Further training program "Realisation of customer-centred Innovations"

Modul 15 Toolbox

Teaching Material 8 Digital toolbox for customer-centric innovation in SMEs

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Content

Derivation of a digital toolbox

The following chapter intends to provide insights into existing digital technologies and tools to realize customer-based 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'.

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)

refs 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 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-based 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 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 to 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

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 1 Applied instruments, methods, and procedures to customer-centric innovation in Germany, 2020, in %
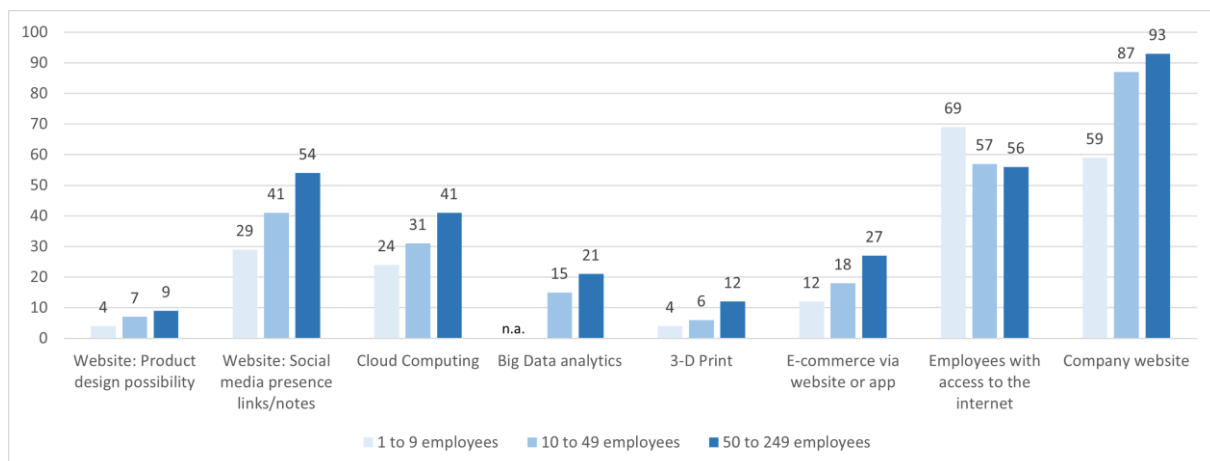
Source: Federal Statistical Office (2021) ICT indicators for companies: Germany, years, employment size classes

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 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 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.

Table 4 Tools for customer-centric innovation by technology 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

Visualizations			x	
Living labs	x			
Diary Search	x			

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:* • 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

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

Tools	Customer relationship					Market conditions							Organisational aspects				
	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	
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	

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

Tools	Financial constrains				Framework conditions			Organisational issues						
	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		

				X				X	X		X	X		
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		

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