become available. This gives great opportunities for enterprises, including those less technologically advanced, to carry out Big Data analyzes in order to use them effectively (Picot and Loebbecke, 2015).

Another technological area is the digital trend, which refers to connecting the real and virtual worlds to create a digitally enhanced environment. It covers all forms of integrating digital technologies into manufacturing processes and workflows. Digital manufacturing refers to computer-controlled manufacturing processes such as additive manufacturing and the use of digital twins in the manufacturing process. Additive manufacturing, i.e. **3D printing** (R. Jiang, R. Kleer, 2017), consists in combining materials layer by layer with a solid based on a digital 3D model. The materials used for 3D printing cover a wide range of substances from steel, plastic, cement and

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even wooden parts. **Digital twins** are virtual replicas of physical objects during the manufacturing process that can help predict key variables and enable fast and inexpensive digital experiments.

In addition, experiences created with the use of **augmented reality (AR)** technology (M.E. Porter, no date) play an increasingly important role in the field of digital technology trends. Augmented reality is about enriching the real world with digital functions in order to provide new forms of perception of the environment. AR technologies also enable users to interact with digital technologies in new forms.

The third technological area relates to the networking trend of connecting people, organizations, and technologies to generate and deliver digital results. Key to this area is **Blockchain technology** (D. Tapscott, 2017), which refers to a peer-to-peer network that enables and records transactions based on an open, distributed ledger. Its potential underlying business impact ranges from its original use as the foundation of the Bitcoin cryptocurrency to the overall digitization of transactions. Another type of networking technology is **digital platforms** (M.W. van Alstyne, G.G. Parker, 2016) that aim to create a network of connections. They represent the technological foundations enabling direct communication and interactions between different groups of actors. The platform owner usually controls the operation of the platform and enables interactions and transactions between the manufacturers who make up the platform's offer and the consumers who buy or use these products and services. Platforms have indirect network effects because the more users on the producer or consumer side, the more attractive the platform is to the other side. In addition, a critical mass of actors on each side is critical to the platform's potential success. In the light of the presented considerations, a wide range of digital technologies can be noticed that can be used in innovative activities of enterprises. However, economic practice shows that not all the opportunities offered by new technological trends are used, and the level of their implementation in individual types of innovation varies.

Digital tools for customer-centric innovation

The following subchapter will describe a selection of digital tools to realize customer-centric innovation covered by the literature. As mentioned, the following tools are applicable to be implemented in different stages of the customer-centric innovation process to collect needed customer information.

To begin with, a basic digital tool is the company website. A clearly structured website helps customers to get an idea of the company and its products. By providing a direct contact person, their email address or a clearly accessible contact form, questions and requests from customers or

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interested parties can be efficiently recorded and processed. The assignment of clear internal responsibilities and the establishment of internal customer management processes, e.g. via customer relationship management tools, support the processing of incoming customer inquiries and helps to capture customer needs on the demand side (Cesaroni & Consoli, 2015; Liang & Tanniru, 2007). Closely related to the website is the use of emails. Emails serve as another basic tool to enable general communication with customers. With the help of emails, customer inquiries as well as newsletters can be used to build a digital network (idid.).

To successfully integrate customer requests that may lead to customer-centric innovations the establishment of suitable communication channels is of particular interest. It is important to ensure that the tools used are easy to use for both customers and SMEs. A generally widespread method of integrating consumers into operational processes is the use of social media platforms (e.g. Facebook, Instagram, LinkedIn). The rapid exchange of information taking place in these platforms can both promote collaboration between customers and companies and expand entrepreneurial innovation networks (Deloitte, n.d.). In additions, social media provides access to a new, fast, innovative way of communicating with customers, creating new ways of collaboration, thought sharing and co-creation. Furthermore, products or services can be co-designed, co-produced and enhanced by interaction between companies and customers. Therefore, with the social media revolution, consumers have expanded their role from passive to active consumers (Cesaroni & Consoli, 2015).

It is important for SMEs to be authentic and personal on social media. It is also important for companies to actively use their social media and to engage with both already established and potential new customers through competitions, quick responses or by sharing user-generated content. This can be a photo of a product, an opinion or feedback, or simple open questions to engage with customers and show them that you value their opinion on potential new developments and products (Carter 2019; George 2019). Nevertheless, SMEs can also use social media without a major strain put on their (financial) resources due to its accessibility and little or no monetary investment needed.

Besides the before mentioned channels, social media also offers the opportunity to use forums, blogs or other social media platforms to further establish relationships with customers. These relationships can be used to collecting first-hand information of customers (Cesaroni & Consoli, 2015). In addition, companies can collect data from customers visiting their website and social media presence which can be used to generate more customer-centric innovation. Digitalisation

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therefore enables companies to perform better in the long run because these companies are usually more connected to their customers and the markets they operate in (Columbus, 2020).

A further integration of digital tools for the realization of customer-centric innovation lies in the use of the web 2.0 in SMEs (Liang & Tanniru, 2006). Web 2.0 describes a socio-technological change in the usage of the internet, from a traditional information sharing and e-commerce to a participation of the web users to generate additional benefits. Therefore, the internet is transformed into a productive platform. The focus lies in gathering different kind of data that is available on the world wide web. As examples of web 2.0 tools, Wikis and social tagging can be named. While wikis enable users to publish information on a specific topic online (so-called crowd sourcing), social tagging describes the collection of meaningful, intuitive and high-quality keywords that enable context indexing of information objects and implemented to improve or refine search results (e.g. on a corporate webpage) (Siepermann, 2021).

It can be summarized that the described technological tools can foster the knowledge acquisition, transfer and elaboration for customer-centralized innovation. Customer data can be collected in various ways such as through customer feedback, during transitions or by using cookies and web-server logs (Castagna et al., 2020). Furthermore, the authors emphasize that relational tools such as email, blogs or content management systems enhance communication between companies and customers, while collaborative tools such as social media improve knowledge sharing and relationship building. With respect to a company's marketing activities, digital tools such as mobile and banner advertising or direct email marketing (e.g. newsletter) help to gather customer data and share knowledge.

Applied instruments, methods and procedures of customer-centric innovation in SMEs

Case study Germany

The quantitative study of ICT indicators by the German Federal Statistical Office shows that more than half of SMEs had an internet presence in the form of a company website in 2020 (see Figure 2). SMEs with 50 to 249 employees occupy a pioneering position here with a share of 93 percent, followed by 87 percent of SMEs with 10 to 49 employees. The taillight is the microenterprises, 59 percent of which operate a website. On a positive note, 69 percent of employees in microenterprises have access to the internet. This is true for 57 percent of SMEs in the medium

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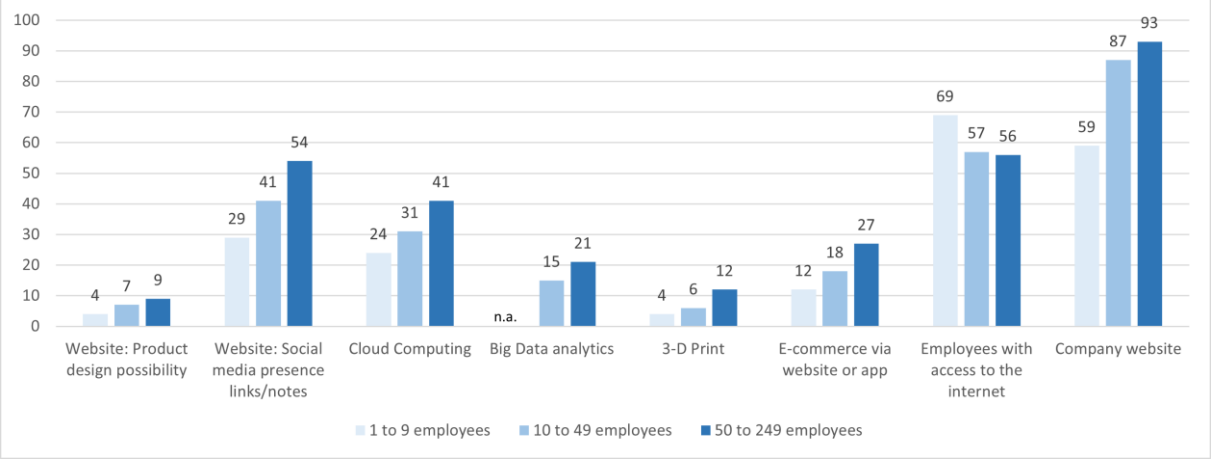
employment size category. SMEs with 49 to 250 employees bring up the rear with a share of 56 percent.

A further, closer look at the use of corporate websites in SMEs shows that large SMEs especially (54 percent) use this opportunity to draw customers' attention to the company's social media channels. This tool offers further opportunities to establish direct contact with customers. This connection is also used by41 percent of SMEs with 10 to 49 employees and 29 percent of SMEs with 1 to 9 employees. Direct opportunities for customers to configure the desired products according to their own ideas are not yet widespread in German SMEs. Only 4 percent of small SMEs, 7 percent of medium-sized SMEs and 9 percent of large SMEs offer this option in 2020.

Figure 3 Applied instruments, methods, and procedures to customer-centric innovation in Germany, 2020, in %



Source: Federal Statistical Office (2021) ICT indicators for companies: Germany, years, employment size classes

When considering the use of technologically and time more demanding digital tools, it can be observed that SMEs in the higher employment size categories are more advanced in their use of these than microenterprises. For example, just under a quarter of microenterprises use cloud computing applications to make areas of internal data processing and exchanges with customers more efficient e. g. by using cloud emailing. These digital solutions are integrated in 31 percent of companies with 10 to 49 employees and in 41 percent of SMEs with 50 to 249 employees.

Due to a shortage of data for microenterprises, it is not possible to provide insight into the integration of Big Data analytics methods for these companies. However, it can be seen that the integration of this technology is already taking place in medium-sized SMEs (15 percent) and large SMEs (21 percent). This offers great potential for evaluating the diversity of existing customer data in a targeted manner for the development of products and services.

On the contrary, strong differences can be seen in the use of additive manufacturing technologies in the area of 3-D printing processes. Above all, SMEs with more than 50 employees are using the

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possibilities of 3-D printing as part of their business activities in 2020. With a share of 12 percent, this digital method is applied two times more frequently in large SMEs than in medium-sized SMEs (6 percent). 4 percent of microenterprises state that they use this technology.

The benefits of e-commerce, such as rapid customer identification and communication, were used by 12 percent of microenterprises in Germany in 2020. With a share of 18 percent of SMEs with 10 to 49 employees, the influence of company size on the digital integration of e-commerce solutions based on sales via a website or app is not very pronounced. For 27 percent of SMEs with 50 to 249 employees, the use of e-commerce is already part of the business model.

Digital technologies for the realization of customer-centric innovations – Application notes

The following chapter will derive application notes for the described tools and technologies to initiate and to perform customer-centric innovation activities in SMEs. To do so, a comprehensive table will be developed, displaying the technologies and tools described and an assignment to technology types will be made (table 4). Furthermore, the technologies and tools will be matched with a selection of innovation stages in the process of customer-centric innovation activities (table 5). Then, obstacles and benefits of these tools will be assigned (table 5), followed by recommendations for application of customer-centric innovation projects. In general, it needs to be emphasized that this overview of application notes is not final and needs to be enhanced as new tools and technologies develop. Also, the table is not to be interpreted as a ranking of tools or technologies applicable for SMEs, but as a general overview. Since individual SMEs have individual technological or human preconditions, wishes, and aims for the realization of customer-centric innovation, each SME may make us of the technology or tool that fits their needs best and therefore also experiences individual benefits or challenges that might occur along this process.

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Tools for customer-centric innovation by technology type

Table 4 Tools for customer-centric innovation by technology type

	Type		
Tool	**Analog**	**Digital**	**Mesh**
E-Mail		x	
Newsletter		x	
Company website		x	
Chatbot		x	
Mobile & banner advertising		x	
Online advertising		x	
Social Media (passive e. g. forums, blogs)		x	
Social Media (active e. g. LinkedIn, Facebook, Instagram)		x	
Q&A		x	
Customer support			x
Computer-controlled manufacturing		x	
3-D printing		x	
Internet 2.0 (e. g. Wikis, Social tagging, crowdsourcing)		x	
Content marketing		x	
Survey, questionnaires, interviews			x
Focus groups	x		
Brainstorming			x
Observations			x
Test groups			x
Field tests	x		
Simulations			x

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Visualizations			x
Living labs	x		
Diary Search	x		

Tools and technologies for customer-centric innovation by innovation stage

Table 5 Tools and technologies for customer-centric innovation by innovation stage

Innovation stage	Applicable tools & technologies
Market research / Exploration	*Tools:* • Forums, blogs, E-Mail, Social Media (active), Social Media (passive), Interviews, Surveys, Observations, Test groups, Living labs, Diary Search, Crowdsourcing *Technologies* • Web2.0, Knowledge management systems, Enterprise resource planning, Artificial intelligence, Big data, customer relationship management, Digital platforms
Idea creation	*Tools:* • Simulations, Visualizations, Living labs, Support Team, Social Media (active), Social Media (passive), E-Mail, Test groups, interactive company website, Q&A *Technologies:* • Big data, Artificial intelligence, cloud computing, customer relationship management, digital manufacturing, digital platforms, internet, knowledge management, Web 2.0
Prototype development	*Tools*:

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	• Living labs *Technologies:* • Internet of things, Augmented reality, Big data, Digital manufacturing, Digital Twins, Internet of Things
Prototype testing	*Tools*: • Simulations, Visualizations, Social Media (active), Focus Groups, Interviews, Observations, Test Groups, *Technologies:* • Virtual reality, digital twins, Augmented reality, Internet
Product and service development	*Tools:* • Chat bots, Support team, Social Media (active), Social Media (passive), Interviews, *Technologies:* • Internet of things, Artificial intelligence
Commercialization	*Tools:* • Company website, Social Media (active), online advertisement, Field tests, Newsletter, Blogs, Forums, Content marketing, *Technologies:* • Internet, Digital platforms, Cloud computing, Web 2.0

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Benefits of the implementation of tools for customer-centric innovation

Table 6 Benefits of the implementation of tools for customer-centric innovation

	Customer relationship					Market conditions							Organisational aspects				
Tools	Digital network	Quick exchange of information	Understanding of purchasing behaviour	Human interaction	Increased customer satisfaction / loyality	Improved product functionality	Increased market acceptance	Reduction of market risks	Overcoming regional restrictions	Improved competitiveness	Increased customer stock	Expansion of market accessibility	Processing of large data sets	Low financial requirements	Data collection	Improved product & services portfolio	Increased productivity
E-Mail	X	X		X	X			X	X	X	X	X		X		X	
Newsletter	X				X				X	X	X	X		X		X	
Company website	X	X			X		X	X	X	X	X	X		X		X	
Chatbot		X			X	X		X	X	X	X	X				X	
Q&A		X			X	X		X	X	X	X	X		X		X	
Online advertising	X						X	X	X	X	X	X				X	
Content marketing			X				X	X	X	X	X	X				X	
Social Media	X	X	X		X	X	X	X	X	X	X	X		X		X	
Customer support	X	X	X	X	X	X	X	X		X	X	X		X		X	
Computer-controlled manufacturing						X	X	X		X			X			X	X
3D-Printing						X	X	X		X			X			X	X
Internet 2.0			X		X		X	X		X	X					X	
Big Data			X			X		X		X	X		X	X		X	X
Surveys, interviews			X	X	X	X		X		X						X	
Focus groups			X	X	X	X		X		X						X	

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Brainstorming			X	X	X	X		X		X				X		X	
Observations			X	X	X	X		X		X				X		X	
Test groups			X	X	X	X		X		X						X	
Field tests			X	X	X	X		X		X						X	
Simulations			X	X	X	X		X		X						X	
Visualizations			X	X	X	X		X		X						X	
Living labs			X	X	X	X		X		X						X	
Diary Search			X	X	X	X		X		X						X	

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Obstacles for the implementation of tools for customer-centric innovation

Table 7 Obstacles of the implementation of tools for customer-centric innovation

	Financial constrains				Framework conditions			Organisational issues						
Tools	High technological investment	Need of specific hard-ware / soft-ware	Unclear return of investment/ high uncertainty	High training costs	Data security	Internet connection	IT Infrastructure	Need for specialized personnel (e. g. IT)	Need for training	Lack of trust in tool	Shortage of human resources	Risk of information overload	Lack of clear responsibilities	Increased vulnerability to technological failures
E-Mail						X	X						X	
Newsletter						X	X				X		X	
Company website						X	X				X		X	X
Chatbot		X		X	X	X	X	X	X	X				
Q&A						X	X					X	X	
Online advertising				X		X	X	X	X		X	X		
Content marketing				X		X	X	X	X		X	X		
Social Media					X	X	X				X	X	X	
Customer support					X	X	X		X		X	X	X	
Computer-controlled manufacturing	X	X	X	X	X	X	X	X	X	X	X			X
3D-Printing	X	X	X	X	X	X	X	X	X	X	X			X
Internet 2.0						X	X	X	X		X	X		X
Big Data		X	X	X	X	X	X	X	X	X	X	X	X	X
Surveys, interviews				X				X	X		X	X		
Focus groups				X				X	X		X	X		
Brainstorming				X				X	X		X	X		
Observations				X				X	X		X	X		
Test groups				X				X	X		X	X		

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Field tests				X				X	X		X	X		
Simulations				X				X	X		X	X		
Visualizations				X				X	X		X	X		
Living labs				X				X	X		X	X		
Diary Search				X				X	X		X	X		

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Recommendations for the implementation of customer-centric innovation

- Develop protocols to elicit knowledge
- Develop metrics to evaluate marketability of ideas
- Targeted segmentation of customer's involved in innovation process
- Think broad- is your customer private/corporate or a public actor?
- Targeted segmentation of personnel involved
- Prioritization of customer information
- Understand the 'story' of your target customers (e. g. value chains, culture)
- Customers are dynamic, specific training needed to capture desirable information
- Tools should be easy to use by personnel and customers
- Regular interaction with customers
- Align organization structure to fully match needs to customer-centric innovation in all fields
- Development of customer protection guidelines
- Active outreach for external knowledge by the company
- Development of a common language between company and customers
- Lack of general skills for customer-centric innovation might have a negative impact on customer-centric innovation process
- Matching company strategies to meet customer preferences
- Human-to-human interaction fosters the transfer of sticky knowledge
- In-person interaction helps to minimize communication issues

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III. Case Study of applied digital technologies in SMEs in Poland, Denmark and Germany

Introduction

As presented in Chapter II, the digital transformation of business processes is very multifaceted. The possibilities, intelligent, digital and the combination of digital and analog (mesh) activities provide companies with the opportunity to generate competitive advantages. These technological trends of digitalization include technologies such as artificial intelligence (AI), Internet of the Things (IoT), cloud computing and digital application methods such as general Information and communication (ICT) tools in the form of websites or the integration of social media.

The following case study provides an insight into the application of digital technologies and methods in three selected *ICIinSMEs* partner countries, namely Germany, Denmark, and Poland. This analysis compares the results of the European Commission's data on digital inclusion (Eurostat 2021a-g) with the results of the project's survey of SMEs in the partner nations.

Based on this analysis, versatile and profound results will be elaborated, which will be used in the further course of the ICIinSMEs project as a basis and decision support for the development of targeted training contents for the promotion of customer-based innovations in SMEs with the help of digital solutions. To allow this to be achieved, the first step is to analyze the digital skills of the population in the selected countries. This knowledge forms the basis for the application and use of the many opportunities offered by digitization. This is followed by a description of the general integration of information and communication technologies in SMEs. The analysis of the application of digital technologies starts with cloud computing, followed by Internet of the Things and the application of social media methods in SMEs. Closely related to this is the application of artificial intelligence and big data analytics in order to be able to evaluate and process the collected information efficiently and in a targeted manner with the help of digital technologies. To create a comprehensive picture, data from the European Commission will first shed light on the aforementioned topics, followed by the practice-oriented survey results of this project.

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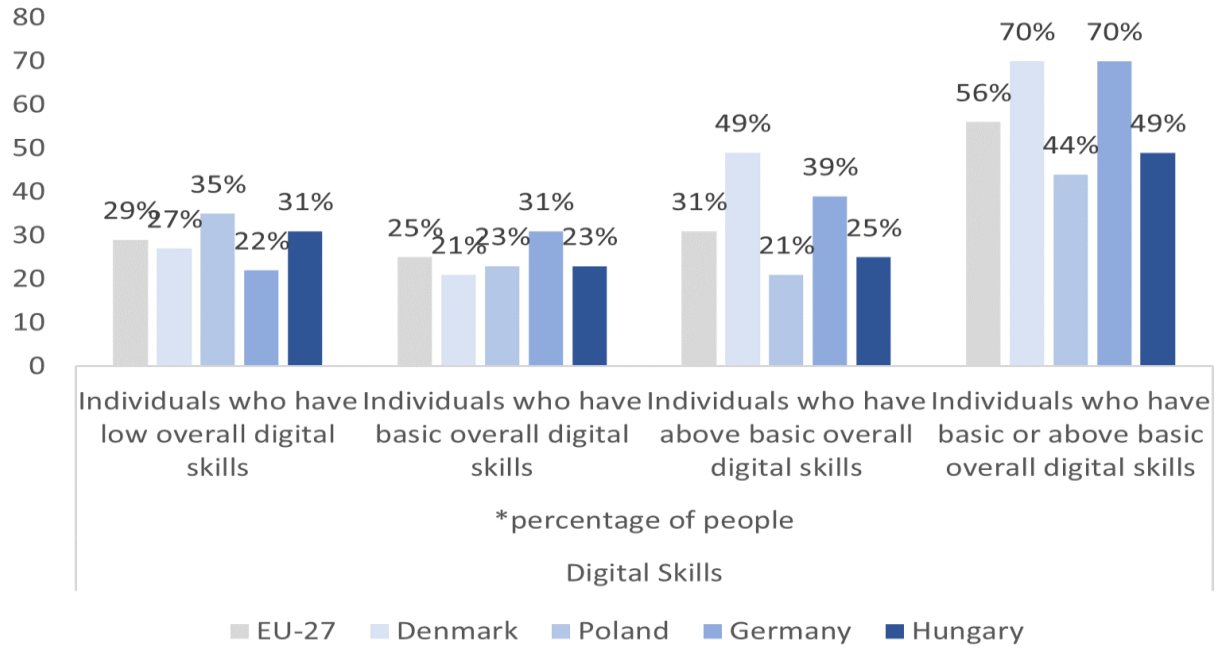
Digital skills

As mentioned, the presence of digital skills in the population is considered a basis for successful digital transformation and integration. As the European Commission's data reveals, the majority of the Danish, Polish and German residents indicated that they have basic or above basic general digital skills. Thus, an important milestone in the application of digital methods has already been reached. However, it should be emphasized that the Polish population has a lower percentage of basic or higher digital skills compared to the EU-27. When looking at individuals who reported basic skills, Denmark, Hungary and Poland are below the EU-27 average, with 21 and 23 percent of respondents, respectively (figure 1). This might be reasoned by the fact that Denmark, for example, has a higher percentage of individuals who have a higher level of digital skills (Eurostat, 2021a).

Figure 1 Assessment of digital skills, in percent of people, 2019



Source: Eurostat (2021a)

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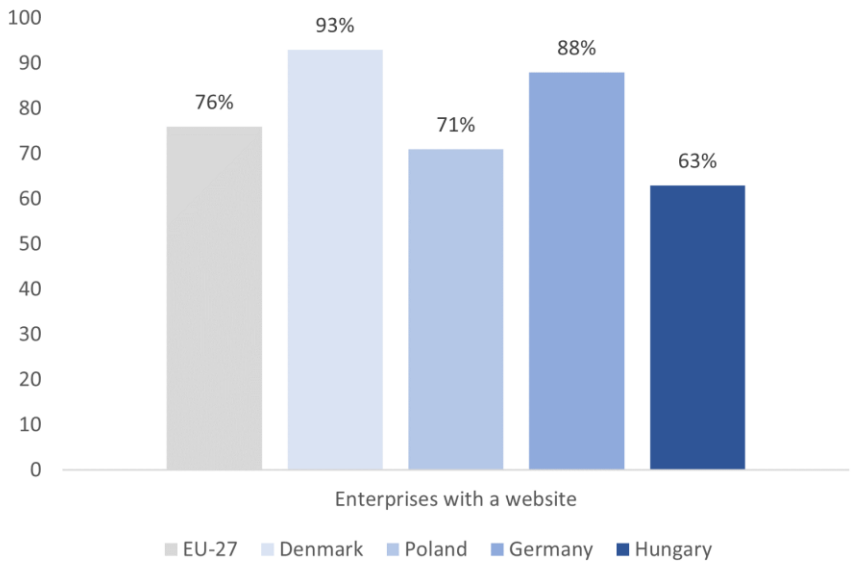
General integration of Information- and Communication technologies

The analysis of the general integration of ICT shows that 93 percent of Danish enterprises have their own website. Denmark is thus the front-runner of the three countries considered, closely followed by Germany, where 88 percent of enterprises stated that they had company websites. Bringing up the rear are Hungary and Poland, where 63 and 71 percent of companies operate a website, below the EU-27 average of 76 percent, see Figure 2 (Eurostat, 2021b). A similar trend can be seen in the use of computers with internet access at work. Here, too, Denmark leads the comparison with a share of 75 percent of all employees. While Germany, with a share of 56 percent of all employees, is just above the EU-27 average of 54 percent, Poland, with 48 percent, and Hungary, with 42 percent, are situated below the EU-27 average (figure 3) (Eurostat, 2021c).

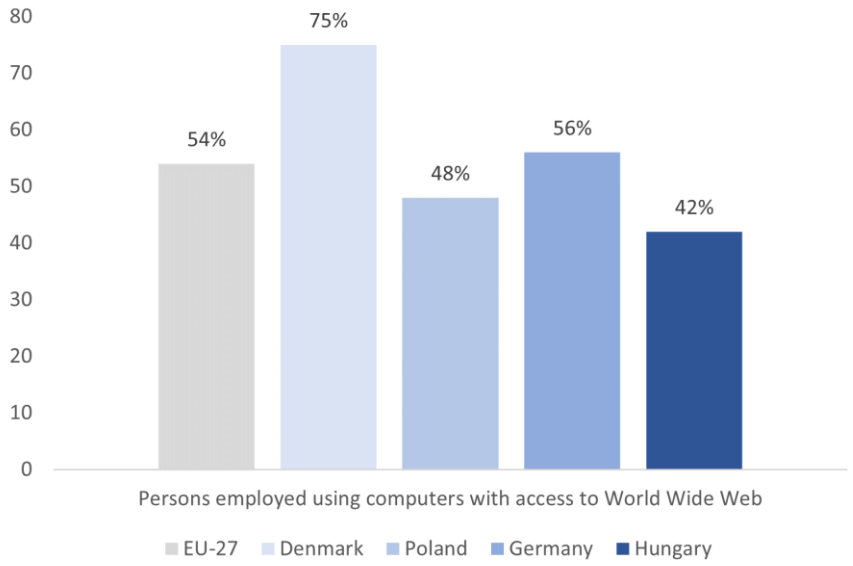
These results are to be interpreted against the background of the industry-specific economic structures of the respective countries. Structural aspects of the individual economic systems can thus justify the use of websites. Nevertheless, the existence of a corporate website represents an initial communication opportunity for sharing corporate information and contacting customers with the help of this digital technology.

Figure 2 Web presence, in % of companies, 2020



Source: Eurostat (2021b)

Figure 3 Employees with access to the internet, in %, 2020



Source: Eurostat (2021c)

Integration of Cloud Computing

The integration of cloud computing in SMEs offers a wide range of advantages, such as location- and time-independent access to data, reduced investment costs for (server) hardware, or the use of IT infrastructures without high administration costs (Scopevisio, 2021). The use of cloud systems thus offers SMEs in particular, which often face difficulties in implementing digital solutions due to a lack of resources or specialist IT knowledge, an opportunity to use them in a resource-saving manner. As figure 4 illustrates, these benefits are not yet widespread among SMEs. For example, 66 percent of Danish companies use this digital technology to digitize internal processes, while 32 percent of German SMEs, 23 percent of Polish SMEs and 24 percent of Hungarian SMEs use this technology. Against this background, 29 percent of Danish SMEs said they use cloud computing for customer relationship management. Thus, Denmark is far ahead of Poland (5%), Germany (6%) and Hungary (6%) in the use of cloud computing for customer relationship management (Eurostat, 2021d).

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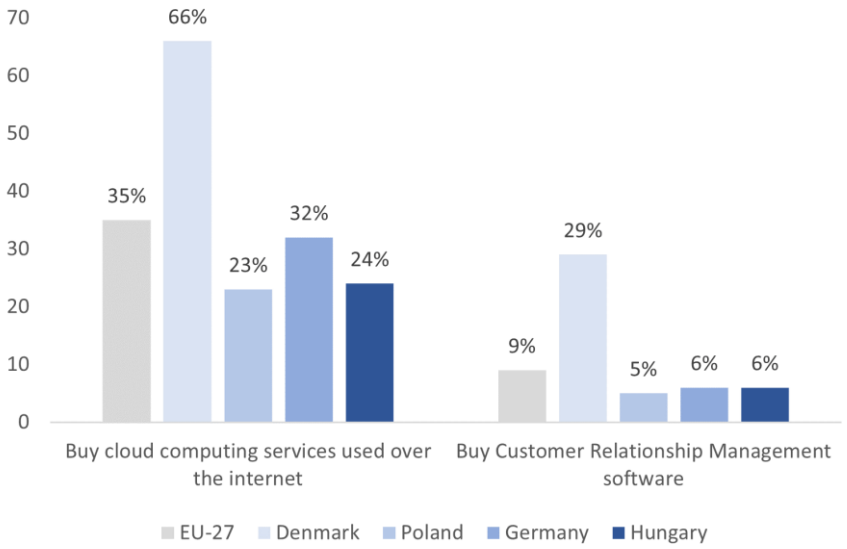
Figure 4 Use of Cloud Computing, in % of SMEs, 2020

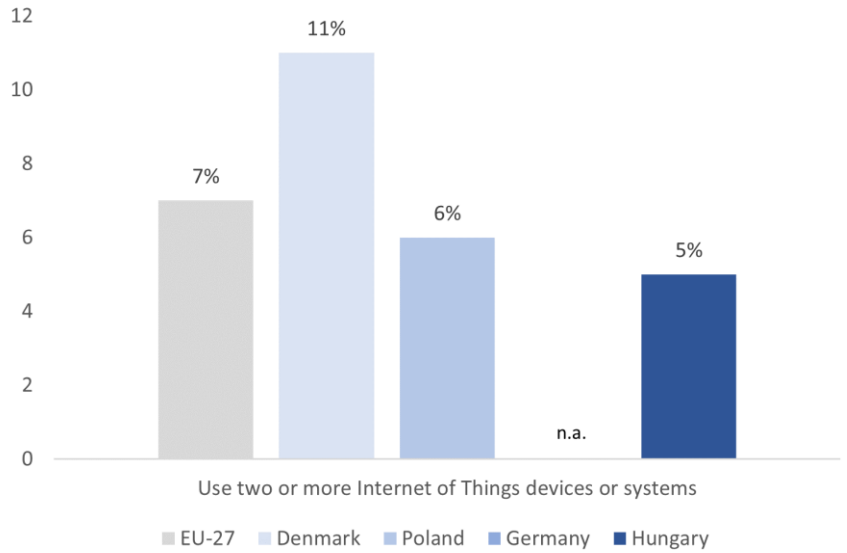


Source: Eurostat (2021d)

Integration of the Internet of Things

IoT is one of the technologies that enable companies to equip physical objects (e.g., machines, robots) with sensors that record and transmit real-time data via the internet and is primarily used to automate processes. As figure 5 illustrates, the use of IoT in SMEs is not yet very widespread (Eurostat, 2021e).

Figure 5 Integration of Internet of Things, in % of SMEs, 2020



Source: Eurostat (2021e)

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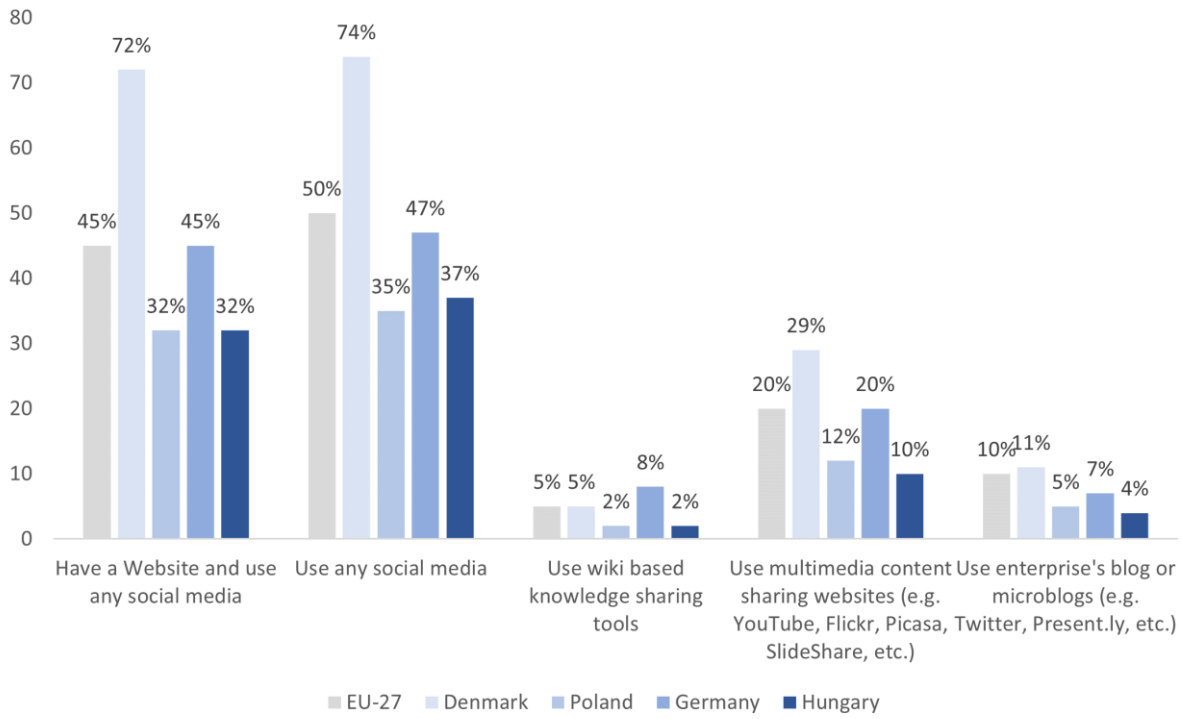
Application of Social Media

The application of social media methods offers great potential for integrating customers into the business processes of SMEs using digital methods and thus enabling customer-based innovations. However, as the analysis of Eurostat data shows, a large number of SMEs in Germany and Poland have not yet recognized or implemented this potential of social media and its positive influence on the competitiveness of companies. Once again, Denmark stands out as the frontrunner in the use of social media, with 74 percent of SMEs using it, far above the EU-27 average of 50 percent. A detailed look at the social media platforms used reveals that content sharing websites such as YouTube and Flickr are frequently used by SMEs. In addition, blogs are used by 11 percent of Danish SMEs, 5 percent of Polish SMEs, 4 percent of Hungarian SMEs and 7 percent of German SMEs to communicate company content to the outside world and to establish contact with customers. The use of wikis is not widespread in the countries under review in 2019 (Eurostat, 2021f).

Figure 6 Use of Social Media, in % of SMEs, 2019



Source: Eurostat (2021f)

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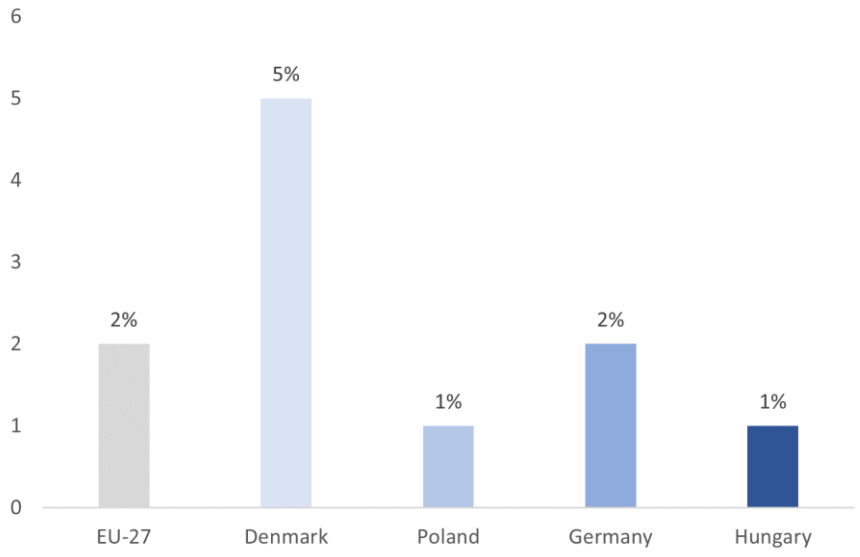
Use of Artificial Intelligence

As indicated in the literature analysis, Artificial Intelligence (AI) refers to a growing data processing ability of computers to perform activities without the influence of human intelligence. This leads to the opportunity to process large data sets which may improve efficiency of internal processing and data analytics. As figure Seven illustrates, only some SMEs in Denmark (5 percent), Poland (1 percent), Germany (2 percent) and Hungary (1 percent) yet have the expertise or financial and time resources to integrate this technology (Eurostat, 2021g). Again, this may also be reasoned by structural characteristics of industries.

Figure 7 Data analysis via Machine Learning, in % of SMEs, 2020



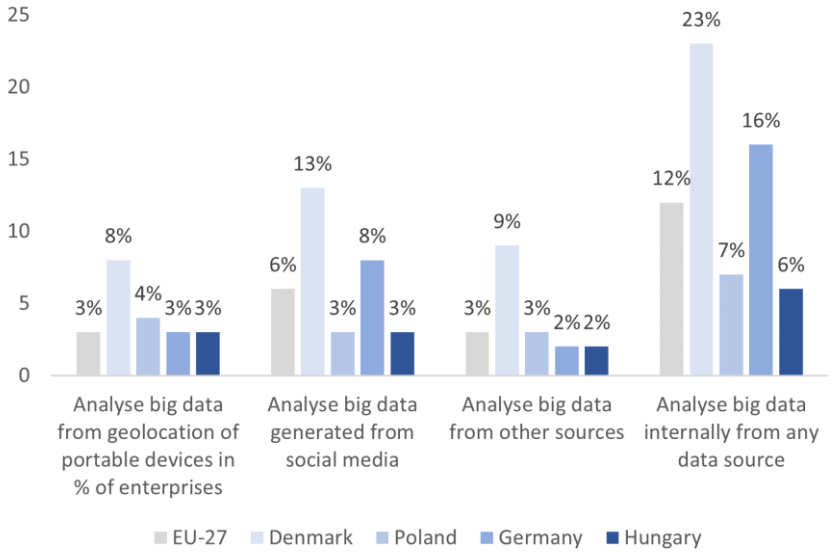
Source: Eurostat (2021g)

Big Data Analytics

Collecting internal and external digital company data offers a variety of opportunities to get to know one's customers better by means of Big Data Analytics and to identify their needs, concerns and wishes. Thus, changes in demand can be identified using data analytics and customer-based innovations can be developed. This agile digital method is used by 8 percent of Danish SMEs, 4 percent of Polish SMEs and 3 percent of German and Hungarian SMEs to identify the regionality of their customers. In addition, Big Data is primarily applied by Danish SMEs (13 percent) to analyze data sets collected in the course of social media activities. Only 8 percent of German SMEs

and 3 percent of Polish and Hungarian SMEs use this option. The most prevalent use of Big Data Analytics in the countries of interest is implemented to evaluate internal processes (figure 8) (Eurostat, 2021h).

Figure 8 Use of Big Data Analytics, in % of SMEs, 2020



Source: Eurostat (2021h)

Survey results – Applied Digital Technologies in Denmark, Germany Poland and Hungary

A total of 99 participants answered the survey. Looking at the countries relevant for this analysis, 15 participants from Poland, 14 participants from Denmark, 26 participants from Hungary and 27 participants from Germany can be considered for the study. Micro-enterprises make up the largest share of survey participants, but responses from large companies are also included in the sample. Against this background and due to the small number of participants, the following analysis results are not scientifically representative. Therefore, the following analysis should be seen as a starting point on which further surveys and analyses can be built if required.

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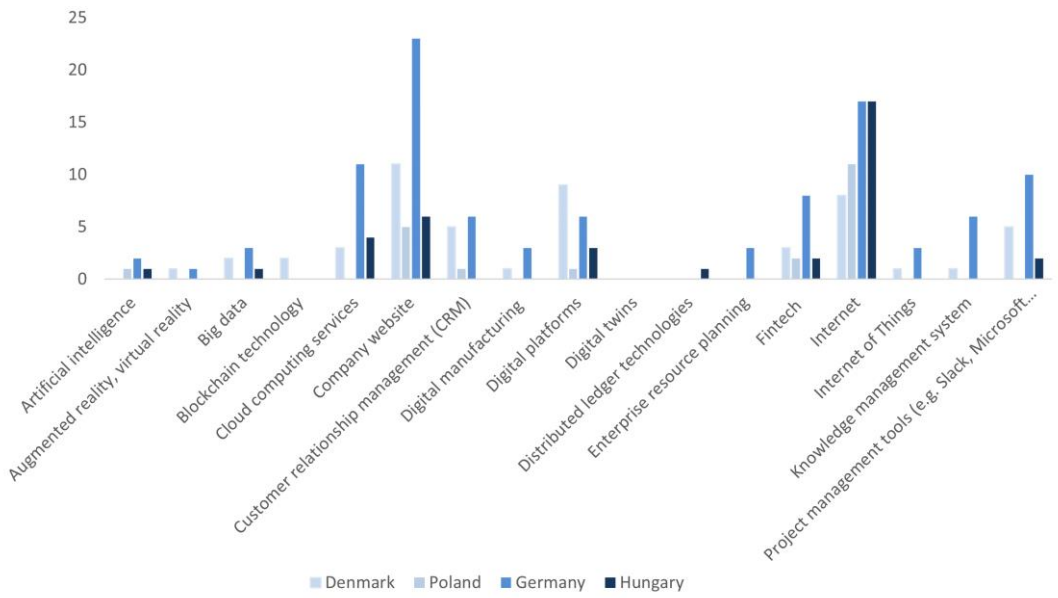
Figure 9 Applied digital tools in SMEs

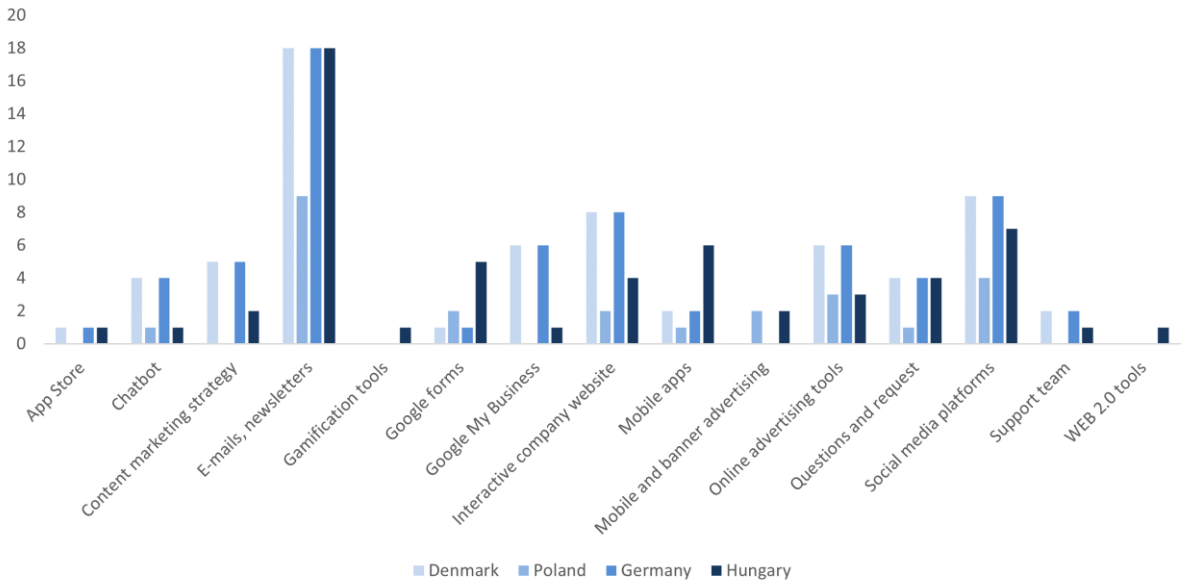


Source: ICIinSMEs survey, 2021

As illustrated by Figure 9, 17 of the German and Hungarian companies stated that they use the Internet in their daily business, while 11 of the Polish participants also mentioned this. Bringing up the rear when considering this technology is, surprisingly, Denmark with 8 mentions, although this is in line with the majority of Danish participants. The use of cloud computing services does not seem to be very widespread in the countries considered. While 11 companies in Germany stated that they use this technology, 3 Danish and 4 Hungarian companies did. The Polish participants all stated that they had not used this technology so far.

The same applies to the Internet of Things. While none of the Polish or Hungarian participants stated that they use this technology, one Danish and three German companies indicated that they do. Likewise, the use of technologically sophisticated Artificial Intelligence is not widespread in the countries under consideration. While 2 German companies use this technology, one Polish and one Hungarian company each stated that they implement this technology, but the technology is not used in any of the Danish companies surveyed. However, if we look at the analysis and evaluation of data generated in the course of digital activities, 2 Danish companies use Big Data to get to know their customers better and to evaluate the collected information for their benefit. The same is true for three German and one Hungarian company. None of the participating Polish companies stated that they use this method of analysis.

Figure 10 Used communication channels in SMEs



Source: ICIinSMEs survey, 2021

The use of social media as a communication channel by SMEs is widespread in the countries under review. Nine of the German and Danish companies each stated that they use this technology to communicate with customers. In addition, 7 of the Hungarian companies surveyed use this digital communication option, as do four Polish companies. Furthermore, Figure 10 illustrates that 8 of the participating SMEs from Denmark and Germany have a corporate website. Two of the Polish companies stated that they operate a website and four of the Hungarian companies have their own corporate website. Furthermore, as can be seen, e-mails and newsletters are the most widely used technologies in all countries to ensure and implement communication with customers.

Conclusion and recommendation

All in all, it can be concluded that there is hardly any consensus on the use of digital tools in the countries surveyed - Denmark, Hungary, Germany and Poland. While the use of, for example, emails, newsletters, corporate websites or social media platforms already seems to be widespread among the companies participating in the survey, there is still a wide range of further possibilities for companies to use resource-efficient digital solutions to increase or initiate customer-centric innovations. As the survey revealed, one main hurdle, the availability of internet in the regions

considered, seems to have been overcome, revealing many potentials of developing digital methods and tools for customer-centric innovation in SMEs. Based on the results, it also makes sense to initiate an exchange between the countries considered, e.g., to exchange best practices and individual solutions and thus learn from each other.

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Part E

Experiences of Best Practices from Training Institutions

Best Practices in the Transfer of Digital Skills and Technologies used in Customer-centric Innovations to SMEs

Experiences of Best Practices from Training Institutions

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Introduction

This report is prepared within the framework of the EU Program *Erasmus + Key Action 2: Cooperation for innovation and the exchange of Good Practices* funded project **"Digital methods, toolbox and trainings for increasing customer innovation in SMEs"**. (ICIinSMEs, Project NO 2020-1-DE02-KA202-007397).

The aim of the project is to strengthen the innovation capacity of SMEs in Eastern Europe. Thereby, the central problem of resource scarcity in SMEs is explicitly addressed, which causes difficulties in the integration of a customer-centric innovation approach within SMEs. To address this problem, this project provides an insight into aspects of the use of digital methods for the identification, processing, and implementation of customer-centric innovations in SMEs.

In the context of the project, we define the concept of customer-centric innovation as follows: "Customer-centric innovation describes a change from innovating for customers to innovate with customers. Therefore, the customer takes an active role in innovation processes and become the primary source of ideas to initiate innovation activities. By integrating the customer-centric innovation philosophy, companies open their research and development activities, meaning that the innovation process happens with input from inside and outside of the company. Customers are involved in all stages of the innovation process." (Desouza et al. 2020; Steinhoff & Breuer, 2014; Zajkowska, 2017)

The project aims to develop two training programs for SMEs, one focusing on the application of digital skills and technologies and the other on customer-centric innovation. In addition, train the trainer programs on both topics will be developed to help trainers master the curriculum using modern teaching methods.

The creation of the curriculum was preceded by an empirical study which, on the one hand, underpinned the legitimacy of the planned training courses and, on the other hand, incorporated the experience gained by them into the curriculum of the training courses.

The first part of the empirical research consisted of a questionnaire survey in which we measured the awareness and diffusion of customer-centric innovations in SMEs, as well as the use of digital solutions that support their implementation. We then collected best practices for the implementation of customer-centric innovation in SMEs.

The aim of this study is to collect best practices from educational institutions that provide training for SMEs to develop digital skills and customer-centric innovation.

We sought to collect best practices from training institutions in 13 countries. The method was that of an interview, preceded in most cases by an email request. Interviews were usually conducted by telephone, and we used a set of prepared questions / templates to ensure comparability. There were several refusals during the surveys. Many educational institutions declined to be interviewed. This was partly due to lack of time and interest, but the most obvious reason was that the project

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was seen as potential competition. Due to the low willingness to respond, usable experiences came from 6 countries.

In our research we also wanted to use the results of international research. However, due to the specificity of the topic, we found few studies that were close to the research question under investigation. Some studies have investigated the effectiveness of training programs for SMEs in general or attempted to explore a relationship between training method and business performance (e.g., Jones et al. 2013). More research has been done on adult learning, for example by the OECD. We have worked on several studies on digital skills development (European Commission 2019ab, Low 2021, UNIDO 2020). We have not received any international (and typically European) study on the effectiveness and success factors of training for the development of digital and innovative competences for SMEs.

This study deals with the following topics:

- What constitutes a good education?
- The reasons for developing digital competences in SMEs
- Modern teaching methods
- Experiences of good practices in training institutions
- Conclusions, proposals.

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Criteria for good education - important factors for success

The aim of this study is to collect best practices from educational institutions that provide training for SMEs to develop digital skills and customer-centric innovation. The survey method was to conduct an interview, preceded in most cases by an email enquiry. Interviews were usually conducted by telephone, using a set of prepared questions / templates to ensure comparability.

Before we compiled the list of questions, we considered what factors make a training effective, i.e., what features can be considered success factors of a workout. We can also phrase this question as knowing what makes a workout a good training.

We assume that the target audience of training for SMEs is the managers and employees of these companies. In this case, the participants are adult, busy professionals who, on the one hand, want targeted and effective training and, on the other hand, since in many cases they are already used to learning, find it difficult to sit down at their desks again.

The criteria and key success factors for good training are presented below.

Content of education - the curriculum: The effectiveness of training and its usefulness to SMEs is mainly determined by the content of the training. An important criterion is that it is consistent with the objectives of the company, meets the needs of the market and aims to develop the skills and knowledge that the company lacks. The development of SMEs' digital readiness meets these requirements, and a number of research findings confirm that SMEs' digital readiness is insufficient, and training is needed. The theoretical and practical orientation of training is also crucial. When training companies, it is important to develop a practical approach and the ability to identify and solve problems. The basic requirement for success is the development of a well-designed curriculum that ensures the achievement of the set goal and a curriculum developed for the appropriate knowledge levels.

Teaching methodology: education achieves its goal if the way of imparting knowledge can ensure that the knowledge acquired becomes applicable to the students. Knowledge is a complex matter, apart from knowledge, skills, abilities, personality traits of the learner and intellectual development also play a role in deepening the knowledge. In addition to traditional teaching the use of modern teaching methods is also playing an increasingly significant role. Particularly important are interactive forms of teaching, in which the acquisition of knowledge is the result of the joint work of teacher and student, and in which the active participation of learners plays a major role. The varied use of teaching methods helps to fix knowledge and maintain attention. Modern teaching methods are presented in a separate chapter.

The instructor: the personality traits, personal charm and enthusiasm of the trainer are of paramount importance for the effectiveness of the training. The basic requirement is the willingness and ability of the trainer, credibility and commitment are very important. But no matter how well the trainer is technically prepared, if he is not able to pass on the knowledge, if he cannot

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inspire his audience, the training will not be successful. This also includes that he considers the prior knowledge of the audience and adjusts to it.

Organization: well-organized training and the smooth running of administrative processes are also important aspects for busy company managers and employees.

The right learning environment: the choice and design of the training venue also contributes to a positive evaluation of the training. The ideal learning environment should be designed in such a way that, as far as possible, nothing distracts, concentration is maintained, and the furniture is ergonomically designed. Creating a friendly, bright environment in the classroom and an inspiring, harmonious atmosphere of the furnishings are very helpful.

Training fees and value for money: a significant proportion of SMEs have financial difficulties and cannot afford the high costs of training and development. An important issue is to review the funding options for training. Consideration should be given to the feasibility of using tender funds where training can be provided free of charge to interested SMEs. It is useful to check the legal background and the possibilities offered by the legislation. In the case of training where the company bears the cost, it is important to consider the return on investment in the training. Although the return on the money invested in employee training is difficult to measure and quantify, it is important that the training provides a 'tangible' benefit to the business, whether it is a financial benefit or an increase in operational efficiency.

On this basis, when collecting good practices, we asked respondents to briefly describe the concept of their trainings, present the main topics, briefly describe the curriculum used, their teaching methods, examination requirements, training duration and fees.

In addition, we wanted answers to questions such as:

- How do they attract training participants from SMEs?
- Are participants asked for feedback on the effectiveness of the training? And how? Are participants satisfied with the training program?
- What makes their training program successful and unique?
- What difficulties do they encounter with the training?

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Reasons for the development of digital skills in SMEs

Digital skills have become increasingly important in both our working and personal lives in recent years. The Covid 19 epidemic that has defined our last two years has played a particularly important role in this. During this time, countries were forced to shut down operations for extended periods of time, and many jobs shifted to home offices and telecommuting. During this difficult time for everyone, the use of digital technologies kept society and the economy running, the use of ICT tools played an important role in crisis management of companies and kept them running.

The Learning and Knowledge Development Facility (LKDF) of the United Nations Industrial Development Organization (UNIDO) and the European Training Foundation (ETF) (2020) conducted a study on whether the need for skills training is changing because of the COVID -19 epidemic according to companies.

As part of the research, 334 companies responded to the questionnaire, of which 32% were large companies and 68% belonged to the SME sector. Geographically, Asian, and African countries were most represented, but there were also several respondents from Western Europe, Eastern Europe, Southern Europe, and Northern Europe. 41.6% of companies said that meeting the challenges of Covid-19 would require new skills among employees, while 42.5% said they would not need new skills.

According to respondents 'COVID -19 the view of what core skills are needed has not changed, but the trend towards digitalisation has increased. The skills that businesses will need in the future are no different from those they needed before COVID -19. Information and communication technology (ICT) and its application, especially in e-commerce and marketing, as well as cross-cutting skills such as design thinking, creativity, analytical skills, and multitasking potential remain the main concerns of companies looking to the future' (UNIDO 2020, pp.6.).

It can be seen that the majority of respondents (76.2%) who say that new skills are needed consider it important to develop ICT skills in their companies. Developing these skills was cited as a necessity by most. This is followed by design thinking and creative approaches, marketing and e-commerce, self-learning and multitasking, analytical skills and problem solving.

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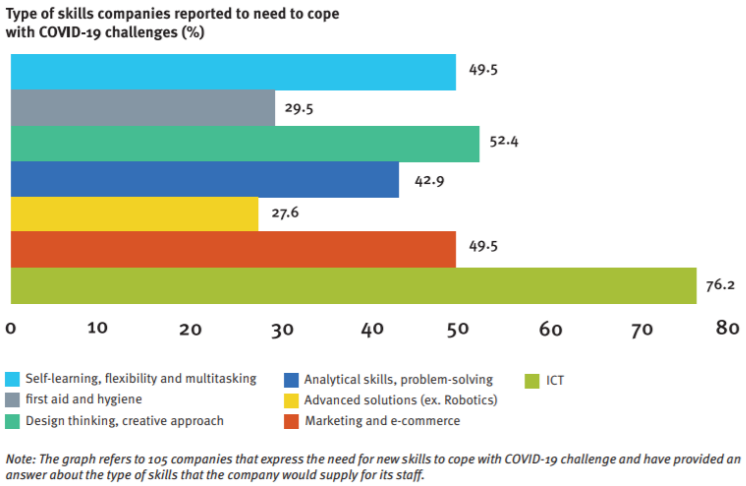

Type of skills companies reported to need to cope with COVID-19 challenges (%)
Source: UNIDO, 2020

It is interesting to ask what strategy, i.e., what type of training programmes, companies would choose to develop these skills.

The following options were mentioned by the authors of the questionnaire: (a) Use of public programmes for retraining. (b) Use of training opportunities offered by industry associations. (c) Internal training within the company with short courses. (d) Use of open source (web-based) training opportunities. (e) We do not plan to retrain employees but replace them with new employees with better skills. (f) Other

The researchers conclude that 'firm size influences the choice of retraining strategies. The medium and large companies in the sample are those that prefer to invest in either in-house training programs or open, web-based training opportunities. Most small and micro firms instead rely on industry associations to support retraining strategies. Very few companies (including no large companies) report using public programs for retraining' (UNIDO 2020, pp. 21.).

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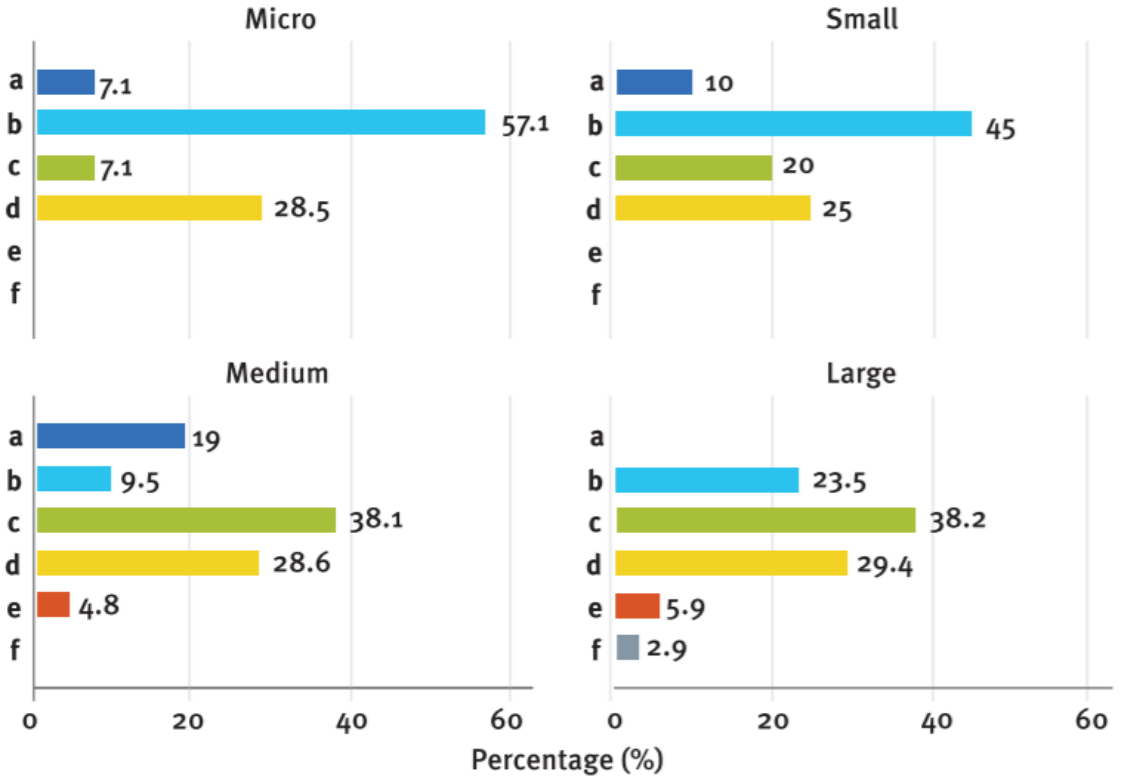

Note:
a. Use public programmes for retraining;
b. Use training opportunities provided by sectorial associations;
c. Train them internally in the company with short training;
d. Use open source training opportunities (web based);
e. we don't plan to reskill workers, but to replace them with new employees with more adequate skills;
f. Other (please describe)

Different strategies for skills development, skills upgrading and retraining
Source: UNIDO, 2020

On this basis, the state, professional associations, and interest groups can play an important role in organizing supported education programs.

In recent years, companies have increasingly offered digital skills development training to their employees. However, a 2021 ILO global study shows that there is a significant difference in company size. While 70% of large companies offer ICT training to their employees, only 23% of SMEs do so.

Several factors can be cited as reasons for the lack of training. According to the Low 2021 studies, Europena Commission 2019a, b, deficiencies in internet coverage are only partly a barrier to providing training. A far more obstructive factor is lack of time, availability of training programs, cost of programs, inflexible schedules and distances, and inability to fully understand the content of the training based on limited information. Often the training provided is inadequate and does not meet the needs of the business.

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Synthesis of Barriers for Skills Development in SMEs
Low 2021

Low 2021 says digital capability development is critical for SMEs. 'SMEs are the backbone of our society, we need to enable their increased adoption of digital skills via supporting measures. This can be done via ecosystem strengthening, strategic outlook development, structured skills development and trainings tailored to their needs'.

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Modern teaching methodology

Today, the difference between generations is a major challenge in the field of education, which is also reflected in the change of basic habits. While learning from books has been taken for granted for barely a decade, the online world now largely provides quick access to information.

Due to the technical and technological changes on one hand and the differences between generations on the other hand, education is constantly evolving. According to Crocket (2016), 21st century students need to have the following skills to be successful in life: problem solving, creativity, analytical thinking, cooperation, communication, ethics, agency, and accountability. The focus of development is to optimise the curriculum, the teaching method, with the aim of ensuring an effective learning process.

The paradigm shift in education from traditional to modern teaching methods is a result of rapid technological change in the 21st century. Modern teaching methods have spread rapidly because of their efficiency. They are useful for students and easy to use for teachers. Technology plays an important role for both students and teachers. Students are involved in the learning process; they are at the center of the teaching and thus they can design their own learning path.

The perspective of teaching and learning is different, and students are not at the same level in terms of their characteristics, strengths, and abilities. The novelty lies in the action-based teaching where the emphasis is more on collaboration, cooperation, and teamwork. The goal of modern technology is to make learning a joyful, easy process for students while meeting the demands of the marketplace. There is a lot of emphasis on practice. According to Mehta (2021), the characteristics of modern teaching methods are the following: 'learner-centered, task- or action-oriented, resource-based, interactive and integrative, collegial collaboration'. Students need to realize independent learning, information seeking and problem solving to excite them, which can be the basis for lifelong learning. Murugesan (2019) summarises the advantages of modern teaching methods as follows:

- They are participating in a media revolution that is profoundly affecting the way they think about and use information technologies.
- They are improving the way people learn in terms of learning fashions,
- improving their skills and abilities in applying their learning environment to real life situations,
- working in groups to learn cooperatively and collaboratively,
- to develop self-learning habits at their own pace and in their own time,
- they learn with the teacher and not from the teacher,
- to develop habits of inquiry-based learning,
- to use the right information in the right place at the right time to achieve the right goal,
- to investigate and explore qualitative data,
- share learning experiences and information with other students and teachers around the world.

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In the following part we will briefly describe these methods.

Problem-based learning uses complex, real-world cases as subject matter and helps students develop problem-solving skills and learn concepts rather than just absorbing facts. Thus, it is not about the traditional transmission of information and knowledge, but about solving an operational life situation using a practical example. Case study method can be a good example of it.

The **case study** provides a practical example of scenarios based on a real business situation. Teachers begin by having students read the case and summary together. Students then work in small groups to solve the case. Teachers set milestones that define what students should accomplish so they can better manage their time.

Gamification is the use of game elements and techniques (not in a game context) to engage people and solve problems (Deterding et al., 2011). Play is not just a self-serving, fun leisure activity, but a potentially value-adding tool that can transform all areas of life, make them effective and, not least, improve well-being and leisure mood (Fromann, 2017). This is exactly what is needed in 21st century education on a new foundation, namely easy learning when students can create interest, engage in collaboration, and learn through play.

Presentation skills are an essential part of modern teaching methodology, making it easier for students to navigate the future workplace. The main purpose of presentations is to develop professionalism. By using advanced technology, students can improve their skills.

Project-based learning is a teaching method in which students apply their knowledge and skills through an experience that provides them with opportunities to deepen contextual learning and develop important skills. It is more than just doing a project. This method connects students to the real world and prepares them to take on and overcome the challenges.

In the **flipped classroom**, the learning process is disconnected from the average. It is a learning method where students read and watch the content already at home and then absorb it at school. This has the advantage that students can acquire the information at their own pace.

Cooperative learning is an instructional strategy in which small teams of students are formed. They have different skills and abilities so that they can learn from each other. At the same time, their understanding and cooperative skills improve. It is easy to implement and not expensive.

Design thinking is a student-centred approach that can support creative thinking and problem solving in innovative ways. It is an iterative process and provides a solution-focused thinking that helps achieve empathy with the target audience.

Thinking-based learning teaches students how to think and make decisions. In class, students practice critical and creative thinking as they put theoretical knowledge into practice. The teacher's primary role is to show students how to find and analyze relevant information.

In **competency-based learning**, students' desired outcomes are the focus of the learning process. In this method, students are encouraged to learn in a specific way so that they can acquire the required competencies. It is a flexible way to provide a personalised learning path.

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If we summarize the new methodology, we can state that the online environment, information technology, is an integral part of the development of new learning methods. When the three components of learning - cognitive, affective, and conative - and even metacognition are well balanced, these domains create a holistic learning experience that enables knowledge acquisition, self-directed learning, and lifelong learning skills. (Leary, 2012).

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Experiences of good practices in the educational institution

Sources of good practice, presentation of educational institutions.

We have **12 best practices** from **6 countries**.

Country	Number of BP
Hungary	5
Germany	3
Denmark	1
Finland	1
Italy	1
Poland	1

Most of the good practices collected were from Hungary and Hungarian educational institutions (5 in number). Three good practices were collected from Germany and one each from Denmark, Finland, Italy, and Poland.

Regarding the type of educational institutions, among the organizations providing good practices there are 7 public institutions and 5 private organizations. Most of the public institutions are affiliated to a higher education institution (e.g., IBC International Business College, Satakunta University of Applied Sciences, Technische Univeristät Hamburg, University of Miskolc), and among the private organizations we find mainly adult education institutions.

Among the educational institutions, there are organizations that specialize specifically in SMEs (e.g., Mittelstand 4.0 Kompetenzzentrum Hamburg, Mittelstand 4.0 Kompetenzzentrum Kiel, Mittelstand-Digital Zentrum Hannover, t2i Technology Transfer and Innovation Scarl), but also those with a broader target group (students, trainers, consultants, companies, etc.).

Digital skills development training for SMEs

Most of the educational institutions surveyed provide training specifically focused on digital skills development for SMEs. Only a few did not indicate that they offer personalized training for SMEs:

'We do not have an "off the shelf" concept, because we always have tailor-made courses and programs - depending on the client's needs'. (IBC International Business College, Denmark)

We do not have public training programs aimed at SMEs. If a company wishes to do so, it is possible. (Satakunta University of Applied Sciences)

The topics covered in the trainings are very diverse and range from basic knowledge (e.g., digitalisation, technical possibilities, basic knowledge - Mittelstand 4.0 Kompetenzzentrum Kiel, Germany), to advanced level (e.g., digitizable processes of business operations, available digital tool systems and methods, business requirements - integration of available digital tools/methods - Small

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Business Development Foundation, Hungary) to specific expertise (pl.: raising awareness/ informing, demonstrating, qualifying and implementing in the field of AI - Mittelstand 4.0 Kompetenzzentrum Hamburg, Germany)

The training material – as well as the topics covered – cover a fairly broad spectrum, such as '*software/apps/classroom/innovative materials/power points and the teacher him-/her self*'. (IBC International Business School, Denmark). It is also worth highlighting that PowerPoint is still one of the most popular formats used by educational institutions to create curricula (e.g., Mittelstand 4.0 Kompetenzzentrum Hamburg). In the practice of educational institutions, knowledge transfer takes place in the form of face-to-face, online, and mixed forms.

The picture also varies as to **the methods of teaching** by which knowledge is imparted. We may come across a training institution that uses traditional methods (e.g., lectures - Office of Legal Counsel Robert Pożarski), but some organizations offer a whole range of teaching methods for knowledge transfer and skill building (e.g.: Webinars, demonstrators, living labs, learning factories, case studies, group work, in-depth projects - t2i Technology Transfer and Innovation Scarl).

As far as **the methodology and assessment aspects of the exam** are concerned, there are training institutions that do not conduct any exams at all in these courses (e.g., IBC - International Business College, Mittelstand 4.0 Kompetenzzentrum Hamburg), while in others the courses end with an exam (e.g., a group training ends with the preparation of an exam task and its assessment - Small Business Development Foundation, Hungary).

Since digital skills training for SMEs is not standardized, **the training system/process** is at least as diverse as the topics or teaching methods used (e.g.: No standard fee or duration. Always tailor-made. It can last from a few hours to days - IBC International Business College, Denmark). So, the duration of the training can range from a few hours to a few days, and in terms of fees, there are completely free courses (e.g., in Germany), but also paid ones (8 hours of training and €390 fee - t2i Technology Transfer and Innovation Scarl).

Usually there are no special conditions for participation in the training, at most that the participant is really a small and medium-sized enterprise (e.g.: Participant must be an SME - Mittelstand 4.0 Kompetenzzentrum Hamburg, must be an SME - Mittelstand-Digital Zentrum Hannover).

Training for the SME sector is the topic of innovation, in particular customer-centred innovation

Among the educational institutions surveyed, there are significantly fewer innovation training courses specifically for small and medium-sized enterprises. In many cases there is no such training offer at all, in some cases it is under development (e.g., *'Currently being developed'* - Mittelstand-Digital Zentrum Hannover; *'Currently, we do not have such type of training, but it would be very important to develop it since there is high demand for that type of training.'* – SZTÁV Felnőttképző Zrt.). However, in some cases the training institutions provide detailed training (e.g., *'Innovation - marketing – competitiveness'* or *'Research and innovation experts'* courses at Mentorius, Hungary).

We can say the following about the topics covered in the training courses:

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'Innovation - marketing – competitiveness' course:

- *Competitive advantages of innovation as critical success factors*
- *Re-interpretation of innovation activity*
- *Open innovations*
- *Product, process, organizational and market innovations*
- *Development of the optimal innovation portfolio*
- *Methodology of basic research and analysis.*
- *The role of technology and network competencies in innovation processes*
- *Success factors of innovation processes*
- *Cooperation, co-creation in innovation processes*
- *Innovation marketing and marketing innovation*
- *Lateral marketing technique for the development of new product ideas.*

'Research and innovation experts' course:

- *Technical, economic, and business knowledge: Lean 4.0, energy, advanced materials science and testing, quality in pre-development, technical trends, strategy and business planning.*
- *Research and innovation management knowledge: innovation and tendering systems, industrial property protection, innovation management, innovation methods, R&D&I project management, sustainability and innovation.*
- *Optional: Behavioural culture and conflict management, Additive technologies, Intercultural competence and team management, Integrated decision making and data management.*

The recruitment of participants from the SME sector

Some of the educational institutions interviewed stated that they do not carry out specific marketing activities (e.g., *'We do not have a sales process'* – IBC International Business College, Denmark; *'No particularly marketing activities are done.'* - Satakunta University of Applied Sciences, Finland).

In contrast, other educational institutions attach great importance to effective marketing communication of their education. They use a wide range of offline and online tools. Among the offline tools, special events, fairs, and theme days organized by themselves or by partners stand out. (*'We have twice a year theme days on entrepreneurship, and also some themedays concerning startups, robotics, artificial intelligence etc, in which we present our services and opportunities we can offer to enterprises.'* - Satakunta University of Applied Sciences, Finland, and face-to-face meetings with potential buyers (e.g., *'Our sales staff are in dialogue with potential customers.'* – IBC International Business College, Denmark).

The range of online tools used is even more colorful: Your own website, newsletter (e.g., *'Sending newsletters to minimum 1.000 SMEs'* – IPOSZ, Hungary), use of social media: Twitter, Instagram, Facebook (e.g., *'Digital formats: Twitter, Instagram'* - Mittelstand-Digital Zentrum Hannover). The variety of marketing communication tools used is perhaps best described by the example of the Small Business Development Foundation (Hungary): *'(a) Own mailing list, (b) Mailing lists run by civil society organizations, (c) Independent events, (d) Partnership events, (e) Social media interfaces"*

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Measuring customer satisfaction in relation to the training

Regarding the measurement of training satisfaction, training institutions agree **they measure training satisfaction continuously**, because it is very important. The measurement method can be verbal and online (e.g., *'Always – there is important feedback – verbally and digital.'* – IBC International Business College, Denmark). Measuring satisfaction is usually part of the educational institution's own quality assurance system (e.g., *'We have a quality management system that includes customer satisfaction.'* – Kisvállalkozás-fejlesztési Alapítvány, Hungary).

In addition to measuring satisfaction, an important question is how effective the training can be, how much it contributes to the continued success of the organization. In this context, we quote verbatim the good practice of Új Ház Felnőttképző Zrt, Hungary: *'The efficiency of a training course is a difficult issue. It is hard to know whether the training course creates value added in sales. Basically, we apply the following measurement methods: we ask the participants of the training courses right after the training then about 5 weeks later we ask them again. We ask the owners of SMEs about their experiences and whether the employees show any sign of their development.'*

Success factors of training programs

The success of training programmes can depend on several factors:

- For example, IBC mentions the **environment**: *'Our learnings labs at IBC/Innovations factory is perfect. It is open, all wood, birds sings, flow of water true the building and GOOD teachers.'*
- At least as important are the **teachers:** *'Teachers are involved and motivated, care their students and – as covid-epidemic proved – very flexible.'* - Satakunta University of Applied Sciences, Finland
- **Customer focus** is also important: *'Each participant may find in t2i an empathic, informal and customer centric environment'* - T2i Technology Transfer and Innovation SCARL, Italy
- Or the **personalization** of training: *'We fully tailor-made our training courses to the requirements of the company'* - SZTÁV Felnőttképző Zrt., Hungary
- Among the success factors we can mention **specific trainings**: *'Focus on AI in the areas of logistics and supply chain management.'* - Mittelstand 4.0 Kompetenzzentrum Hamburg

The success factors are best summarized by Mentorius: *'There are three sources of success for training programs: a) We provide* ***training that fills gaps*** *(that are either non-existent, very remote, or very rare) (e.g., explosion protection engineer). b) We can* ***tailor your training*** *(we can adapt it to the needs of the company). c)* ***We are flexible****, both in terms of location and methodology (use of online training, mixed forms of training).'*

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Difficulties with training

Among the difficulties in training, several training institutions mention the epidemic situation: (e.g., '*The most challenging effort is to balance the training goals with the restricions on physical presence due to the pandemic, especially for training where human interaction plays an essential role.*" - T2i Technology Transfer and Innovation SCARL, Italy; *"At present, the greatest challenge is caused by Covid. There is a constant change in the type and form of training courses they can organise.'* - Easy Learning Hungary Skills Development Ltd., Hungary).

There is a typical attitude of SMEs towards training which can be characterized as follows: *'When the business goes well, there is no need for training, when the business does not go well there is no money to spend on training. It is a very typical attitude.'* - Új Ház Felnőttképző Zrt., Hungary). However, completely free training is not necessarily a good solution to this problem either: *'Training courses are free of charge, therefore participants often drop out.'* - Mittelstand 4.0 Kompetenz-zentrum Kiel).

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Conclusions and recommendation notes

Based on the best practices collected from the training institutions, we draw the following conclusions and provide recommendations for the industry:

- **Create a suitable environment for training, provide basic infrastructure facilities at a high level!** A suitable environment and a high level of infrastructural background are necessary but not sufficient conditions for the success of training programs. If we cannot offer this to our potential customers, we are unlikely to be credible when it comes to topics such as digitalization or customer-oriented innovations.

- **The importance of teachers is beyond question: choose those who understand their profession and (digital) teaching methodology at the highest level!** The role of teachers is undeniable in the success of training programs. Not only should they be experts, but they should also have excellent teaching methodology, especially if they use the latest digital solutions. They must be able to adapt to all forms of education, be it face-to-face, online or blended.

- **The trainers, the training program, and the training facility itself should be customer-centric!** Customer-centricity starts with identifying the needs of our customers and addressing those needs when developing our training portfolio. Training facilities with a high level of customer dependency can rightfully expect customer satisfaction, repeat purchases, and referrals to the training facility. However, these three factors are essentially synonymous with business success.

- **Use differentiated (personalized) methods!** It is possible to reach the widest possible range of SMEs if we acknowledge their diversity and the fact that each SME has unique needs that can only be best met with personalized services (training). It is also important to note that uniqueness does not end with the fact that the services are personalized. The approach (marketing communication), the curriculum and the teaching methods used must also be tailored to the individual.

- **Focus on sub-markets, do niche marketing!** Many educational institutions are successful because they have found niche markets where there is demand but no supply or shortage. Satisfying such market needs can be profitable in the short or even long term. So let us focus on these market segments and add to our training portfolio the training that can meet their needs.

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Best practices – appendix

Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Denmark
Name of institution: IBC – International Business College
Type of institution (Private/public): Public
Short description of the activity (Target group,...): Teachers, companies and consultants in all levels.

Trainings on digital/ICT skills for SMEs

Concept: We have not a „finish"-concept because we always have tailor made courses and programs – depending on the needs of the customers.
Curricula: Tailormade for SMEs – (alternative on an individual levels (programs at Universities) we have curriculums.)
Teaching materials: software/apps/classroom/innovative materials/power points and the teacher him-/her self. IMPORTANT! 90% of the success is the teacher/consultant!
Teaching methods: Dialogue/ inform / seminars / often workshops / group sessions
Examination regulations: Normally non. We always look at the outcome from the innovative process. (At a personally/student (universities) level there can be examinations, normally 30 min. Verbally buide up on a case.)
Organisational structure (fee, duration,...): No standard fee or duration. Always tailor made. It can go from few hours to days.
Further conditions for participation: No – but so many people as possible is always an advance.

Trainings on customer-centric innovation for SMEs

Concept: We have not a „finish"-concept because we always have tailor made courses and programs – depending on the needs of the customers.
Curricula: Tailormade for SMEs – (alternative on an individual levels (programs at Universities) we have curriculums.)
Teaching materials: software/apps/classroom/innovative materials/power points and the teacher him-/her self. IMPORTANT! 90% of the success is the teacher/consultant!
Teaching methods: Dialogue/ inform / seminars / often workshops / group sessions
Examination regulations: Normally non. We always look at the outcome from the innovative process. (At a personally/student (universities) level there can be examinations, normally 30 min. Verbally buide up on a case.)
Organisational structure (fee, duration,...): No standard fee or duration. Always tailor made. It can go from few hours to days.
Further conditions for participation: No – but so many people as possible is always an advance.

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How do you attract training participants from SMEs?

Always when we are talking customers/compagnies – we tailormade over courses. We do not have a sales process – brochure, but our sales staff are in dialogue with potential customers OR the customers contact us. (When we are talking on upskilling af individual student from university we have standards with ECTS-point).

Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

Always – there is important feedback – verbally and digital. Both from the employee and the compagnie. (Also from student level (universities) there is a feedback process - always). It is a good area to teach, because it is funny and always with some outputs. So the participants (students and customers(SMEs) are happy

What makes your training program successfull and unique?

It works. There are concrete outputs. Our learnings labs at IBC/Innovations factory is perfect. It is open, all wood, birds sings, flow of water true the building and GOOD teachers. It funny and have huge influent on the environment in the compagnies.

What kind of difficulties do you face regarding the training?

The following up – process. It is difficult for us, because afterwards it is in the hand of the compagnies.

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Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Finland
Name of institution: Satakunta University of Applied Sciences
Type of institution (Private/public): Public
Short description of the activity (Target group,...): Bachelor and master level education, target group individuals who want to study or proceed in their study path (for example from vocational to bachelor or from bachelor to master)

Trainings on digital/ICT skills for SMEs

Concept: We don not have public training programs directed to SME enterprises. If a company wants us to arrange such, it is possible but all the termis, including curriculum, materials and methods must be negotiated, and – due to rules - it is VERY EXCEPTIONAL that such training leads to any examination.
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: Based to legislation concerning the universities of applied sciences (EQF 6-7) and regulation of ministry and rules of the school, e.g. code of practices and degree regulations.
Organisational structure (fee, duration,...): In trainining ordered by enterprise, all the conditions must be negotiated. In open university (only for private persons) 10 € / credit unit, see: https://www.samk.fi/en/education/open-studies/. The normal full-time university studies with examination as a goal are free (apr. 3.5 to 5 years) for Finnish citizens. Nationals of non-EU and non-EEA countries, are due to pay the annual tuition fee.
Further conditions for participation: Negotiable for a company.

Trainings on customer-centric innovation for SMEs

Concept: In common, see the answer above. However, we have some Academies where the company, student and unversity together solves problems that a company has met as a work-based learning (project learning). In these cases a group of students solves a problem, company pays a formal payment to university and gets the rights to use solution, and students gets credit units and valuable experience. See further: https://www.roboai.fi/en/, https://www.robotiikkaakatemia.fi/
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

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How do you attract training participants from SMEs?

We have twice a year theme days on entrepreneurship, and also some themedays concerning startups, robotics, artificial intelligence etc, in which we present our services and opportunities we can offer to enterprises. As a matter of fact, this question is not really relevant, except in academies, where companies are coming to see, if we could help them. Sometimes students and teachers find enterprises who have suitable problems to be solved, but in common, the university is known in the region, and no particularly marketing activities are done.

Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

Only students are asked for feedback. The feedback is compiled and evaluated by ministry. According to the feedback we have for years been among the best three universities of applied sciences in Finland. For further information: https://www.samk.fi/en/uutiset/record-number-of-degrees-completed-at-satakunta-university-of-applied-sciences-in-2020-the-quality-of-education-evaluated-the-best-in-finland/

What makes your training program successfull and unique?

Teachers are involved and motivated, care their students and – as covid-epidemic proved – very flexible.

What kind of difficulties do you face regarding the training?

Lack of resources, the level of students is sometimes not necessary as high as it could be, and sometimes the changes both in the environment, disciplines and the organization seems to come too rapidly.

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Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Germany
Name of institution: Technische Univeristät Hamburg, Institute of Business Logistics and General Management, Mittelstand 4.0 Kompetenzzentrum Hamburg
Type of institution (Private/public): Public
Short description of the activity (Target group,...): SME in Manufacturing, Logistics, Trade and Craft

Trainings on digital/ICT skills for SMEs

Concept: Lectures, demonstrators (living labs), training courses with several companies (informative teaching of basics & development of content), workshops, implementation projects in companies, AI consultation hour
Curricula: Raising awareness/ informing, demonstrating, qualifying and implementing in the field of AI
Teaching materials: PowerPoint
Teaching methods: Brainstorming, root cause analysis, failure mode and effect analysis, self-developed training concept (as-is analysis) Company examples, best practices
Examination regulations: No examination
Organisational structure (fee, duration,...): Free of charge, lecture (30-60 minutes, if necessary implementation of lecture series), demonstrators (60-120 minutes), trainings (60-180 minutes), office hours (60 minutes), implementation projects (3-4 dates of 120 minutes each)
Further conditions for participation: Participants have to be an SME

Trainings on customer-centric innovation for SMEs

Concept: No specific training offered
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

How do you attract training participants from SMEs?

Chamber of Commerce Newsletter, social media, trade fairs, networks, homepage of the Competence Centre

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Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

Yes, after each event participants are asked for feedback in the form of an online questionnaire. No insight into results but positive direct feedback.

What makes your training program successfull and unique?

Focus on AI in the areas of logistics and supply chain management.

What kind of difficulties do you face regarding the training?

Digital maturity of SMEs often insufficient to apply AI, lack of basic digitisation, trust & understanding in AI not well-developed.

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Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Germany
Name of institution: Mittelstand 4.0 Kompetenzzentrum Kiel
Type of institution (Private/public): Public
Short description of the activity (Target group,...): SMEs

Trainings on digital/ICT skills for SMEs

Concept: Online events or face-to-face events in universities, companies or under the umbrella of regional multipliers (e.g. start-up centres, chambers of commerce, clusters)
Curricula: Digitalisation, technical possibilities, basic knowledge
Teaching materials: Frontal Trainings & Workshops, Online Trainings, Digitalisation Lab
Teaching methods: Digital labs with demonstrators on the topic of AI/VR/Big Data/IoT/sensor technology, classic workshops, best practices from companies that have already implemented training formats, goals: Raise awareness & build expert knowledge, programming workshops
Examination regulations:
Organisational structure (fee, duration,...): No fee, different duration (2 hours – half day/day workshops)
Further conditions for participation: -

Trainings on customer-centric innovation for SMEs

Concept: No specific training offered
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

How do you attract training participants from SMEs?

Own communication channels, cooperation with multipliers (business development, clusters, chamber of commerce, address customers directly, only free media), multiplier events.

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Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

Evaluation takes place officially (paper, online questionnaire directly after the training and again after a certain period of time), satisfaction exists, clients report positive things, competence centre is extended beyond the actual project duration.

What makes your training program successfull and unique?

Knowledge transfer from science to business, demonstration labs for micro-enterprises (especially available in SH) Hands-on digitisation, exchange of business knowledge among each other, projects need to be published and therefore a bit of publicity for businesses.

What kind of difficulties do you face regarding the training?

Training courses are free of charge, therefore participants often drop out.
You have to be careful not to compete with companies where training is part of the product portfolio (therefore no certification courses are offered). Overall, a wide range of training courses. Building block principle - depending on requirements and needs, a suitable training programme is created to ensure the greatest possible benefit. Great tension of digital knowledge in SMEs, sometimes participants misjudge themselves.

Co-funded by the Erasmus+ Programme of the European Union

Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Germany
Name of institution: Mittelstand-Digital Zentrum Hannover
Type of institution (Private/public): Public
Short description of the activity (Target group,...): SMEs

Trainings on digital/ICT skills for SMEs

Concept: Combination of pedagogical and professional expertise. Adult education background in the foreground. Concepts are developed on the basis of adult pedagogical guidelines, didactic guidelines (how should the moderation take place, how should the technical content be made understandable to the SMEs? Where do we have to start so that SMEs understand the subject matter). Learning as a space of possibility, the learner needs space to learn, enabling didactics, action orientation examples from practice, didactic reduction (technical reduction of thematic terms).
Curricula: Introductions, workshops, setting expectations, meeting expectations at the end, group work & case studies (learning from each other), demonstrators, learning factories (e.g. Gastronomy 4.0), Lego Series Play, before COVID everything in presence, now webinars 90 minutes designed as teasers for further workshops.
Teaching materials: -
Teaching methods: Webinar, Demonstrators, Living Labs, learning factories, case studies, group work, in-depth projects
Examination regulations: -
Organisational structure (fee, duration,...): Free of charge, duration varies with training format: Webinars (90 min), Workshops (>90 min), in-depth projects (few weeks to 6 months)
Further conditions for participation: Has to be a SME

Trainings on customer-centric innovation for SMEs

Concept: Currently being developed on the topics of social media, digital marketing, digital business models
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

Co-funded by the Erasmus+ Programme of the European Union

How do you attract training participants from SMEs?

Digital formats: Twitter, Instagram, website, network of 26 digitisation centres, no classic media, Great accessibility through multipliers (Chamber of Commerce; flyers, magazines, newsletter)

Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

Evaluation for everything that is done, regular evaluation and training developed accordingly (quality assurance), regular coaching internally, continuous development of concepts.

What makes your training program successfull and unique?

Clear communication of workshop content to meet SME expectations (challenges, information conveyed, tools entry), in-depth company talks, workshops (webinars, online workshops >90 min, face-to-face events on over 20 topics)

What kind of difficulties do you face regarding the training?

Large number of offers but companies have to accept offers, direct impact often not clear for companies.
There are topics that are well received and others that are not (e.g. ethics). Training needs are identified, but companies do not take up training (due to cultural differences). Issues are addressed via company talks, these challenges are openly addressed & revealing added value.

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Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Italy
Name of institution: T2I TECHNOLOGY TRANSFER AND INNOVATION SCARL
Type of institution (Private/public): Public
Short description of the activity (Target group,...): SMES, STARTUPPERS, PROFESSIONALS

Trainings on digital/ICT skills for SMEs

Concept: PREDICTIVE AND PROACTIVE MAINTENANCE TECHNIQUES (Scheduled, done)
Curricula: Training will introduce participants in Predictive Maintenance through an overview of its various techniques through theoretical insights and analysis of real application examples.
Teaching materials: Slides and multimedia tools for theory and a machine (software/hardware) for simulation sessions.
Teaching methods: On line frontal training blended with simulation sessions
Examination regulations: t2i/MIPU certificate
Organisational structure (fee, duration,...): 8 hours training and 390€ fee
Further conditions for participation: Not specified

Trainings on customer-centric innovation for SMEs

Concept: DESIGN THINKING LAB (Scheduled, done)
Curricula: Design thinking is a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test. Involving five phases—Empathize, Define, Ideate, Prototype and Test—it is most useful to tackle problems that are ill-defined or unknown.
Teaching materials: Slides and multimedia tools for theory. For interactive and applicative sessions there are two options: paper and sticky notes in physical attending training or cooperative platform (as. Mural or Miro) for webinar.
Teaching methods: On line frontal training blended with workgroup sessions
Examination regulations: t2i certificate
Organisational structure (fee, duration,...): 20hours training and free edition (EU Co-founded) for target according to the call requirements
Further conditions for participation: Not specified

How do you attract training participants from SMEs?

T2i is one of the most important innovation hub at local level (Veneto Region), it supports people empowerment by defining and developing innovative pathways of value-added services for industries and organisations also by means of co-funding programmes at local and european level, as applied research and technology transfer are key drivers to gain competitiveness.

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Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

Customer satisfaction is monitored during and after the training, through a constant dialogue with training tutors, and by collecting customer satisfaction questionnaires at the end of the path. Trainers are qualified by quality requirements and KPI monitoring, in order to guarantee the manintenace of high level performance.

What makes your training program successfull and unique?

Each participant may find in t2i an empathic, informal and customer centric environment, a one- stop-shop for innovation in terms of skills emprovement pathways for companies and people looking for new professional and training opportunities, orientation services, education, mentoring on work placement.

What kind of difficulties do you face regarding the training?

The most challenging effort is to balance the training goals with the restricions on physical presence due to the pandemic, especially for training where human interaction plays an essential role.

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Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Poland
Name of institution: Office of Legal Advisor Robert Pożarski
Type of institution (Private/public): Private
Short description of the activity (Target group,...): Training in occupational health and safety, labor law, civil law, commercial law and others

Trainings on digital/ICT skills for SMEs

Concept: Vocational training
Curricula: The institution conducts activities in the field of quality assurance of the conducted education. An education quality management system has been developed and approved.
Teaching materials: Scientific studies, research. The institution develops and implements its own curricula for the education provided.
Teaching methods: Lectures
Examination regulations: Test of acquired competences
Organisational structure (fee, duration,...): Payment and duration, details included in the terms and conditions
Further conditions for participation: You can take other courses

Trainings on customer-centric innovation for SMEs

Concept: Vocational training
Curricula: The institution conducts activities in the field of quality assurance of the conducted education. An education quality management system has been developed and approved.
Teaching materials: Scientific studies, research. The institution develops and implements its own curricula for the education provided.
Teaching methods: Lectures
Examination regulations: Test of acquired competences
Organisational structure (fee, duration,...): Payment and duration, details included in the terms and conditions
Further conditions for participation: You can take other courses

How do you attract training participants from SMEs?

Cooperation with the Labour Office, with craft organisations (guilds, cooperatives), advertising (mainly posters and information in the voivodeship and district labour offices), Advertising on the website

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Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

After each training, an evaluation is conducted on participants' satisfaction with the training.

What makes your training program successfull and unique?

The training program was created with the help of professionals. Customer needs and requirements as well as market research were taken into account.

What kind of difficulties do you face regarding the training?

Sometimes there are problems with internet connections, during online training

Co-funded by the Erasmus+ Programme of the European Union

Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Poland
Name of institution: Training Center (Ośrodek Szkolenia Sp. z o.o.)
Type of institution (Private/public): Private
Short description of the activity (Target group,...): Training company provides all kinds of training, which is one of the forms of extracurricular supplementing, expanding or changing the profile of existing vocational education by adults, working or seeking employment.

Trainings on digital/ICT skills for SMEs

Concept: Vocational training
Curricula: The institution conducts activities in the field of quality assurance of the conducted education. An education quality management system has been developed and approved. It includes the education quality policy, the tasks of the education quality management system and the education quality management structure.
Teaching materials: Scientific studies, research. The institution develops and implements its own curricula for the education provided.
Teaching methods: Lectures
Examination regulations: Exam regulations available in the office. Written exams, checking the knowledge gained during the course
Organisational structure (fee, duration,...): Payment and duration, details included in the terms and conditions
Further conditions for participation: You can take other courses

Trainings on customer-centric innovation for SMEs

Concept: Vocational training
Curricula: The institution conducts activities in the field of quality assurance of the conducted education. An education quality management system has been developed and approved. It includes the education quality policy, the tasks of the education quality management system and the education quality management structure.
Teaching materials: Scientific studies, research. The institution develops and implements its own curricula for the education provided.
Teaching methods: Lectures
Examination regulations: Exam regulations available in the office. Written exams, checking the knowledge gained during the course.
Organisational structure (fee, duration,...): Payment and duration, details included in the terms and conditions
Further conditions for participation: You can take other courses

Co-funded by the Erasmus+ Programme of the European Union

How do you attract training participants from SMEs?

Cooperation with the Labour Office, with craft organisations (guilds, cooperatives), advertising (mainly posters and information in the voivodeship and district labour offices)

Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

After each training, an evaluation is conducted on participants' satisfaction with the training.

What makes your training program successfull and unique?

The training program was created with the help of professionals. Customer needs and requirements as well as market research were taken into account.

What kind of difficulties do you face regarding the training?

Sometimes there are problems with internet connections, during online training.

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Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Poland
Name of institution: Center for Vocational Training in Olsztyn
Type of institution (Private/public): Private
Short description of the activity (Target group,...): Training company provides all kinds of training, which is one of the forms of extracurricular supplementing, expanding or changing the profile of existing vocational education by adults, working or seeking employment. Vocational courses: welding, carpentr

Trainings on digital/ICT skills for SMEs

Concept: Vocational training
Curricula: The institution conducts activities in the field of quality assurance of the conducted education. An education quality management system has been developed and approved. It includes the education quality policy, the tasks of the education quality management system and the education quality management structure.
Teaching materials: Scientific studies, research. The institution develops and implements its own curricula for the education provided.
Teaching methods: Lectures
Examination regulations: Exam regulations available in the office. Written exams, checking the knowledge gained during the course.
Organisational structure (fee, duration,...): Payment and duration, details included in the terms and conditions.
Further conditions for participation: You can take other courses

Trainings on customer-centric innovation for SMEs

Concept: Vocational training
Curricula: The institution conducts activities in the field of quality assurance of the conducted education. An education quality management system has been developed and approved. It includes the education quality policy, the tasks of the education quality management system and the education quality management structure.
Teaching materials: Scientific studies, research. The institution develops and implements its own curricula for the education provided.
Teaching methods: Lectures
Examination regulations: Exam regulations available in the office. Written exams, checking the knowledge gained during the course
Organisational structure (fee, duration,...): Payment and duration, details included in the terms and conditions
Further conditions for participation: You can take other courses

Co-funded by the Erasmus+ Programme of the European Union

How do you attract training participants from SMEs?

Cooperation with the Labour Office, with craft organisations (guilds, cooperatives), advertising (mainly posters and information in the voivodeship and district labour offices)

Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

After each training, an evaluation is conducted on participants' satisfaction with the training.

What makes your training program successfull and unique?

The training program was created with the help of professionals. Customer needs and requirements as well as market research were taken into account.

What kind of difficulties do you face regarding the training?

Sometimes there are problems with internet connections, during online training

Co-funded by the Erasmus+ Programme of the European Union

Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Hungary
Name of institution: SZTÁV Felnőttképző Zrt.
Type of institution (Private/public): Private and local government owned
Short description of the activity (Target group,...): Our main profile is technical and engineering vocational training, namely everything that is connected with technical training. In addition to this, we also organise other types of trainings, if required and we develop the training materials of the traini

Trainings on digital/ICT skills for SMEs

Concept: We do not have digital skill development training courses for SMEs. However, we have ICT training in which cases the syllabus includes ICT and that section is built into the professional training courses. We are really experienced in that area.
We are in contact with about 250 people whose are employed as trainers.
We deliver numerous training courses funded from money won at tenders, but in each case, it is the company that submits the tender application and the company sends its employee(s) for training to the training institute. …..
In our opinion, the present problem is that we do not know yet how we could launch relatively short-term, target-oriented training courses for the small companies/entrepreneurs, because these companies could only send one person or maybe two to the training course. But in our case, the number of participants at a training course is minimum 12 persons. Unfortunately there is no such organisation in Hungary that would coordinate these small companies in the area of training.
In our opinion, there is a need for an employer organisation that could coordinate and gather the many, different interests of micro enterprises that are capable to send many one-person.
The biggest problem today is that the SME employer organization cannot apply for training, even though it could coordinate and recruit the training participants from many small businesses.
This is the biggest problem, because at this moment only the enterprises can submit tender applications for the training of their employees to the EU Funds and this can only be done by larger companies with minimum 30 to 40 employees. The micro companies cannot submit tender applications.
Sometimes we manage to contact a smaller company located in an industrial park, then more and more customers come from that industrial park.
One of the biggest problems of becoming a supplier is that also the small companies should have to have an ISO certificate, because otherwise the German companies do not accept them as suppliers.
In the case of large companies our experience is that they do not require complex training but only training courses and/or preparation focusing on certain partial activities, but those have to be provided at very high level.
It is not clear what the future of the handicraft sector providing services will be in the area of adult training. The large manufacturing companies whose products are serviced by the micro companies train the respective staff of the micro companies free of charge. For example, this training institution have general boiler mechanic training with a large number of training hours, registered in the National Training Registry but nobody wants to attend it. However, the large boiler manufacturers regularly deliver 1 to 2 day training courses for their mechanics, and it works. The boiler manufacturer does not charge a fee for the training, and the boiler mechanic learns at these training courses what they have to do in the case of that specific boiler product. Each product manufacturer trains their service people this way.
In the case of adult training, at present there are tenders opened up that provide besides training subsidy, wage subsidy as well for the company.
The truth is that the majority of the training institutions have become lazy, because earlier, in the case of each profession there were long-term training courses regulated by the National Training Registry. This

Registry will cease to exist as of 31st December this year, and the government decreased the group of regulated professions.
As a result of this measure, the value of what is possible based on the present law in the area of adult training should become more valuable, meaning that the training institutions have the possibility to announce special short-term training courses and issue a certificate at the end of these courses. In fact at present it does not work, because the enterprises have become used to government-issued certificates and if the training course fails to provide this certificate, then they do not want to participate at a special short-term training course.
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

Trainings on customer-centric innovation for SMEs

Concept: Currently, we do not have such type of training, but it would be very important to develop it since there is high demand for that type of training.
We provide digital and innovation trainings, but these are built into the professional training courses. For example, in the case of refrigerators' cooling systems, there are digital controls and that is the first area where we provide IT basic training and then the attendees learn the rest. The programmes provided by the training institution specify certain so-called entry conditions that are part of the professional training. In our opinion, adult training should be developed in the direction that the training material should be freed from all the unnecessary content and skills and should focus only on the parts that contain skills about the given profession, or deal with the operation and programming the machine in question and the installation and repair activities important for the client. For example, in the case of digital training, the only thing that should be taught is that if the person touches an instrument what the given person has to pay attention to. These persons have to be trained to be users of the machine and not to know what is inside the machine.
We do not have training materials that would explain what the company should do and what they should pay attention to in order to gather customer-related information.
Our institute elaborated training materials in compliance with customer requirements in the case of medium-size companies. In that case, for example, the company indicated, just to tell you an example that their production lines' performance is not efficient enough. The training institution went to the site and based on observations it turned out that those who work on the given production line do not have any electricity and electronics skills on where the product they manufacture shall be built into. The training institution compiled a 30 hour further training programme where training in electronics was provided specifically about the critical issues in their production and efficiency was improved on the given production line. For the request of the company, training courses in the above subjects were organised for approximately 60 employees. The staff members are now aware of the critical points in their work activities.
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

How do you attract training participants from SMEs?

We also do on-site visits and if we manage to get inside the premises, we try to explain why it is beneficial for the companies if they attend the training courses of the training institution. We also use open marketing tools, sending newsletters to minimum 1.000 SMEs. We have compiled the database during several decades. We also organise a large number of forum at different locations, industrial parks, where we publicise ourselves. This is the area where cooperation with those organisations, like IPOSZ would be necessary, because these organisations' local trade corporations could offer the venues and recruit participants to these forums from among their own member companies.

Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

Since we develop our own training courses based on the requests of our clients, we always receive feedback from the customers on the efficiency of the training course. If the clients are satisfied with the training course, they will order such training courses also later and will spread good news about our training courses among other companies. However, we have to note again, that we mostly deal with large companies.

What makes your training program successfull and unique?

Our training programmes are successful because we have been active in the training business since 40 years and do adult training since 40 years. We have an extensive network of large companies and medium-sized companies and the training materials are developed and prepared by experienced experts. We fully tailor-made our training courses to the requirements of the company in question, if the customer provides tools and equipment, the trainings are done on their premises and the time schedule is also coordinated with the company.

What kind of difficulties do you face regarding the training?

Training of small and especially of micro companies is a problem to be resolved. Communication problem: it is very difficult to contact the small companies and it is even more difficult to find a common language. The explanation to this problem is that at small companies the head of the company does everything, he/she is the only person we can talk to, and it depends on the educational level and approach to the issue of that person what he/she understands and what not. At the large companies, there are HR specialists, and it is much easier to negotiate with them. Among the small entrepreneurs, there are many elderly people and it is difficult to communicate with them electronically, the only option is to make phone calls. Naturally, the increasing requirements of our clients give us an impetus to approach also the small companies and convince them, whether they want it or not, about the need to develop if they want to remain at the market. However, we have to note again that at present there is no such training course that calls the attention of the small companies to consciously measure and collect the impetus in order to participate at training courses and make developments in the function of the impetus identified. In order to measure the impetus, they have to use, at least to a certain level, digital technology, but in order to be able to do that, they have to be proficient in digital training at least to that extent.

Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Hungary
Name of institution: Új Ház Felnőttképző Zrt.
Type of institution (Private/public): Private
Short description of the activity (Target group,...): This is a construction material distribution company that also distributes digital construction products. The company has its own distribution network. This network consists of about 80 shops located all over the country. Each of them is legally independe

Trainings on digital/ICT skills for SMEs

Concept: The company basically provides digital training courses for the sales network consisting of 80 SMEs, so that they become familiar, at system user level with the information system the company use. For this purpose, we have a support team. This is the way we develop our colleagues. This training is not obligatory. Those who register to the training course, have access to the online training materials. We also organise online knowledge-sharing days, where the support team delivers presentations, organises question and answer sessions that are recorded thus can be listened and watched also at a later date.
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

Trainings on customer-centric innovation for SMEs

Concept: It highly depends on stores. At present, we have more than 80 stores, and it all depends on the local manager. At some of the shops, storage is organised according to the demands and feedback received from the clients and at other shops, they do not really care about the received proposals, opinions. At present in construction industry, anything can be sold, thus there is little incentive to really become familiar with the customers' needs. At present, this is the situation, but it will definitely change. The company's homepage is a central interface, but the shops also have their own homepage. The purpose of the homepage is to direct the interested customers to the shop. Personal consultation is the most important part in the customer relationship.
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

How do you attract training participants from SMEs?

The company can continue to provide trainings for the SMEs, because our network consists of 80 SMEs. We are a big network, the network of 80 SMEs. We, as a centre and several of our partners have also submitted tenders for European Union funded training courses. But submitting and winning a tender is a very difficult, consumes a lot of time and causes a lot of problems. The party who writes the tender takes the profit, and the tendered training course they offer is usually not good. The end-user construction companies are provided information by the local sales persons about where they can find on the Internet the information leaflets and product descriptions issued by the product manufacturer. The most serious professional training courses of the company are the manufacturers' product shows on their products. At these occasions, the supplier product manufacturer companies comply online professional shows and presentations, for example, on hygienic products, tiles, heat insulation materials, etc. These training courses provide 3 to 4 hour professional information for those colleagues who sell these products in the shops. We also have some products labelled with our own brand name. Soft skill training courses, sales methodology, stress management, time management. The materials of these latter training courses are produced by the internal training department of the mother company.

Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

The efficiency of a training course is a difficult issue. It is hard to know whether the training course creates value added in sales. Basically, we apply the following measurement methods: we ask the participants of the training courses right after the training then about 5 weeks later we ask them again. We ask the owners of SMEs about their experiences and whether the employees show any sign of their development.

What makes your training program successfull and unique?

Our training programme is quite unique. At present, we offer 25 different training courses for our network in the area of both professional trainings and soft skills development. We define and announce a date for the training, and if there are enough participants who want to attend, we launch the training. We work a lot online, due to Covid-19. It varies whether a training course is free of charge or there is a fee to pay. If the presenter is not an in-house person, we distribute the costs of the training course among the participants, but the training courses delivered by our in-house staff are free of charge. Our training courses are more similar to an exchange of experiences than to classical training, because even if there is a main topic to follow, we focus on sharing knowledge. There are issues that we definitely touch upon, but we involve the participants who, to some extent also shape the course of the training course. Typically, the training courses last 4 hours, these do not have to be reported, consequently there is no mandatory output or end-result to fulfil. Training courses that must be reported require a lot of administrative work that is why we do not want to organise them since they do not give enough value added that would compensate for the time and work invested into administration.

What kind of difficulties do you face regarding the training?

When the business goes well, there is no need for training, when the business does not go well there is no money to spend on training. It is a very typical attitude. Probably it will be easier to attract people in the future to the training courses.

Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Hungary
Name of institution: Easy Learning Hungary Skills Development Ltd.
Type of institution (Private/public): Private
Short description of the activity (Target group,...): Easy Learning Hungary Skills Development Ltd. is a training institute with extensive experiences operating with in-house staff and external collaborators. It has been organising corporate training courses since about 25 years for small and medium sized co

Trainings on digital/ICT skills for SMEs

Concept: In general, it deliver training courses whose concept, training materials and syllabus are developed by the state and not by the training institution. Easy Learning Hungary performs the trainings based on these training materials, organises the training courses, looks for and provides the relevant experts and administers the training courses. The training institution is selected for these tasks via public procurement procedures.
The training institution has well-prepared in-house experts with huge experiences available to perform these tasks. It also provides digital training. Of them, Iker (Twin) 1.0 and 2.0 programmes, organised and implemented earlier by the training institution are the most significant. These programmes were developed by the state on the use of the most simple digital tools and basic digital skills. The basic purpose of the training programmes developed by the Government IT Development Agency (KIFÜ in Hungarian) was to facilitate for the economically most disadvantaged social groups to catch up and the development of digital competencies in order to improve their economic competitiveness and chances on the labour-market. At present, the company also participates in the implementation of Iker (Twin) 3.0 and 4.0 programmes. The subjects of these training courses are more sophisticated, focusing on sending the data into the cloud, delivering online interviews and meetings. Up until now, 800 persons participated at these training courses. In these cases they also use the syllabus prepared by the government and they perform the work as sub-contractors of the government. In the case of Iker (Twin) 3.0 and Iker (Twin) 4.0 training courses, the target group is the trainers working at the Vocational Training Centres. In general, these training courses have the duration of 30 hours each. Earlier, the training institution delivered such training courses also for companies, but those were organised within the framework of European Union subsidy programmes. In the majority of the cases, there are no exams at these training courses, but at the end of the course, practical exercises have to be completed and submitted. There was no tuition fee, because the costs of the training courses were funded by the government. During the past few years, the government announced several of these types of training courses funded by the European Union. This training institution, the Easy Learning Hungary Skills Development Ltd. also took part in those training courses and has obtain extensive experiences also in this type of work. Specifically digital training courses were delivered by the training institution for SMEs within the framework of the above-mentioned EU-funded projects, thus they have great experiences also in that area. However, the mentioned training courses did not target family and micro companies, but other target groups.
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

Trainings on customer-centric innovation for SMEs

Concept: Yes, they used to do something like this. The training institution used to work at enterprises, where the customer service activities of certain products, and/or services were located. They used to train communication techniques for the customer service staff. These were training courses of 2-3 days, and 20-25 hours for adults. The programmes were tailor-made to the requirements of the specific company. These companies had a customer service centre. The training institution used to work for companies with call-centre. We asked the question whether through these programmes and training courses the training institution gained experiences based on which it is worthwhile to present also to small companies how to open up to their customers. The answer was yes, but the software that functions at the large companies is not not at all available and applicable for the SMEs. We are talking about software that is expected to be capable to do filtering on when and with whom should the customer centre staff talk. These are CRM systems that work at the large company systems, and would be useful also for the small companies. And the fact is that there are good and cheap Hungarian software, like the mini-CRM software which are useful for small companies as well. After the training courses, the training institution also perform "mystery calls", in order to compare the before and after performance of the customer centre staff. Before the training course, the training institution agreed with the company about the type of training they want and after the training, they evaluate the results.
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

How do you attract training participants from SMEs?

They have a newsletter, a home page and they also use telemarketing methods. They have very good relationship also with the employers' organisations and they circulate among their member companies the information about its training courses. Consequently, this training institution has very good contacts since decades with the professional employer organisations. One of the good examples for this cooperation with the employer organisations is that quite recently in cooperation with IPOSZ this training institution delivered three training courses on digitalisation for construction companies. These training courses proved that there is an ever-increasing demand at the labour market for short-term, fast, efficient, profession-oriented trainings and retraining courses which include dual coaching elements too. Before these trainings were implemented the first step was that IPOSZ interviewed 100 construction companies about their digital requirements that could improve their construction performance. Based on these questionnaires, the training institution prepared three training materials with the duration of 25-25 hours each and licensed those in cooperation with IPOSZ. After that, they delivered those training courses as an experiment or test for 20-20 construction companies each. The companies taking part at the trainings were selected by IPOSZ from among their member companies.

Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

Of course, the training institution do ask for feedback in each case. Yes, the participants are satisfied, in the majority of the cases. The training institution put great emphasis on feedback. They have a mandatory satisfaction questionnaire that has to be filled in at the end of the training courses. However, it is not too informative, because the level of satisfaction can only be expressed with numbers in this case. But the advantage of these questionnaires is that the participants have enough time to respond to the questions. In the majority of the cases, the training institution complement these questionnaires with a textual questionnaire on which the participants can verbalise their comments. This latter one was developed by the training institution as an extra feedback opportunity that they send to the participants a few days after the end of the training course and can be filled in electronically as well.

What makes your training program successfull and unique?

We have contacts with organisations that represent the small companies, since they know best the world of SMEs. We become familiar with the world of SMEs and their requirements through these professional employer organisations.

What kind of difficulties do you face regarding the training?

At present, the greatest challenge is caused by Covid. There is a constant change in the type and form of training courses they can organise. These conditions change rapidly, and they are quite difficult to follow. Legal constraints, restrictions regarding the training are introduced much earlier than in the case of other sectors. The regulations are not differentiated at all. Earlier, there were separate regulations for the trainings organized according to the National Training Registry (OKJ in Hungarian) and separate regulations for our adult training courses. However, by nowadays, all the training types have been mixed up and unified. This training institution do not spend as much time with the training courses as those training institutions that provide 2-3 years long vocational trainings, but the regulations are very similar for both type of training institutions. Nowadays, there are many professions that cannot be taught by adult training institutions, only by vocational training centres maintained by the state. The government gave privileges to the Vocational Training Centres. In case of adult training, however, this training institution were left some scope of movement. The situation in case of short-term training courses has also become more difficult. Up until now, this training institution added VAT to the fee of their short-term corporate training courses, but the training did not have to be reported to the Authority. Now they have to conclude an adult training contract with the participants, at the end of the training course each participant receives a certificate and the training institution have severe data provision obligations and, in exchange for that, the fee of these short-term trainings is also free from VAT. This summer it was very difficult to recruit participants for the trainings, because everybody either had a lot of work or was on holiday.

Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Hungary
Name of institution: Kisvállalkozás-fejlesztési Alapívány
Type of institution (Private/public): Non-profit foundation
Short description of the activity (Target group,...): Based on the founding objective, the organization carries out its activities for the development of entrepreneurial knowledge, culture, and environment in Hungary. Accordingly, its main business areas are: (a) business development services with common elements of mentoring and consultancy; (b) adult education to support the operation and development of enterprises; (c) support and strengthening of the civil sector, organization, and implementation of professional programs; (d) conducting research related to the operation and development of small and medium enterprises to integrate them into policy. The target groups of our activities are: (a) micro and small enterprises (b) non-governmental organizations (c) Local governments, local government associations planning and implementing enterprise development programs.

Trainings on digital/ICT skills for SMEs

Concept: Our foundation is an accredited training center with licensed training programs. At the same time, the real results of digital skills development at the level of business people are linked to individual developments carried out in the framework of mentoring consultations. We follow the same system of objectives in the group trainings we offer and the individual developments within the mentoring-consulting complex for business development: promoting the use of digital tools, introduction of digital methods and applications that are beneficial to the operation of a company, help in choosing between digital tools and alternatives.
Curricula: Digitizable processes of business operations, Available digital tool systems and methods, Business requirements - integration of available digital tools/methods.
Teaching materials: Course-based group training material: self-developed online syllabus supplemented by the instructor introducing specific applications and describing their capabilities.
Teaching methods: Knowledge divided into modules, the learning of modules starts with a short theoretical explanation/lecture and illustration followed by project work in a group of 2-3 persons, in case of individual development, a common knowledge of the digital device involved in the development of the specific operational areas of the company is discussed, the advantages and disadvantages are clarified.
Examination regulations: Group training ends with the preparation of an exam task and its evaluation.
Organisational structure (fee, duration,...): Group, course-based trainings - subject to the payment of a deductible / participation fee; 2-6 suitable, occasionally 4 hours development within the framework of adult training. Development within the framework of complex mentoring / counselling - a source of application or a fee fixed in an individual service contract is the basis for financing; min. 10 suitable but variable number of occasions to suit individual needs.
Further conditions for participation: -

Trainings on customer-centric innovation for SMEs

Concept: -
Curricula: -
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): -
Further conditions for participation: -

How do you attract training participants from SMEs?

(a) Own mailing list, (b) Mailing lists run by civil society organizations, (c) Independent events, (d) Partnership events, (e) Social media interfaces

Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

We have a quality management system that includes customer satisfaction. Elements: self-administered questionnaire; custom feedback via email; customer service operation.

What makes your training program successfull and unique?

Consideration and service of individual entrepreneurial needs, Possibility of consulting after the training, which is also integrated, Integration of the training participants into a network of contacts, possibility of participation in further events, which contribute to the development of cooperation

What kind of difficulties do you face regarding the training?

Reaching your target group effectively, Dependence of companies' training activities on the economic environment, Free training courses that provide thematically similar knowledge but become a negative experience for companies

Best practices in the transfer of skills and digital technologies for the realisation of customer innovations

Information about the educational/vocational training institution

Country: Hungary
Name of institution: MENTORIUS - Miskolci Egyetem Tudás- és Képzőközpont
Type of institution (Private/public): Private
Short description of the activity (Target group,...): The mission of Mentorius Knowledge and Training Center is to provide a modern, flexible, versatile 'knowledge product portfolio', training and services based on 'knowledge needs' - primarily based on the competences of the University of Miskolc.
Our aim is to help companies and institutions with training, supporting professional services, creation of new knowledge and consultancy in solving their technical, legal, linguistic, health, social and business challenges to achieve competitiveness and success.
Our open training courses aim to improve and develop individual skills and professional knowledge so that our graduates are better prepared and competitive in the labour market and in economic and social life.

Trainings on digital/ICT skills for SMEs

Concept: USING THE AUTOCAD SOFTWARE PACKAGE Introduction of the participants to the training with the software package Autocad.
Curricula: Program interface, usage, access to services. Coordinate systems and methods of point assignment. Grouping commands and system variables. Creating and modifying drawing elements. Training and management of selection sets. The concept of layer techniques, practical issues related to their use. Text and size styles. Streamlining the drawing, block techniques. Drawing substitute files. Archiving and plotting of technical computer drawings. The concept of professional environments and the tools for their design.
Training material: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration, ...): 40 hours
Further conditions for participants: -

Concept: PLANNING AND PRACTICE OF ONLINE MARKETING Imparting practical knowledge that can be applied in everyday business, with the help of which especially small and medium-sized companies can start online marketing activities. Nowadays, in the age of digitalization, it is almost impossible to compete without online marketing content or activities, no matter what industry. This knowledge is essential for small and medium-sized businesses, but also for large companies, whether in industrial production, trade or services.
Curricula: Online marketing basics; using online marketing tools; creating websites; GoogleAds; Facebook ads; email marketing; web analytics.
Training material: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration, ...): 20 hours
Further conditions for participants: -

Concept: PLC PROGRAMMING COURSE Learn programming, text and graphic languages, and operation of a programmable logic controller (Rexroth L40 PLC).
Curricula: During the course, students will learn the text and graphics languages of PLC programming (LD, SFC, ST, FBD, CFC) as well as the structure and operation of the PLC. They practice the special features of the various programming languages using at least 20 sample tasks. The participants learn how to address the PLC (output, input, memory).
Training material: -

Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration, ...): 4*8 hours
Further conditions for participants: Bachelor's or Master's degree in engineering

Trainings on customer-centric innovation for SMEs

Concept: INNOVATION - MARKETING - COMPETITIVENESS Practical, situational examples, training, enriched with the analysis of one's own company situation, based on international and national empirical studies, results of experience, strategic and methodological information help with the company strategy, the innovation strategy, the market strategy and the planning and implementation of the operational steps for their realization.
Curricula: Competitive advantages of innovation as critical success factors - Re-interpretation of innovation activity - Open innovations - Product, process, organizational and market innovations - Development of the optimal innovation portfolio - Methodology of basic research and analysis. The role of technology and network competencies in innovation processes - Success factors of innovation processes - Cooperation, co-creation in innovation processes - Innovation marketing and marketing innovation - Lateral marketing technique for the development of new product ideas.
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): 20 hours
Further conditions for participation: -

Concept: RESEARCH AND INNOVATION EXPERTS The aim of the training is to train future professionals who can use their knowledge in the field of technical education, complemented by the theoretical and everyday practical knowledge and skills needed to initiate and manage R&D&I projects in companies and institutions. + The potential of R&D&I activities.
Curricula: Technical, economic, and business knowledge: Lean 4.0, energy, advanced materials science and testing, quality in pre-development, technical trends, strategy and business planning. Research and innovation management knowledge: innovation and tendering systems, industrial property protection, innovation management, innovation methods, R&D&I project management, sustainability and innovation. Optional: Behavioural culture and conflict management, Additive technologies, Intercultural competence and team management, Integrated decision making and data management.
Teaching materials: -
Teaching methods: -
Examination regulations: -
Organisational structure (fee, duration,...): 2 semesters; HUF 250.000 / semester
Further conditions for participation: In the field of technical sciences obtained at least at Bachelor level

How do you attract training participants from SMEs?

There are three main ways to reach SMEs:

a) Through our own database (a database consisting mainly of SMEs was compiled from a previous survey (Labour Market Needs Survey)).
b) We attend meetings organized by various professional associations. There is an opportunity to meet SMEs there and to appear in the newsletters of the professional associations (e.g. BOKIK).
c) Appearance in professional journals (offline and online)

(Individuals may come across our FB advertisements, for example, but they are already participating in the training as employees of a particular company).

Are participants asked for feedback on the effectiveness of the training? How? Are participants satisfied with the training program?

For some training (e.g., licencing training), a satisfaction measure was mandatory, usually in the form of a satisfaction questionnaire. This is essential for quality assurance in adult education. Most of these measurements are still in progress.

What makes your training program successfull and unique?

There are three sources of success for training programs:

a) We provide training that fills gaps (that are either non-existent, very remote, or very rare) (e.g., explosion protection engineer).
b) We can tailor your training (we can adapt it to the needs of the company).
c) We are flexible, both in terms of location and methodology (use of online training, mixed forms of training).

What kind of difficulties do you face regarding the training?

There are two main difficulties for SMEs:

a) Lack of resources (In many cases, SMEs do not have the resources needed for training. They often expect funds for tenders, which are not always sufficient to finance training that meets their needs).
b) Difficulties in organizing the work (SMEs cannot always be without training staff).

On the side of the training institution, the difficulties of the trainers (college teachers), their lack of motivation and market practice are difficulties.