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The Potential Value of Digitization for Business – Insights from German-speaking Experts

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Abstract: IT know-how is one of the main drivers for digitization within enterprises. Besides, new business models evolve from recent digitization processes because of ongoing information technologies in the world of business. The question to solve within this paper is what is the potential value of digitization for business? Some managers are still hesitating or even refusing to enter their enterprises into a digital transformation. This study will be part of a better understanding, that considering several issues of digitization can be worth it! Based on a qualitative research by interviewing German-speaking experts, the authors found six factors (efficiency, innovation, data privacy, mobility, new business models and human integration) and two moderating effects (industry and firm size) that influence the potential value of digitization for business.

Keywords: digitization, business, potential value, German-speaking experts, qualitative study

1 Introduction

As a result of the upcoming fourth industrial revolution, the digitization has become one of the most important economic future topics [Lo16]. However, it's not just about the economy, it also affects the society. "The digitization is omnipresent" [Br14]. Due to the changing economic environment and changing processes caused by digitization many companies are facing an enormous challenge. Conquering this challenge is seen as the "most important management task of our age" [BM16]. Despite being well known, the term digitization has gone through a long evolution [BI16]. Today its meaning is not really clarified within specialist literature as well as the major technologies and processes shown by previous literature research [Sc16].

Digitization can be defined as the transformation of signals and media objects (e.g. documents, images or sounds) in a digital form being processed, stored, and transmitted through digital devices and networks caused by the adoption of digital technologies and application of systems that are built upon them [HSM16]. However, there are different levels of intensity regarding digitization: the pure presentation and information (web-site), the sales channel functions (E-Commerce) and the business process integration (E-Business) to new business models with virtual products and/or services [Sc15a]. As a

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consequence of the digital transformation, companies in all industries have to adapt to the potential of digital approaches, like Big Data, Internet of Things, Cloud and Mobile computing as well as Social Software [BFM17].

The objective of this study is to identify chances and risks, as well as important aspects which are crucial for the potential value of digitization within companies as it is not clear yet how to profit from digitization in all business related matters considering recent studies. The paper is structured as follows: Chapter 2 represents research methods and the way data was collected. Chapter 3 shows how data was analyzed within this study followed by the research results in chapter 4. In the end, there will be a conclusion in chapter 5. Research Method and Data Collection

2 Research Method

The following section explains the research method and applied methodology for collecting and analyzing the interview data in order to find essential drivers regarding the potential use of digitization. The potential use of digitization can be defined as the individually perceived capability of the implementation of digitization technologies [Sc15].

2.1 Research Method

The authors developed a qualitative research study to investigate the potential value of digitization for business. The study design is based on the methodology of Grounded Theory according to Glaser [AW10]. By using Grounded Theory, it is possible to inductively develop a theory based on the data by the use of several procedures [Gl04]. By systematically gathering and analyzing the data during the research process [GS67], the approach of Grounded Theory was used to develop an own theory in order to explain main drivers regarding the use of digitization. Using Grounded Theory allows for the handling of masses of raw data by several analytical tools, while also exploring different phenomena. This is accomplished by identifying and developing concepts which are the building blocks of the theory [SC98].

It has to be noticed that a substantive literature review is not part of the concept of Grounded Theory [GS67], [Cr98], [SAM84]. Instead, this approach is appropriate for discovering new and unknown relations. The researcher should be unbiased when applying this approach. Prior to identifying and developing concepts following the Grounded Theory approach, data has to be collected by interviewing experts in order to build and interrelate main categories. The approach describes potential relationships and generate theoretical suggestions and hypotheses to explain opportunities and risks of digitization for business [SC98].

2.2 Data Collection

The collection of the necessary data among experts was conducted by an online survey, and was executed in the German speaking area (Germany, Austria and Switzerland). Two criteria were determined to define a participant as an expert. First, the participant has to have a minimum two years of experience in the area of IT and second, he has to work in an IT department in a managing position, as a consultant in the IT area or as a researcher at a research institute. The experts were formally ad-dressed via email. Informally, personal and social networks were used. For formal contacting, appropriate directories of trade associations [SC98] were used. Further, chambers of commerce and industry were requested to forward the online survey to relevant enterprises respectively experts. Four chambers cooperated, the other denied due to data privacy concerns. Sources of informal contacting were Xing and LinkedIn. More than 30 groups, which deal with subjects (IoT or Industry 4.0) within the frame of digitization, were selected and contacted via the group moderators. Six of the groups supported this study. As a result, the answers of 72 different experts were collected and analyzed. The online survey was conducted between January and March 2016.

The survey was structured as follows: First, the researcher and the study design were introduced. Next, the main part started with a question about the definition of digitization. Regarding enterprises, advantages and disadvantages of digitization have been asked. Following this, the participants were required to state benefits, important technologies, and aspects which must be considered. The next question was about special industries profiting from digitization. The main part has been completed with the questions about the impact of company size on the success of the digitization and innovation processes. The final part of the survey asked for general information about the participants such as department, company size, industry, and location. All questions were based on general aspects of digitization that needed to be clarified.

All of the respondents have been from Germany except one expert from Austria. The recruited participants of this research have an average of 9.81 years work or research experience in the area of IT Management or IT Research. Therefore, a high involvement as well as a strong expertise in this research topic can be assumed. Taking the companies of the survey into consideration as seen in Figure 1, there were 62 participants in companies with less than 500 employees, six experts in firms with a number of workers between 500 and 5.000, and four experts in firms with more than 5.000 employees.

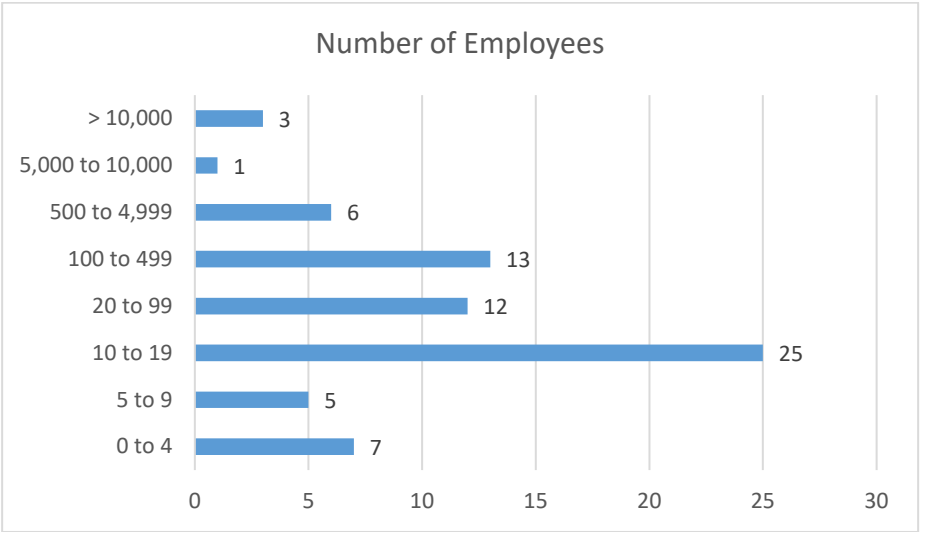

Fig. 1: Number of employees

According to the industries of the participants, as seen in Figure 2, 35 of all experts are working in the IT sector, 17 in the services sector, and nine participants in research.

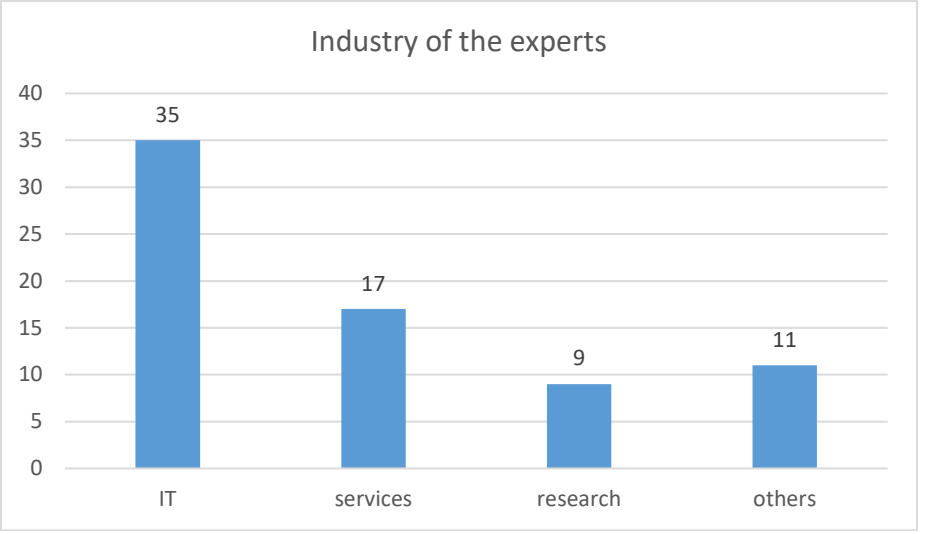

Fig. 2: Industry of the experts

3 Data Analysis

To analyze the collected data, the procedure of coding by Strauss and Corbin [SC98] was used. The described procedure follows a systematic format including open coding and selective coding [SC90]. In the first step, the authors used open coding. By that activity, coherencies within the raw data can be identified by searching for patterns in the process of constant comparison sentence-by-sentence in order to build the initial categories [SC98]. In the next step, related categories were subcategorized and linked to categories with the same property level and dimension. In the third step, the authors used the approach of Glaser. In accordance with Glaser's approach [SC98], the authors introduced the core category, which is the category with the most coherencies to all other categories [SC90]. By open coding the authors realized that for most of the experts the "potential value of digitization" has been an important issue. This core category was also strongly related to all the other identified categories. In the last step of selective coding, all concepts that are weakly related to the core category are eliminated [GS67]. In general, a literature review was not made according to the concept of Grounded Theory as described [SAM84], [LG85].

During the first phase of open coding more than 1,400 codes were generated to structure the collected data. Every single aspect mentioned by the experts was noted. After coding every given answer, the second step of selective coding was executed. Approximately 1,400 codes were subcategorized and merged into less than 30 categories. To decide which of the remaining codes have to be included in the final hypothesis model the numbers of experts, who mentioned these codes, were used. To be included in the model, a code has to be mentioned by at least 30 experts. This was determined to identify the most important aspects which may have a significant influence on the potential value of digitization. The other codes were not considered due to being mentioned by low number of experts. Beneath the pure codes, the probable effects on the potential value of digitization have also been included in the hypothesis model as shown subsequently.

4 Results

After analyzing the empirical data with the method of Grounded Theory, six different influencing factors and two moderating effects have been identified. In the following the factors and the two moderators will be described.

4.1 Efficiency

The first and most recommended positive factor is efficiency. This was mentioned by more than 83% of the experts. The use and integration of the digital technologies of digitization enable companies to optimize their value chain. The acceleration of processes along the value chain was specifically mentioned by the participants.

Important aspects mentioned by the experts are the speed of processes and the potential of minimizing the different types of costs. As a result, an increase in efficiency impacts the value of digitization which leads to hypothesis 1:

H1: Efficiency positively influences the potential value of digitization.

4.2 Innovation

Nearly 81% of the experts stated, that digitization will have a significant positive influence on the innovation process of companies. The frequency of new innovations will increase tremendously due to the faster processes and the improvement of customer integration into these processes. An expert remarked: “Because of the higher availability of information and know-how, the speed of innovation processes will increase continuously.” As a result of the better integration of customer demands into the processes, it is possible to implement a pull-strategy where customers will be specifically asked for new products and services. Hence, an improvement in innovation impacts the value of digitization which leads to hypothesis 2:

H2: Innovation positively influences the potential value of digitization.

4.3 Data privacy

The experts identified a sensitive influencing factor for the potential value of digitization with the handling of data issues. This was named by more than 54% of the participants. Based on the possibility of collecting enormous amounts of individual and company related data, the exposure and security of these sensible data is a very important aspect. One expert said: “The risk of data theft and manipulation increases significantly”. Especially in the context of cloud computing, where the location of the servers plays a major role because of different legal foundations. The authors can summarize that all mentioned concerns about data security can influence the potential value of digitization negatively. In contrast, a high data privacy impacts the value of digitization positively which leads to hypothesis 3:

H3: Data privacy positively influences the potential value of digitization.

4.4 Mobility

In the case of local mobility, cloud computing in the context of mobility was very often mentioned as a positive influence. New digital technologies allow access to necessary information from all around the world. One expert mentioned the following example: “A service worker who is outside the plant gets the information that a machine in a production line needs a service, otherwise there is the possibility of downtime. Thanks to a tablet, he gets this information and he is able to order arrangements fixing this

problem, independently from the location." Based on the contributions of the experts the authors can note that an increase in mobility within enterprises impacts the value of digitization which leads to hypothesis 4:

H4: Mobility positively influences the potential value of digitization.

4.5 New business models

One of the most important positive effects of the digitization is the upcoming of new business models. New digital technologies enable the companies to create completely new products and services, but also can change the value chain processes which leads into a different business model. Thus, the creation of new business models impacts the value of digitization which leads to hypothesis 5:

H5: New business models positively influences the potential value of digitization.

4.6 Human integration

The last significant aspect which was mentioned by the participants is the human integration into the process of digitization. If people are left behind in the changing process which goes along with the digitization, the acceptance of the digitization itself will decrease. Hence, it is an enormous challenge for companies to involve their employees and customers, and to be aware of actions against the dehumanization of the production and processes in general. According to this, integrating humans impacts the value of digitization which leads to hypothesis 6:

H6: Human integration positively influences the potential value of digitization.

4.7 Industry

Beneath these six influencing factors the research identified two moderators. The first one is industry. Although one expert said: "Digitization can optimize every value chain process, no matter in which industry the company acts", numerous of the experts mentioned that the sector of the company can have a different effect on every influencing factor. For example, human integration may be a bigger issue in a manufacturing company where an employee can be afraid of being replaced by a cyber- physical system than in a service company. As a result, industry specifics have an impact on the value of digitization which leads to hypothesis 7:

H7: Industry influences the potential value of digitization.

4.8 Company size

The other moderator is company size. The participants illustrated the impact of the company size on the ability of the companies to succeed in the process of digitization. The major amount of the experts mentioned that a small sized company is often more flexible and faster when it comes to the implementation of new technologies and changing processes. On the other hand, big companies are more experienced in change management, and also have a bigger capital base to advance digitization. The authors can summarize the statements of the experts as follow: The size of a company impacts the value of digitization which leads us to hypothesis 8:

H8: Company size influences the potential value of digitization.

The model of the potential value of digitization is based on empirical data given by German-speaking experts. It might have benefits for enterprises facing digitization with illustrated key aspects. A model, which is depicted in

Fig. *3* below, has been developed based on the collected and analyzed data. It could be a starting point for future research by validating this model via a representative quantitative study.

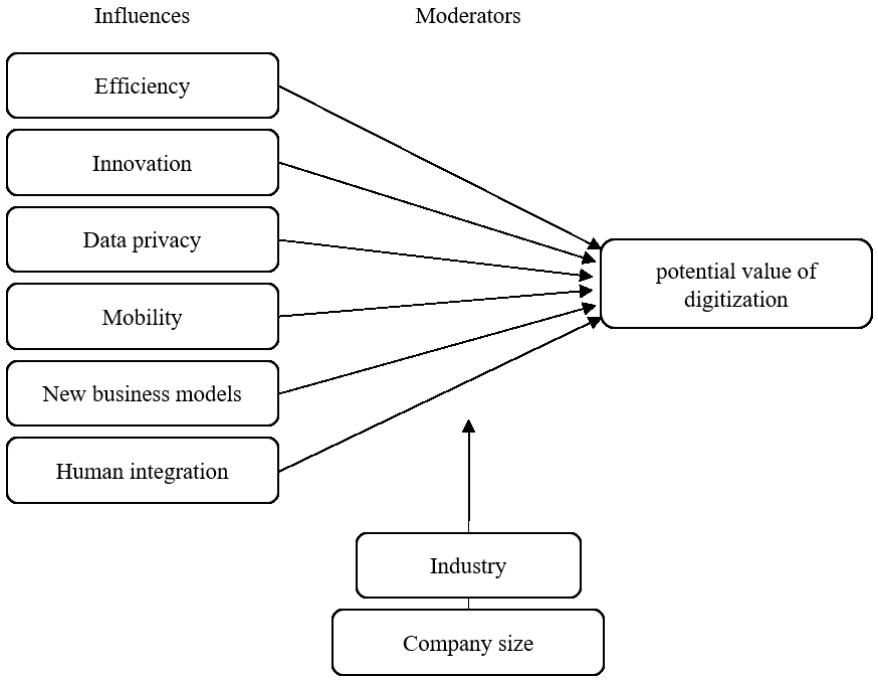

Fig. 3: Potential value of digitization

5 Conclusion

A model of the potential value of digitization, based on empirical data from German-speaking experts using Grounded Theory, was developed. This data shows some important influencing factors like efficiency, mobility, data security, and innovation. Experts in the digitization environment mentioned all these factors repeatedly. For that reason, they can be viewed as a good base for the model as well as the concept of what drives to the potential value of digitization. Furthermore, current research can use these results to extend the current scientific view of potential value of digitization.

There are also some practical implications. Enterprises can benefit from the research by evaluating the different aspects of digitization with their own business cases. In addition, this model can help to find suppliers for their specific requirements. Besides the view of benefits of digital technologies, this research demonstrates other aspects which can have a negative impact on the companies' digitization process.

This qualitative research also shows some limitations due to the fact that it only focuses on a small sample of different experts. Obviously not all experts from all German-speaking countries have been reached. It has to be noted again that a sample that includes different perspectives was created to get reliable information. Nevertheless, a model validation using a quantitative approach is needed to prove this qualitative method using Grounded Theory.

Future research should validate this model via a representative quantitative study (e.g. web-based survey). For that purpose, the influencing factors explored in this research could be an adequate starting point for the set of answers given in the questionnaire of the survey. Evaluating this model in different countries and focusing on different aspects (e.g. data security) is a good opportunity for future research. In this context, a distinguished investigation of single German-speaking states would be interesting as well.

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