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Crunch Time: How Can Small and Medium-Sized Enterprises in Germany Manage the Turnaround in Product Innovations?

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Abstract. The economic importance of small and medium-sized enterprises (SMEs) for the Federal Republic of Germany remains undisputed. However, it is worrying that the innovation performance in terms of product and process innovations of German SMEs has been predominantly in decline for more than a decade. In addition, Germany has also fallen behind in an international comparison in the area of digitalization. To make matters worse, a closer look reveals that within Germany SMEs lag far behind large companies in their use of digital technologies. However, digitalization in particular offers enormous potential for the development of innovations. The aim of this paper is to examine, within the framework of a literature review, how SMEs in other countries use and take advantage of digital technologies in order to create product innovations and what German SMEs can learn from this. The paper focuses first on the identification of the main deficits of German SMEs in the areas of product innovations as well as digitalization and analyzes the causes for their occurrence. Subsequently, based on the literature analysis, it will be examined which current possibilities exist or are already in use by international SMEs, which could possibly contribute to overcoming the existing deficits of German SMEs. Following this, a preliminary assessment approach is shown on the basis of assumptions, which should lead to an evaluation of the most important deficits. Derived from this, the prioritization of the proposed activities for the SMEs is developed. Finally, the paper is completed by further implications as well as a presentation of the limiting factors of this study. Furthermore, this paper shall support decision makers in SMEs in Germany to make more efficient decisions regarding the perception of innovation potentials, which could be derived with the help of digitalization. In conclusion, this paper also aims to identify approaches for further research works in the context of international benchmarking of SMEs with regard to the use of digital technologies for the purpose of innovation development.

Keywords: Product Innovations, Digitalization, Digital Technologies, SMEs

1 Introduction

Following the argumentation of (Endrődi-Kovács and Stukovszky 2022), both the implementation of digitalization and the realization of innovations can prove to be beneficial for the development of individual companies, the entire country and thus ultimately for society as well. Furthermore, according to (Ferreira, Fernandes and Ferreira 2019), digitalization can increase the chances for companies to be successful in the market and thus also positively influence the willingness to innovate. In the opinion of (Łobacz and Szanter 2022), the digitalization of innovation processes makes it possible to manage them better and in a more targeted manner, as well as to work on them collaboratively.
Small and medium-sized enterprises (SMEs) often fulfill important functions within the respective national economy and therefore usually take on a special role (Glonti, Manvelidze and Surmanidze 2021; Olokundun et al. 2022).
On the road to digitalization, however, SMEs in particular face various challenges. In order to adapt digital technologies, they most urgently need the appropriate competencies as well as the financial means (Roman and Rusu 2022).
A particularly hampering factor is that SMEs in Germany in particular still have a lot of ground to make up compared to their international competitors when it comes to embracing digital transformation (Papen, Lundborg and Tenbrock 2021). In addition, SMEs in Germany are also at a disadvantage with

regard to national competition in the form of large companies in terms of the digitalization level (Bundesministerium für Wirtschaft und Klimaschutz 2023).
Regardless of the size of the company, there are also different levels of development with a view to digitalization among the various sectors in Germany. For example, companies from the "information and communications technology (ICT)" sector are leading the way in digitalization in Germany. These are followed by companies from the "vehicle manufacturing" and "business-related service providers" sectors. For instance, companies from the "other manufacturing", "trade" and "other production" sectors are at the bottom of the rankings (Bundesministerium für Wirtschaft und Klimaschutz 2023).
The economical relevance of SMEs in Germany can be considered as very significant due to several factors. SMEs represent the overwhelming majority of companies in Germany; only 0.7% of companies in Germany were not SMEs in 2021. In addition, more than half of the employed persons in Germany are employed in an SME. Furthermore, SMEs account for more than a quarter of the total sales of companies in Germany (Statistisches Bundesamt 2023).
The above information is based on the proposal 2003/361/EC on the classification of SMEs prepared by the European Commission (Statistisches Bundesamt).
This proposal was issued by the European Commission in 2003 for the delimitation of SMEs. The thresholds set out in Article 2 propose for SMEs a maximum number of 249 employees and a maximum turnover of 50 million euros per year respectively a maximum annual balance sheet of 43 million per year (European Commission 2003).
However, in addition to the above-mentioned classification of the European Commission, there are also other definitions of SMEs, such as the definition of the Institut für Mittelstandsforschung Bonn from 2016, in which, for example, the maximum number of employees of an SME may be 499 (Institut für Mittelstandsforschung Bonn).
Moreover, the Institut für Mittelstandsforschung Bonn offers a definition of the term "Mittelstand enterprises" that on the one hand encompasses a very large number of SMEs, but on the other hand may also include large family businesses that may exceed the limits of the previously mentioned definitions of SME sales and employee sizes (Institut für Mittelstandsforschung Bonn).
Therefore, in the further course of this research work and in the analysis of the literature, no explicit delimitation of SMEs according to a specific definition is made in favor of the greatest possible diversity of information; likewise, no distinction is made between "Mittelstand enterprises" (Institut für Mittelstandsforschung Bonn) and SMEs.
The European Commission has been measuring the developments of its member states in the area of digitalization every year since 2014. In this way, it is also possible to compare the digitalization status of the individual member nations, including Germany (European Commission 2023). The respective level of digitalization in each country is made up of four overarching categories. These categories are *„Human Capital“*, *„Connectivity“*, *„Integration of Digital Technology“* and *„Digital Public Services“*.
In the evaluation for the year 2022, Germany occupied only a mid-table position across all categories, ranking 13th. Looking at the *„Integration of Digital Technology“* category by itself, Germany is ranked 16th, which puts it in the lower midfield of the 27 member states (European Commission).
In the literature review conducted by (Papen, Lundborg and Tenbrock 2021), the hurdles SMEs face on their way to digitalization were identified and grouped as follows. The literature analysis revealed that the main hurdles to be overcome are a shortage of expertise in digitalization, an insufficient number of qualified employees, financing problems, a lack of understanding among many companies of the beneficial effects of digitalization, security concerns regarding digitalization, and rejection of digitalization processes within companies.
In supplement to the digitalization hurdles already mentioned, (Brockhaus et al. 2020) identified another significant hurdle for companies in their meta-study in the form of underdeveloped infrastructure.
The innovation capacity of SMEs in Germany is still considered to be relatively high compared to the large nations in Europe (Bundesministerium für Bildung und Forschung 2023).
Nevertheless, the development in the area of product and process innovations for SMEs in Germany has been declining for some time now. The *„innovator rate“* measures the proportion of companies that

have implemented at least one product or process innovation in the past three years (Rammer et al. 2023). While this was still an estimated 70%[1] for 2008 (Rammer et al. 2022), it was only 53.5% in 2021 (Rammer et al. 2023). In contrast to SMEs, large companies in Germany were able to moderate the decline in the *„innovator rate"*. The *„innovator rate"* was an estimated 90%[1] among large companies in 2008 (Rammer et al. 2022) and decreased to 80.7% in 2021 (Rammer et al. 2023).
Irrespective of company size, the chemicals and pharmaceuticals sectors, closely followed by the information and communications sector, proved to be the sectors with the highest *„innovator rate"*. Whereas the sectors of supply and disposal as well as mining, followed by the sectors of wholesale trade and transport, were able to show the lowest *„innovator rates"* (Rammer et al. 2023).
In the view of (Zimmermann 2021), the insufficient financial allocation of many companies, on the one hand, and the deficiency of qualified employees, on the other hand, are among the most frequent causes that prevent innovations from taking place in Germany.

2 Research Methodology

The research methodology used in this research is based on conduction of a literature review. This will serve to identify recent scientific articles written in the context of SMEs and product innovations for analysis with regard to the research questions posed below.

2.1 Research Purpose and Questions

The main purpose of this research work is to find out how small and medium-sized enterprises in Germany can increase the number of their product innovations again. Therefore, the first research question consists of asking: How can German SMEs increase the number of product innovations? On the basis of the aforementioned main purpose of this research work, further questions develop, which will also be answered in the course of this work. For example, the question whether digitalization can help SMEs in Germany to increase their product innovations. In this sense, the second research question is therefore: Can digitalization promote the implementation of more product innovations in German SMEs? The next question also ties in with the topic of digitalization, asking whether German SMEs can learn something from their international competitors when it comes to digitalization and its use to promote product innovations. Therefore, the third research question is framed as follows: How do SMEs abroad cope with digital transformation and how do they use the opportunities of digitalization to support the development of product innovations? In this context, the fourth research question also arises: What challenges do German SMEs face in the context of the digital transformation and in using digitalization to generate product innovations? The fifth and final research question of this research work deals with the current status of German SMEs' efforts with regard to digitalization and product innovations. Therefore, the fifth research question asks: What is the current status of German SMEs in terms of overcoming digitalization hurdles and exploiting opportunities from digitalization to unlock product innovations?

2.2 Literature Search and Selection

The Scopus literature database was used to conduct the literature search. Several search terms were used, with the aim of primarily covering the areas of product innovations, SMEs and digitalization comprehensively. The search terms used for the individual areas are shown below.

[1]These values are based on visual estimations from the corresponding chart

Search terms for the area of product innovations:
"product innovation*"; "product novelt*"; "product invention*"; "new product"; "product creation*"; "product development*"; "innovat* product*"; "novel product*"; "product news"; innovation*

Search terms for the SME sector:
"small and medium size enterprise*"; sme*; "small and medium size compan*"; "small and medium size firm*"

Search terms for the field of digitalization:
digitalization; "digitalization degree"; "digitalization level"; "level of digitalization"; "degree of digitalization"; "digital technolog*"; "digital transf*"; digitization; "digitization degree"; "degree of digitization"; "digitization level"; "level of digitization"; "digital maturity"; "digital maturity level"; "digital maturity degree"; "degree of digital maturity"; "level of digital maturity"

In addition, the following restrictions further narrowed the search. The search was limited to papers in the field of business, management and accounting published in English or German between the years 2019 and 2023 with unrestricted access. The search terms mentioned were then combined with the restrictions to form the following search text and queried in the Scopus literature database:

(TITLE-ABS-KEY ("product innovation*" OR "product novelt*" OR "product invention*" OR "new product" OR "product creation*" OR "product development*" OR "innovat* product*" OR "novel product*" OR "product news" OR innovation*)) AND (TITLE-ABS-KEY ("small and medium size enterprise*" OR sme* OR "small and medium size compan*" OR "small and medium size firm*")) AND (TITLE-ABS-KEY (digitalization OR "Digitalization Degree" OR "Digitalization Level" OR "Level of Digitalization" OR "Degree of Digitalization" OR "Digital Technolog*" OR "Digital Transf*" OR digitization OR "digitization degree" OR "degree of digitization" OR "digitization level" OR "level of digitization" OR "digital maturity" OR "digital maturity level" OR "Digital maturity degree" OR "degree of Digital maturity" OR "level of Digital maturity")) AND (LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (LANGUAGE , "English") OR LIMIT-TO (LANGUAGE , "German")) AND (LIMIT-TO (OA , "all")) AND (LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2023))

The query resulted in a total of 74 hits. The remaining 74 articles were then examined for their relevance to answering the research questions. The focus of the analysis was essentially on the criteria of the extent to which the articles can contribute to the digitalization of SMEs and on the content of how digital technologies can be used to generate new product innovations. This analysis and the further selection of articles were based on the titles of the articles, the keywords used and the abstracts. The remaining articles were then subjected to an in-depth review. This led to the result that a final of five papers were included in the further literature analysis.

3 Results

The analysis of the results has shown that there are two significant obstacles for SMEs to overcome on their way to more product innovations. On the one hand, the execution of the digital transformation and, on the other hand, the exploitation of the possibilities and opportunities arising from digitalization for the generation of product innovations. The following section therefore first examines the criteria for coping with digital requirements and then looks at the ways in which SMEs can derive their benefit from digitalization in order to be able to develop more product innovations in the future again.

3.1 Factors Influencing Digitalization

In the opinion of (Radicic and Petković 2023), government support for SMEs should take into account that SMEs may differ in their structural set-up and size, and therefore appropriate support must also be tailored to their respective needs. This also applies in particular to the distinction between SMEs that do not and those SMEs that do have their own R&D division.
The study by (Müller, Buliga and Voigt 2021), to the contrary, focuses on the task of the government in providing SMEs with relevant information as a necessary support on the way to digitalization. In particular, this involves the development of new entrepreneurial concepts based on the new possibilities offered by digitalization.
The research by (Röhl and Engels 2021) provides information that a key prerequisite for being able to use digital technologies at all is a corresponding technological infrastructure. In the case of digitalization, for example, this infrastructure must enable certain minimum data transmission speeds so that the digital potential can be exploited at all in the context of cross-company processes for the creation of new products. Furthermore, the paper of (Röhl and Engels 2021) makes clear that there is also a need for further support with regard to the framework conditions for interorganizational cooperation and simplification of government regulations.
In terms of financial assistance in relation to digital transformation from the government, (Bettiol et al. 2021) take the view that financial support alone does not have an impact on the progress of digitalization by SMEs. The study suggests that SMEs that already have greater commercial resources can benefit more from government support than other SMEs.
According to (Bettiol et al. 2021), the crucial elements in the context of SME digitalization from a company-internal perspective include the employees as well as the capabilities and expertise available within the company with regard to digitalization.

3.2 Support of Product Innovations through Digitalization

The research of (Radicic and Petković 2023) illustrates that digitalization can offer companies the opportunity to drive the development and generation of new abilities, expertise and know-how, which in turn can contribute to the creation of product innovations.
Knowledge is one of the essential prerequisites for innovation, as argued by (Müller, Buliga and Voigt 2021). SMEs should therefore, for example, optimize their internal structures and processes so that they can better share knowledge within the company in order to generate further advantages. In addition, the use of specialized service providers from the IT sector or consulting can also be useful for SMEs in the opinion of (Müller, Buliga and Voigt 2021). Ideally, these service providers can offer relevant support that is geared to the individual needs of SMEs and can thus also help to close any knowledge gaps that may exist. In the view of (Müller, Buliga and Voigt 2021), cooperation with external companies can also contribute to this.
This assessment is also shared by (Röhl and Engels 2021), who see considerable potential, for example, in the cooperation between SMEs and start-ups. Here, for example, SMEs could also benefit from the knowledge of these companies. Furthermore, advancing digitalization also promotes the cross-company development of new products, for example, so that companies would like to benefit more from collaborative work, especially on forward-looking projects (Röhl and Engels 2021).
The results from the research work of (Bettiol et al. 2022) provide indications that servitization can play a crucial role as a mediator between digital technologies in the context of Industry 4.0 and product innovations. This is relevant in this respect, as otherwise no indications could be found in the research work that there is a connection between Industry 4.0 digital technologies and product innovations. In terms of information and communication technologies, according to (Bettiol et al. 2022), on the one hand, there is a direct relationship between these technologies and product innovations, but on the other hand, servitization also occupies a special position in this constellation, in which it can partially reinforce the relationship between the aforementioned technologies and product innovations.

3.3 Preliminary Assessment of the Progress

Hereinafter, the hurdles of German SMEs in the areas of digital transformation and the creation of innovations listed in the introductory section are contrasted with the findings obtained from the literature analysis. The findings obtained from the literature analysis are intended to provide guidance of possible ways in which these hurdles can be addressed by SMEs in Germany.
This is followed by a preliminary assessment by the author based on subjective assumptions. Here, the current progress of SMEs in Germany is assessed with regard to the hurdles mentioned from the digital transformation and the generation of innovations. For the evaluation of SMEs, essentially very rough categories are used. These divide the assumed progress into low, medium and high, whereby intermediate steps in the evaluation are also possible.

Hurdles for SMEs arising from the digital transformation:

Insufficient know-how in the context of digitalization (Papen, Lundborg and Tenbrock 2021):
Concerning this point, it would be beneficial, for example, if the government could support SMEs in building knowledge with appropriate programs (Müller, Buliga and Voigt 2021). Beyond that, another measure from the study by (Röhl and Engels 2021) could be that the policy creates conditions to promote cross-company cooperation and can thus also contribute to the development of knowledge in SMEs. However, SMEs themselves can also build relevant capabilities in the area of digitalization. According to (Bettiol et al. 2021), the strategic direction of the company could contribute to this by, for example, providing an appropriate investment plan for digital technologies and in this way promoting the gradual progress of knowledge development.
Preliminary assessment: medium progress of SMEs in Germany

Insufficient number of qualified employees (Papen, Lundborg and Tenbrock 2021):
This is another point where the government could make a significant contribution to support SMEs by intensifying cross-company cooperation programs (Röhl and Engels 2021). In line with the argumentation of (Bettiol et al. 2021), SMEs themselves can also contribute to counteract the shortage of qualified employees by, for example, investing specifically in further training programs for their employees. On top of that, however, companies can also focus their investments on recruitment to bring the necessary capabilities into the company from the outside (Bettiol et al. 2021).
Preliminary assessment: low progress of SMEs in Germany

Funding issues (Papen, Lundborg and Tenbrock 2021):
The study by (Bettiol et al. 2021) points out that when providing financial support to SMEs regarding digitalization, governments need to be careful that financial support does not automatically promise digitalization progress in the companies. SMEs that are already in a comparatively good financial position are much more likely to accept this support than SMEs that are in a worse financial position.
Preliminary assessment: medium progress of SMEs in Germany

Absence of understanding for the benefits of digitalization (Papen, Lundborg and Tenbrock 2021):
Similarly, with this hurdle, a targeted investment in in-house employee advancement and training could be beneficial (Bettiol et al. 2021) to increase the employees' understanding of any digitalization measures.
Preliminary assessment: medium to high progress of SMEs in Germany

Security concerns regarding digitalization (Papen, Lundborg and Tenbrock 2021):
From the perspective of (Radicic and Petković 2023), SMEs should receive differentiated government support that meets their needs. In this way, SMEs could receive the support they really require. (Müller,

Buliga and Voigt 2021) argue that one of the fundamental tasks of the government is to support SMEs with relevant information on the path to digitalization.
Preliminary assessment: medium progress of SMEs in Germany

Rejection of digitalization processes within the companies (Papen, Lundborg and Tenbrock 2021):
Analogous to the approach to a shortage of know-how in the digital context, a cautious and gradual implementation of digitalization processes could also be advantageous here (Bettiol et al. 2021).
Preliminary assessment: low to medium progress of SMEs in Germany

Underdeveloped infrastructure (Brockhaus et al. 2020):
The government could make a significant contribution to the support of SMEs and the digital transformation by rapidly expanding the infrastructure required for digitalization (Röhl and Engels 2021).
Preliminary assessment: medium progress of SMEs in Germany

Hurdles for SMEs resulting from tapping digital opportunities to generate product innovations:

Absence of qualified employees (Zimmermann 2021):
SMEs could adapt their structures so that knowledge that is new to the company is shared more quickly within the company (Müller, Buliga and Voigt 2021). In principle, SMEs also have the option of obtaining external support from service providers in the IT sector, who can then respond specifically to the needs of individual SMEs (Müller, Buliga and Voigt 2021). One further option may also be available to SMEs by entering into partnerships with external market players (Müller, Buliga and Voigt 2021; Röhl and Engels 2021).
Preliminary assessment: low progress of SMEs in Germany

Financing deficits (Zimmermann 2021):
In terms of financial support for SMEs from the government, care should be taken to ensure that - as in the case of digitalization support - not only isolated SMEs that already have comparatively good financial resources can benefit from state financial assistance (Bettiol et al. 2021).
Preliminary assessment: low to medium progress of SMEs in Germany

4 Conclusions and Implications

The increased use of digitalization technologies could be a possible way for SMEs in Germany to generate more product innovations once again. In this sense, the increasing application of digitalization benefits could also form a possible answer to the first research question of this research work. However, this requires, firstly, overcoming the hurdles in the context of the digital transformation of companies and, secondly, overcoming the challenges in terms of tapping new innovation potential.
The comparison of the digitalization barriers faced by German SMEs with the opportunities for counteracting these barriers revealed in the concluding subjective assessment the assumption that the greatest challenge for German SMEs lies likely in the shortage of qualified employees (Papen, Lundborg and Tenbrock 2021). The second major challenge for SMEs is seen in the rejection of digitalization measures by their own employees (Papen, Lundborg and Tenbrock 2021). Following the two biggest hurdles, the other barriers are seen in the scarcity of expertise related to digitalization (Papen, Lundborg and Tenbrock 2021), the insufficient financial resources available (Papen, Lundborg and Tenbrock 2021), the existing security concerns related to digitalization (Papen, Lundborg and Tenbrock 2021), and the insufficient infrastructure (Brockhaus et al. 2020). On the last point, it should be noted that SMEs are considered to have very little room for improvement with regard to the further development of infrastructure. The government in particular is called upon to take action on this point. In relation to the absence of understanding of the benefits of digitalization (Papen, Lundborg and Tenbrock 2021),

the author's assessment is that, although the optimum has also not yet been reached in this area, SMEs have now probably developed a greater understanding of the benefits of digitalization and SMEs have thus made the greatest progress in this area.
The comparison between the barriers to innovation and the corresponding countermeasures leads to the following assessment. Analogous to the challenges of digital transformation, it is assumed that the greatest barrier in terms of innovation performance is probably also in the form of a shortage of qualified employees (Zimmermann 2021). Financing also plays an essential role in the provision of innovations and thus represents the second major hurdle for SMEs with regard to innovations (Zimmermann 2021).
In answering the second research question, it can therefore be assumed that this is well within the realm of the conceivable. However, the basic prerequisite for this is also that SMEs are first able to overcome the digitalization and innovation hurdles mentioned.
In response to the third research question, it can be assumed that it would be advisable for SMEs in Germany to focus their efforts on the areas of employees and further training in particular when it comes to managing digital change. Following (Bettiol et al. 2021), the strategic orientation of the company towards digital transformation is of importance. It can contribute in particular to make the process of digitalization plannable and to introduce it step by step, in order to be able to develop the digital knowledge of the employees accordingly. Furthermore, in the view of (Bettiol et al. 2021), SMEs also have the option of investing specifically in the further training of their employees in order to increase their capabilities. Finally, SMEs ultimately also have the opportunity to obtain the expertise they need by acquiring employees from outside the company (Bettiol et al. 2021). In view of innovation performance, SMEs should examine whether servitization could not be a useful addition for them. The results of the research work of (Bettiol et al. 2022) suggest that there is probably no link between Industry 4.0 technologies and product innovations. However, there are indications in the study that servitization can act in the role of a mediator between the two areas. Furthermore, (Bettiol et al. 2022) argue that while there is a direct correlation between available information and communication technologies as well as product innovations, this correlation can be partially strengthened by the use of servitization.
Chapter 1 provides the main points of reference for answering the fourth research question. This chapter describes the challenges and hurdles for SMEs in Germany in the context of digitalization and in the area of product innovations.
The evaluation of the fifth research question was described in chapter 3.3. Overall, the subjective preliminary assessment of SME progress in digital transformation and product innovations leads to the assumption that SMEs in Germany are beginning to address these issues seriously. However, digital transformation and the creation of product innovations do not yet appear to be among the top priorities of SMEs.

4.1 Political Implications

The literature analysis has shown that politics can support SMEs in Germany primarily in the following key areas in the context of digitalization. The first area concerns the know-how required to master the digital transformation and to deal with the challenges of digitalization in general. On the one hand, this support can be provided directly by transferring expertise to SMEs within the framework of government support programs (Müller, Buliga and Voigt 2021). On the other hand, however, policy can also indirectly promote knowledge transfer in SMEs by, for example, improving the conditions for SMEs to cooperate with different companies or organizations and thus contributing to an increase in the level of knowledge of SMEs through the exchange of know-how (Röhl and Engels 2021). The second area relates to the financing deficits of many SMEs. Policymakers should be aware that the financial assistance provided to SMEs does not necessarily lead to progress in digitalization by SMEs, but that it is precisely those SMEs that have already a good financial situation are in a position to take advantage of the financial offers provided (Bettiol et al. 2021). Therefore, policymakers should design their programs and financial support measures in such a way that financially weak SMEs can also participate

and are not left even further behind in the progress of digitalization. The last area is one of the essential tasks of politics. It concerns the point of providing an infrastructure that meets the requirements of companies (Brockhaus et al. 2020), which is the basic prerequisite for the entire digitalization efforts of SMEs.
In the context of supporting SMEs in the development of product innovations, policymakers should design their offerings in a way analogous to digitalization assistance (Bettiol et al. 2021) that the obstacles to participation in these programs are not set too high, so that, for example, it can also be made possible for innovative but financially weak SMEs to participate in them.

4.2 Managerial Implications

The recommendations for SMEs with regard to digital transformation are, in particular, that those responsible in the executive suites of SMEs should focus primarily on the key factor of employees. This is primarily due to the fact that the overwhelming share of hurdles to digitalization (Brockhaus et al. 2020; Papen, Lundborg and Tenbrock 2021) for SMEs in Germany are attributable to the human factor. In this respect, according to the author, the human factor should refer to both managers and employees. The categories mentioned by (Papen, Lundborg and Tenbrock 2021) with regard to the challenges of SMEs in relation to digitalization, such as for example the development of knowledge and capabilities, the hiring of personnel and the seizing of economic opportunities that present themselves, essentially relate to entrepreneurial tasks that, taken as a whole, do not represent genuinely new entrepreneurial activities. However, it is assumed that the above-mentioned areas cannot usually be achieved through short-term actions, but require a long-term, planned and targeted approach. Therefore, in accordance with (Bettiol et al. 2021), it would be advisable for SMEs in Germany to include the topic of digitalization as an essential element in the strategic corporate planning.
Looking at the recommendations regarding the development of product innovations, one of the two hurdles according to (Zimmermann 2021) also focuses on the human factor. Therefore, analogous to digitalization, it is advisable for SMEs to focus more on the concerns of the people, who already work in the company or will work there in the future.

5 Limitations and Future Research

This research work has a number of limitations. These are primarily due to the research methodology chosen for the literature review. The literature analysis conducted focused only on the Scopus bibliography, limiting the available number of possible scientific research papers already in advance. In addition, the filtering and selection process conducted resulted in only five papers that could be analyzed as part of the literature review. Another major limitation of this research work is that the author's preliminary assessment of the current state of SMEs in Germany with regard to the aforementioned digitalization and innovation hurdles was made purely subjectively. Accordingly, the prioritization of those hurdles where the author believes SMEs have the greatest need to catch up is also based on a subjective assessment by the author.
However, these subjective preliminary evaluations or assessments are intended to provide starting points for future research work, which could aim to explore in which areas SMEs in Germany are lagging the furthest behind in terms of digitalization and product innovations. This knowledge could be beneficial for policymakers as well as for the business community. It could help them to optimize the prioritization of action plans to improve the situation of SMEs in Germany with regard to the digital transformation and the generation of product innovations. In addition, this research work also promotes more transnational research in the areas of digitalization and innovation. Similar to the views of (Müller, Buliga and Voigt 2021; Röhl and Engels 2021), who see a possible way to increase knowledge in SMEs through cooperation with external organizations, this paper argues that for example comparative studies on the experiences of SMEs from different countries or regions in dealing with digitalization and innovation requirements can also contribute to increase knowledge in these areas.

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