

# Small- and Medium-Sized Enterprises Strategizing Digital Transformation: Backend & Frontend Integration for Horizontal Value Creation

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**Abstract.** The research shed light on how Small and Medium-sized Enterprise (SME) Board of Directors (BOD) and Chief Executive Officer (CEO) strategize digital transformation for value creation. The research is based on participative action research (PAR) conducted with 20 SME Chairman of the BODs and CEOs during 2018-2019 to reveal their aim for frontiers in digital transformation. The findings show that SMEs strategize digital transformation for value creation along different paths depending on SME business process context. However, the essential frontier for SME BOD and CEO is found in the horizontal combination of frontend face-to-face & digital products/service processes with backend face-to-face & digital system platform processes to reach for collaboration with external network actors. Digital and face-to-face processes are perceived as interwoven for value creation. The SME BOD and CEO aim for new frontiers to integrate horizontal leadership through strategizing organizational- and network development processes to create value across ecosystems. This goes beyond hitherto literature- and practice understanding of digital transformation as a top-down process emphasizing the coordination role of senior management in the SME. A new frontier for horizontal leadership to organize digital transformation is hereby empirically revealed.

**Keywords.** Digital transformation; SME, Board of Directors, CEO, Value creation.

## 1. Introduction

Small and Medium-sized Enterprises (SMEs) increasingly use Business Model Innovation (BMI) processes for strategizing digital transformation to create value [1]. SME operations shift from the ‘physical world of place’ to enhanced lens of ‘world of digital space’ [2, p. 71]. SMEs are not ‘little big businesses’ as their size, ‘resource poverty’ and the impact of CEO ownership amongst others distinguish SMEs from Larger Enterprises (LE) [3, p. 1] and provide a specific context. In Europe SMEs represent 53 percent of value added [4, p. 9]. Research in SME digital transformation

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provides both a specific and important context in society currently scarcely researched [5] [6].

Development of SME organizational- and management capabilities are shown essential for digital transformation to create value [5]. SME Board of Directors (BOD) and Chief Executive Officers (CEO) digital strategizing have only to a limited extent been subject for research [7]. In combination the BOD and CEO manage the digital business space for strategizing SME digital transformation. Digitalization enhances transparency and ‘behavioral visibility’ in digital space of organization and BOD/ CEO [8, p. 1601]. This visibility stresses integration of disciplinary- and functional silos in digital transformation to deliver value beyond own organization to customers and ecosystem [8; 9; 10; 11]. The limited research conducted regarding digital strategizing reveal a gap in knowledge regarding integration of disciplinary and functional domains [7; 8]. The research question focus on this gap as follows: *How can SME BOD and CEO strategize digital transformation to create value?*

Digital transformation is defined by Lucas, Agarwal, Clemons, Sawy & Weber (2013) [12] as transformation ‘precipitated by a transformational information technology’, which involves ‘fundamental changes in business processes’ [5, p. 1130]. Additionally, digital transformation is emphasized in Wessel, Bayiere, Ologeanu-Taddei, Cha & Jensen’s (2021) [13] research to redefine the value proposition of the organization and involves the emergence of a new organizational identity. Value in the value proposition concept is noted as revenue generating for the enterprise and beyond by meeting functional and hedonic needs of customers and other network relations for creation of these value aspects for all [13]. The SME value proposition is suggested to be enhanced by BMI processes to support continuously changing needs for value creation in society [14; 1]. It means that static business models (BM) have to be continuously innovated [14; 1]. Digital BMI processes explain how ‘a firm employs digital technologies, to develop a new digital business model that helps to create and appropriate more value for the firm’ [14, p. 643]. SMEs often have limited resources and digitalization can decrease the use of resources, which is potential beneficial for the SME [1; 6]. However, SMEs often lack capabilities for digital strategizing [5; 6]. Strategizing is here understood as the organizations ‘on-going processes and practices of strategy making involving IS [information systems] and IT [Internet Technology]’ [15, p. 1]. Large digital investments can be necessary up-front, which can harm the SME. BOD and CEO thus hesitate, neglect and sometimes reject strategizing digital BMI transformation [1; 16]. These ‘liabilities of smallness’ [17, p. 291] highlights a need for research on SME BOD and CEO capabilities for strategizing digital transformation. In this research 20 SMEs provide information on BOD/ CEO aim for frontiers in digital transformation for value creation.

The article begins with the literature review to highlight hitherto knowledge. Then the empirical context and research method are explained. Next findings are analyzed and summarized in a model for contribution to the research question. Furthermore, a discussion is conducted to inspire further research. The conclusion ends the article.

## 2. Literature Review

The literature review takes point of departure in the research question. First, the primary literature regarding SME digitalization for value creation are reviewed to reveal existing knowledge for digitalization in SMEs to create value. Then, more specifically knowledge

about the combination of SME digitalization and BMI are reviewed on value creation. Next, literature regarding SME BOD and CEO to strategize digital BMI are reviewed for more thorough understanding of SME opportunities to reveal new frontiers of strategizing initiatives to pursue digital BMI for value creation. Finally, the summarization of the literature review conducted shows the conceptual overview and suggested proposition according to hitherto knowledge.

First, SME digitalization for value creation is reviewed.

### *2.1. SME Digitalization for Value Creation*

Digitalization is in overall broad terms defined as ‘the ways in which social life is organized through and around digital technologies’ [8, p. 1602]. It means that everything related to digital technologies needs an organizing approach with processes to change as functional and hedonic needs change in society [8; 18]. This is contradictory to static organizations with hierarchies, rules and procedures [18]. In the organizing-notion of Weick (1995) [18] this means new processes integrating organizational levels, which leads to tensions between levels in the organization. Additionally, digitalization causes significant increase in behavioral visibility of actors and organization in digital space [8]. The consequences are in literature found both to be of advantages and disadvantages dependent on ‘who is looking’ and ‘who is being looked at’ for control of behavior and actions to create value in SMEs and beyond. Negative ‘dark’ impacts have in literature been noted as ‘Technostress’ [19; 20]. Understood in literature as ‘stress that users experience as a result of their use of information systems (IS) in the organizational context’ [19, p. 103].

Research regarding SME digitalization have often focused on positive impacts – ‘opportunity to overcome resource limitations’ of SME organizations [1; 16]. Resource limitations can furthermore be overcome by enhanced digital collaboration with suppliers, customers and partners [1; 21; 22] on frontend-customer- and backend-supplier collaboration for reach of collaboration with the entire ecosystem.

On one hand Tan, Chong, Lin, and Eze (2010) [23] note the opportunity to overcome the shortage of resources in SMEs through use of frontend Internet Communication Tools (ICT). The frontend approach notes the participatory-, voluntary invitation- and community aspect for involved actors and organizations to form participation on User Generated Community (UGC) platforms [24, pp. 262-263]. Customer data are shown to be important for big data analyzes to provide products and services to potential customers through personalized marketing and augmented reality [25]. The frontend applications are often driven by actors within marketing- and sales knowledge domains.

On the other hand, digitalization initiatives can provide advanced collaborative and communicative back-end user applications to overcome the shortage of resources such as shown in ‘Industry 4.0’. The concept of industry 4.0 is adopted globally for introduction of new manufacturing processes, for instance additive manufacturing, manufacturing systems integration, Internet of Things (IoT), advanced robotics and big data analytics regarding production [26, p. 3]. New technologies to train and advance digitalization activities are augmented Reality (AR). The backend applications are often driven by actors within technical-, R&D- knowledge domains.

Caused by different actor-disciplines to drive frontend and backend digitalization in SMEs the actual digital transformation defined as ‘processes precipitated by a transformational information technology’ [12] often become fragmented and dispersed

regarding actual transformation in SMEs [5, p. 1130; 26]. The digital transformation processes are noted to contain business processes, operational routines and organizational capabilities [5] for coherently combined frontend and backend digital transformation to pursue value creation. Considerable impact is thus identified in literature concerning coherent digital architectures to be pursued by service providers for integrating digital transformation [5; 27].

Digital architectures are then often provided on digital platforms for SME interactions in extended network context to actual overcome the resource limitations of SMEs. The obtained competitive advantage of digital networks is noted to origin from platform architecture, customer experience and content of exchange [2, p. 67]. Basically, this means that coherent information and communication on digital platforms are dependent on experienced customer- and business content. This is related to capabilities of minimizing complexity and costs for the SME organizations to adopt meaningful digital initiatives [26]. This requires communicative and easy understandable business insights in the SME organization provided by digital BMI insights [16].

In summary digitalization can overcome SME resource limitation through organizing of front-end and back-end digital activities to reach for digital network platforms to provide competitive advantage. However, digitalization is shown to be a double-edged sword with needed tradeoffs regarding behavioral visibility and reduction of complexness in digital architectures to organize digital BMI to create value.

Next literature on the combination of SME digitalization and BMI are reviewed.

## *2.2. SME Combination of Digitalization and BMI for Value Creation*

The definition of digital BMI highlights the use of ‘digital technologies, to develop a new digital business model that helps to create and appropriate more value for the firm’ [14, p. 643]. Literature has supported the use of enhanced digitalization to pursue innovation in SME business models [6; 14]. However, limited knowledge based on empirical research is actually present, which cause a gap in knowledge regarding SME digital transformation to create value.

The notion of business models is at overall level defined in the literature review conducted by Massa et al, (2017; 73) [28] as ‘a description of an organization and how that organization functions in achieving its goals (e.g. profitability, growth, social impact) and hereby creates value’. Focus in this definition is on individual organizations and their value proposition [28]. However, the BMI-notion actually reaches out to create value for other organizations as highlighted by Nailor & Buttriss (2020) [29] through continuous development of the individual firms ‘value-creating activity system’. Both supply-side and demand-side actors collaborate to pursue BMI noted as an ecosystem context [22]. In the literature review Massa et al, (2017) [28] noted four suggested questions contained in BMI, respectively: who are customers?, what value proposition?, how is the value proposition created (activities and capabilities)? and description of actual value creation. The two first questions represent front-end value creation. The next question represents backend value creation. The last issue providing explanation represents the integration of front-end and back-end. BMI can amongst others be elaborated in the design-based approach developed by Osterwalder & Pigneur (2010) [30, p. 16ff] called ‘Business Model Canvas’ (BMC). Literature has called for further empirical research on how SMEs can ‘embed digitalization into their business models’ [6, p. 622] as ‘digitalization can cause drastic changes to business models’ [5, p. 1131] and create new frontiers to digital transformation in SME organizations. Empirical

knowledge hitherto is thus limited to pursue value creation.

In summary, SME digital BMI reach out to other organizations to overcome SME resource limitations through a value-creating activity system, which can drastically change SME digital BMI to strategize value creation. However, empirical knowledge hitherto is underdeveloped.

Next literature on SME BOD and CEO to strategize digital BMI are reviewed.

### *2.3. SME BOD and CEO to Strategize Digital BMI.s*

The ‘liability of smallness’ emphasizes that the SME BOD and CEO need to prioritize digital BMI [6, p. 619; 14]. Quinton et al (2018) [21, p. 433] frame the importance of the SME CEO in this way: ‘In the context of SMEs, senior management is generally dominated by the owner-manager, whose attitudes and behaviors have a domino effect on others in the organisation’. The SME owner manager hires the SME BOD. It means that the domino effect moreover impacts SME BOD. The level of IT knowledge of the owner manager and the belief of the owner manager that digital BMI will deliver benefits to the organization has in literature been shown to be important for SME adoption of digitalization. Both ‘push’ and ‘pull’ forces for CEO digitalization are noted to create value in SMEs [21, p. 434]. Additionally, research in SME digital BMI has revealed that SME CEOs often invest in digital technologies based more on intuition than on analytic cost-benefit analyses [14]. This is a challenge as digital BMI is integrating disciplinary- and functional knowledge domains for new business processes and new operational routines to create value through coherent organizing by the SME CEO [14, p. 645]. The SME BOD can shed enhanced light on SME digital BMI through supply of external heterogeneous knowledge both on digitalization and BMI. SME BOD and CEO thus need to organize digital BMI to strategize value creation through new strategic-, organizational- and network- capabilities reducing complexity and costs for adoption of meaningful digitalization initiatives [26].

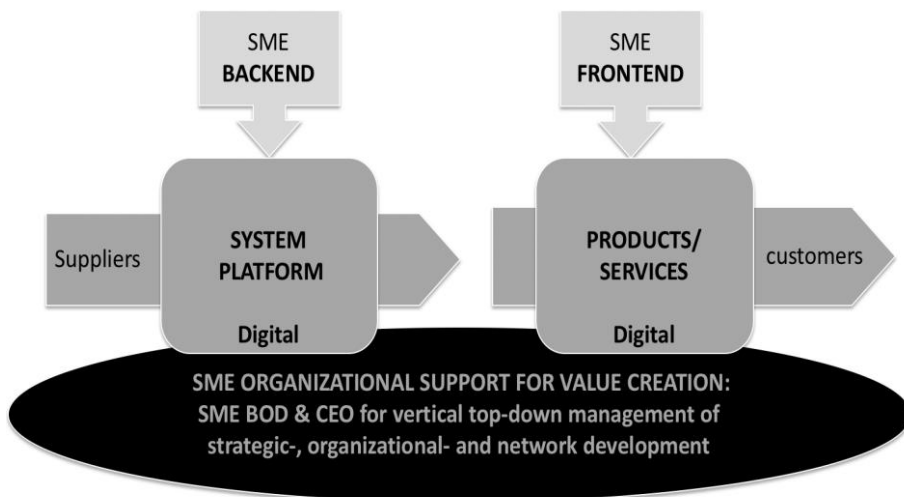
Employees have to conduct operations and take fast decisions to prioritize initiatives in a coherent manner as highlighted by Leonardi & Treem (2020) [8] in the notion of ‘behavioral visibility’ displayed in open visible digital spaces. On one hand behavioral visibility advance control [8] as early noted by Hamel (2008) [31, p. 98] in ‘Management 2.0’, which is ‘often just as effective as a rigidly applied rule book and is usually more flexible and less expensive to administer’. On the other hand, behavioral visibility can create stress for those who is looked at [32; 8]. Behavioral visibility thus changes SME BOD and CEO activities as control becomes much easier and visible on strategic-, organisational- and network-development activities to create value. The importance of BOD to embrace a strategic approach in SMEs as suggested by Whitley & Puto (2020) [33] is essential for sparring to the SME CEO for strategizing to reduce complexity [26] integrating activities and routines to understand value creation [8].

In summary both SME BOD and CEO essentially need to strategize digital BMI. SME BOD can provide external lenses and SME CEO can provide the internal lenses for integrated development of new strategic-, organizational- and network- capabilities reducing complexity and costs for meaningful digitalization initiatives to form coherent ‘behavioral visibility’ of the SME organization in digital space.

## 2.4. Summary of the Literature Review

In literature is suggested that digitalization can overcome SME resource limitations through organizing of front-end and back-end digital activities to reach for digital network platforms to provide competitive advantage. It is further suggested that SME digital BMI actually can reach out to other organizations for creation of a value-activity system for drastically change of SME BMI to pursue value creation.

Both SME BOD and CEO are important for pursuing digital BMI for value creation. SME BOD can provide the external lens and SME CEO can provide internal lens for integrated development of new strategic-, organizational- and network- capabilities reducing complexity and costs for meaningful digitalization initiatives to show coherent ‘behavioral visibility’ of the SME organization in digital space. However, behavioral visibility both have positive and negative – dark sides. This summary is graphically illustrated in Figure 1.



**Figure 1.** Graphical summary of literature hitherto.

Figure 1 shows the SME organizing for strategic value creation through the combined efforts of SME CEO and BOD for digital BMI to pursue value creation. Digitalization is in literature primarily either focused on digital backend system platforms connected to suppliers or on digital products/ services connected to customers due to different fragmented disciplines and functions to focus activities. A gap in knowledge is revealed in literature on how backend and frontend is combined for continuous coherent horizontal processes to create value. The SME organization is in hitherto literature proposed to provide support between backend and frontend through SME BOD and CEO vertical strategizing for coherent value creation. The SME BOD and CEO thus provide vertical top-down management to strategize digital BMI for value creation. This does not support the need for continuous coherent horizontal organizing of processes. This study aims to reveal how SME BOD and CEO can strategize digital transformation to create enhanced value not highlighted in existing literature.

Next the research context and method are explained.



Table 1 shows a wide range of activities in the 20 SMEs in the research, however, focused on production in different industrial areas within metal, wood, electronic and other more specialized production areas. Moreover, wholesale and service/ IT are present as focused activities in the SME. Nearly 1/3 of the participating SMEs have a double focus on production supplemented by either wholesale or service/ IT. It means that these SMEs span heterogeneous activities for digital BMI.

The size of the participating SMEs is shown in Table 2 in relation to the definitions stated by the EU (2005) [34] on respectively micro, small and medium-sized SMEs. The categorization in this paper is done based on number of employees in 2018 as this information is disclosed in the open business database.

**Table 2.** Overview on the size of the participating SMEs.

<b>Range of SME Sizes EU definition - number of employees 2018</b>	<b>Number of SMEs in the research sample</b>
Micro < 10	0
Small < 50	11
Medium < 250	9
<b>Total</b>	<b>20</b>

Table 2 shows that the analyzed SMEs are nearly equally divided between small and medium-sized SMEs. This shows that SMEs across sizes of EU definition (2005) [34] are motivated to find potentials for digital BMI to create value.

The capability of the self-selected SMEs to be profitable are shown in Table 3 by measurement of Return of Investments% (ROI) in 2018. This is also registered in the open business database. The range of ROI% is divided in respectively negative/ moderate ROI and in good/ very good ROI to reveal if the SMEs have been able to be profitable and hereby have resources for BMI digitalization. Digitalization is an opportunity for value creation – often requiring increased investments in point of origin.

**Table 3.** Overview on profitability of the participating SMEs.

<b>Profitability to enhance resources ROI – Return on Investment - Range of % in 2018</b>	<b>Number of SMEs in the research sample</b>
Negative < 0%	3
Moderate 0% - 9%	7
Good 10% - 19%	9
Very good > 20%	1
<b>Total</b>	<b>20</b>



Table 3 shows that the self-selected SMEs are divided equally between historically negative/moderate and good/very good results regarding their capabilities to be profitable according to ROI. SMEs often have limited resources with ‘liabilities of smallness’ and therefore it could be anticipated that most SMEs pursue digitalization to become more efficient in utilizing their resources. It seems that 50% of the self-selected SMEs in the moment already are reasonable capable of developing profits and they aim to continue for digital BMI strategizing to enhance results.

All in all, the SMEs in the sample represent a broad range of business activities, SME sizes and capabilities in strategizing for ROI. Next the method will be explained. After data collection the COVID 19 pandemic are anticipated to have an impact as also other issues happen in SMEs due to the uncertainty present in these organizations. Further research on follow-up will thus be interesting to conduct after due time e.g. 5 years to see how strategizing of BMI digitalization has developed long term in SMEs participating.

### *3.2. Research Design and Method*

The research is based on qualitative empirical SME data [35; 36] collected from Participatory Action Research (PAR) [37]. The research approach is thus based on social construction between research participants, who construct their realities as ‘knowledgeable agents’ and researchers in the role of ‘glorified reporters’ [36, p. 17] to be combined for new actions to contribute to insights and understandings. The research approach use abduction to first establish understanding from hitherto literature in a deductive approach for developing a proposition to frame contribution to the research question. Then an inductive approach is used to find emerging phenomena in the PAR material to enlightening new frontiers to be found in the research material. In the end these findings are compared to the proposition in Figure 1 and a new model is developed to understand SME strategizing for digital BMI to create value and accumulate knowledge on the research question.

The research conducted is based on the PAR meeting with the Chairman of the SME BOD, CEO, researchers and different digital experts for consultation regarding technological questions on digitalization. The PAR approach ‘focused on helping individuals free themselves from constraints found’ and aimed to be ‘practical and collaborative because it is inquiry completed ‘with’ others rather than ‘on’ or ‘to’ others’ [37, p. 25]. Researchers thus aim to let the voice of participants to be heard through the research process with report of findings to become meaningful for all.

The reflective processes in PAR is grounded in the notion of Weick & Quinn (1999) [18] called a ‘reversed Lewin’. The reversed phases according to Lewin’s (1946) [38] seminal thinking of ‘unfreeze-rebalance-freeze’ is then conducted first to ‘freeze’ for making the chairman of BOD and the SME CEO aware of the current business situation through development of the state of current BMI revealed in design-based business model canvas [30]. Next PAR discussion to ‘re-balance’ BMI through identification of opportunities for digitalization of BMI initiatives to strategize value creation was conducted. Finally, the ‘un-freeze’ was done in the last part of the PAR meeting, where the SME chairman of the BOD and CEO prioritized future digital initiatives for BMI to create value in the SME. This created a prioritized draft for strategizing digital BMI at BOD/ CEO level for explicit agreed initiatives to act upon in the SME organization afterwards.

The research is conducted by a core research team of three senior researchers, an academic analyst and capable resource people coming from different digital areas for consultation. The core three researchers are coming from different research disciplines, respectively SME BOD governance and law, organizational development and innovation. The academic analyst has SME board experience. This cross-disciplinary research team can thus in PAR discussions with research participants provide different lenses and in analyzing the data can provide ‘theoretical saturation’ and rigor to the findings in own knowledge domains [36, p. 20].

The Data collected from the interview with the SME BOD chairman reveals the approach of the chairman of BOD and reveal the strategic considerations about digital BMI hitherto. The interview and PAR processes was recorded and transcribed for first level coding done individually by the core research team. Then the citations/ coding was compared among researchers for discussion in large-room display to reveal ‘aggregate dimensions’ [36, p. 20].

Next the current SME BMI was revealed. This was done in the design-based illustration of BMC [30, p. 18ff]. The business model template was filled out with inputs from the SME BOD and CEO and captured in photos. The SME participants kept their filled-out business model for further BMI elaboration in own enterprise after the PAR meeting. Then opportunities for digital BMI to create value was elaborated based on the current BMI. This was done based on the BMC developed earlier in the meeting. A discussion unfolded in the PAR meeting with questions, elaborations and reflections made by the SME BOD and CEO, researchers and questions were posed to digital experts for more thorough understanding of different digital issues. In the end of the PAR meeting the SME Chairman of the BOD and CEO made a prioritization of opportunities and digital initiatives for digital BMI to create value. This prioritizing was captured in photos. The material was sent to SME BOD and CEO after the PAR meeting. The PAR meetings were recorded and transcribed for first level coding individually by the core research team. However, the large-room-comparison between researcher coding’s gave this time no meaning because this data provided much longer explanations and the coding was experienced to result in ‘destruction of meaning’ [39, p. 534; 36, p. 25]. Therefore, the research process was changed for one researcher to provide citations for meaning to be generated and the other members of the research team then commented according to their own registrations of the collected material. This change in research process aim to utilize ‘the benefits of qualitative research’s flexibility in applying different approaches to fit different phenomenological needs’ [36, p. 25]. In the findings section selected citations are displayed to provide the direct ‘voices’ of research participants [37; 36, p. 20]. In the analyses coherent quotes were used to reveal the meaning and patterns detected in the collected data [40, p. 1119]. The second order coding take point of departure in all citations and are summarized on overall themes. Several meanings of SME participants are converging and this is shown through the listing of several SMEs for highlighting the same meaning/ citation. Next the findings from the analyzes are revealed.

#### **4. Findings**

The findings are analyzed according to the research question posed on how SME BOD and CEO strategize digital transformation to create value. Additionally, the summary of the deductive literature review, graphically illustrated in Figure 1, shows hitherto

knowledge to propose a frame for analyzes to reveal enhanced findings according to the research question [36; 35].

The paths to digital BMI are found to be different for all participating SME due to their very different context of business activities, sizes and resources (section 3.1). SME digital BMI is then revealed to be essentially context-laden and different for each participating SME. However, the more thorough analyzes find digital BMI path-patterns from the data to provide the underlying processes and meanings for contribution to enhanced knowledge. According to Figure 1. the conducted analyzes are divided in two parts (Fig. 1. - dark grey and black drawings):

1. SME Digital BMI opportunities & limitations to pursue frontend and backend value creation.
2. Organizational SME BOD and CEO to conduct vertical coordination to create value.

These analyzes in combination provides the enhanced contribution to hitherto knowledge.

#### 4.1. SME Digital BMI Opportunities & Limitations in Frontend and Backend Value Creation

The SME BOD and CEO in this research first and foremost aim to collect more information and data from the front-end, respectively end-users, customers and not-yet-customers to pursue and create customer partnerships and customer intimacy. The SMEs perceive in general digital data collection as important to support the understanding of customer applications and processes. Several of the SMEs would like to have both digital data collection and face-to-face meetings to get an even more thorough understanding of customers in the customers own environment and in the further potential ecosystem. Especially, SMEs primarily in Business-to Business (B2B) context emphasize the combination of face-to-face and digital development (N2, N6, N7, N10, N20). However, different issues both support and hinder the SMEs to pursue information and involvement with frontend users as shown in the following citations:

*N1: 'The digital approach provides a global reach for customers, which will be impossible without the internet'.*

*N2, N15: 'We are such a small part of the customers business, so they are not interested in talking with us. They cannot see the relevance to have us as 'preferred partners''.*

*N11: 'It is extremely difficult for us to get the data collected about end-users. We have no contact to them at all'*

*N16, N17: 'Partnerships with customers could be interesting for us and also for the customers, because we can tell them more about their own business'.*

*N1: 'System integration would be very interesting for us along the delivery chain of our products and services to end-users. However, to fully understand end-users for product and service development it will require a thorough 'face-to-face' research approach at customer site in our business.*

*N2: 'Our customers are typically 'drowning in data' as our product and services are digital and a lot of data can be created very easily. We can support the customers in the selection of the vital few data they need to focus to run their business – if they are open for listening to us.*

The citations highlight practical limitations due to be ‘a small part of business’ (N2, N15) and practical obstacles in access to customers to collect data (N11). However, the SMEs perceive opportunities in digitalization for ‘global reach’ (N1) and enhanced network actor systems to all kind of customers and partners (N16, N17, N1). However, there is also opposing issues derived from data collection, when too large amounts of data are developed and the focus on the important data then can be lost for customers ‘drowning in data’ (N2). Then the SMEs perceive opportunities to help customers in the network to simplify and select the vital few data, which actually are needed for customer-business to create value (N2). Opportunities and limitations are shown to be interwoven.

In summary, SME BOD and CEO suggest to pursue access and collection of data along horizontal network and ecosystems to support customers, network actors and own development. Additionally, the vital important data needs to be selected to provide digital transformation along the network/ ecosystem in combination with face-to-face meetings for thorough understanding of horizontal value creation.

However, conflicts can easily arise across the network from SME to end-users if some of the present actors are bypassed. This is commented by the SMEs in the following way:

*N12, N9: ‘A large proportion of our business is done with large retailers. It will be risky to approach end-users for data collection. The retailers want to work with end-user data in own business without interference from suppliers – like us.’*

The conflicts arising (N12, N19) create limitations to overcome for SMEs. The limitations can be elaborated through analyzes of the impact of the mentioned risk on the SME or by approaching the opportunity to share data and information (N12, N19). The latter is not really perceived as an alternative opportunity in the moment due to focus on ‘own business without interference from suppliers – like us’ (N12, N19). Limitations then exist for utilizing opportunities through the ‘small part of customer business’, practical obstacles of data collection and bypass of larger network actors, which needs to be organized horizontally by the SME to create value in the end. This is contradictory to the present vertical organizing of dataflow.

Opportunities is present in all participating SMEs for collaborative network/ ecosystem documentation of the entire flow of products and services according to legal requirements, customer requirements and traceability to support safety and health of employees, users and end-users. The opportunities are very dependent on the actual business context, e.g. high requirements of documentation within the food industry and monitoring services. However, across contexts the need for participatory- and community actions for involved actors and organizations to communicate horizontally in own organization and among external network actors are mentioned by many SMEs to create value as follows:

*N5, N19: ‘Communication – back and forth – between us and the end-user is important for delivering the right dimensions of the product’*

*N7, N9: ‘the communication between us and the production units abroad could be very much increased for deliveries on time and with a quality product to be installed in the end’*

*N17, N18, N2: ‘Data analyzes could improve the logistic activities in our enterprise and also within customer activities’*

Horizontal communication among and across network actors, disciplines and functions is mentioned as essential by the SMEs (N5, N19, N7, N9). Additionally, horizontal data analyses are suggested by the SMEs to have a large potential for value

creation (N17, N18, N2). Horizontal digital communication and data analyze can be done relatively low cost, as shown in the literature review, which increase the already highlighted perceived opportunities by SME participants for horizontal value creation.

A specific limitation challenging digital communication and data analyzes is stressed for SME development. It is a necessity to have coherent data structure in own organization to create meaningful communication and data analyses for actual value creation as noted in the following way:

*N6: 'We do not have a data structure which can be transmitted to others with recognizable numbers to actually do it'*

*N7: 'We do not have all the data due to limited standard reporting'*

*N13, N15: 'We have several systems internally, which does not fit together'*

The SMEs stress (N6, N7, N13, N14) the need for underlying data structure in their own organization to support communication and data analyzes in own organization and across the horizontal network/ ecosystem. This is a challenge, which needs organizational support to develop the required useful data structure to provide meaning and pursue transfer to other actors in relevant horizontal network/ ecosystems. During these analyzes an interesting phenomenon arises regarding some SMEs to be highly 'uneven digitalized'. It is revealed that some SMEs are very digitally advanced regarding their product and services and at the same time lack a systematic registration of manhours and registration of materials consumed for invoicing customers (N10, N13). This is a lack in basic operational capabilities in the SME organization, which actually has to be mastered in all SMEs. Yet, other SMEs can be very digitalized along horizontal network/ ecosystem processes and then lack digital development of frontend products and services (N1). It means that disciplines/ functions in the SME organization can be very digitally advanced while other functions are far from any kind of digitalization and can lack elementary work processes to run their business both face-to-face and in digital space. Even though SMEs have relatively small organizations there can be functional- and disciplinary silos present limiting meaningful horizontal communication and data analyzes.

In summary, SME BOD and CEO emphasize digital opportunities for enhanced participation for involved actors and organizations to communicate horizontally in own organization and among external network/ ecosystems to create value. Digitalization can hereby provide low-cost-data and communication enhancing the value creation potential. Limitations are perceived by SMEs through larger enterprises to claim own data protection, the current lack of data structure in SMEs for integration and uneven digitalization professionalism across disciplines and functions in SME organizations. The participating SME BOD and CEO suggest to change hitherto vertical coordination to horizontal coordination situated close to the relevant and important activities for value creation.

Opportunities for value creation are revealed by SME BOD and CEO to be situated in horizontal management and leadership practices in the organization to create value. This will change the role of SME BOD and CEO to be much more aware of organizing integrated horizontal activities in the organization than hitherto.

Next the suggestions of SME BOD and CEO to support vertical coordination will be analyzed in more detail.

#### 4.2. Organizational SME BOD and CEO to Conduct Vertical Coordination to Create Value

SME BOD and CEO are in literature stated as important for support of digital BMI to create value. The SMEs in this research first and foremost perceive a need for increased organizational knowledge to add value as mentioned in the following citations:

*N6: 'More technical skilled people would be an advantage for us'*

*N9: 'More advanced digital tools to show the products would require the sales people to be trained in other ways'*

*N13, N14: 'Development of capabilities to prioritize tasks would add value'*

*N15, N16: 'Development of organisational knowledge about the use of digital tools is necessary'*

*N13, N15, N16, N17: 'Project management to use digital tools for enhanced knowledge in the organization would make a difference'*

The citations show that digital transformation in BMI application requires both technical digital knowledge and horizontal application knowledge to be developed in the organization (N6, N9, N15, N16) to pursue digital BMI for value creation. The horizontal knowledge capabilities need to be strengthened e.g. regarding capabilities to prioritize along horizontal organizing, when digital and face-to face activities are conducted (N9, N13, N14, N15, N16) and capabilities to execute project management typically crisscrossing disciplines and functions to provide new deliveries and processes to develop enhanced organizational knowledge (N13, N15, N16, N17). It means that digitalization not only requires technical capabilities to pursue digital BMI, but also considerable capabilities in understanding for business to utilize horizontal prioritization and horizontal knowledge creation.

Moreover, organizational behavior is considered important. Especially the openness for organizational transparency of activities integrating functions, levels, disciplines and organizations as shown in the following:

*N8: 'BOD would not like the many deviations according to plan, which will come in through needed flexible activities, which will be registered in the information systems'*

*N9: 'Country cultures will have different impacts on digital BMI – making processes different'*

*N15: 'For us it will be from anarchy to processes'*

*N20: 'Family spirit – our origin means a lot'*

*N19: 'Think digital solutions the whole way through the network'*

The citations show that SME BOD and CEO need to have a more flexible approach to control the SME (N8) with acknowledgement of needed fast and flexible changes (N8), different country cultures (N9), different work approaches (N15). This requires flexible and empowered employees to take own leadership for efficient and effective digital BMI horizontally processes. Moreover, SME BOD and CEO has to be able to think digital solutions the whole way through the horizontal network/ ecosystem (N19) to support coordination and prioritization. Additionally, it requires employees to be ready for change in work processes (N15) and the capability to keep family spirit in digital space (N20). SME BOD and CEO thus need to support emergent horizontal leadership among employees.

The SME research participants emphasize the need for integrated horizontal processes, which means that the hitherto vertical span of control used in hitherto

management literature is not suited for SME BOD and CEO to pursue digital BMI for value creation. New frontiers for management and employees are thus emerging in the organization. The vertical top-down management needs to be replaced by horizontal intra- and inter-organizational leadership conducted by SME BOD, CEO, employees with digital systems adapting to differences regarding e.g. work processes, flexibility of activities to fit with systems reaching the whole way through the network/ ecosystem. Horizontal leadership are opposing to vertical leadership perceived to be emergent and focused on lateral, temporal and horizontal relations between individuals and organizations [41, p. 80ff]. Horizontal leadership needs to be embedded in processes and employee empowerment to take fast decisions and relevant meaningful actions to support the desired digital BMI to create value. Due to the high degree of transparency created in digital spaces the control of the organizational performance can be made much easier accessible for SME BOD and CEO, who actually takes first visible ownership of SME value creation.

In summary, new capabilities for horizontal leadership of combined SME strategic-, organizational and network development is thus suggested by research participants to pursue digital BMI for value creation.

#### 4.3. Summary of Analyzes and Findings

It is found that SME BOD and CEO aim to pursue digital BMI through many different paths for value creation. Additionally, it is revealed that SME BOD and CEO have relative clear understanding of the need for digitalization and also can elaborate the need for strategizing in the SME to work with digitalization processes – even though they are not trained in digital tools and applications. However, several factors hinder digital BMI as stressed. The analyzes conducted are summarized in second order coding to develop the themes essential for digital transformation to reveal new frontiers in the organization. This is shown in Table 4.

**Table 4.** Summarization of analyses in second order coding and derived themes.

Digital Transformation	Digitalization processes Support: + Hindering: -	Face-to-face for digitalization Support: + Hindering: -	Themes
SME front-end digitalization	+ 'Global reach' 'Big-data analysis' 'Direct communication in the ecosystem' 'First hand assurance of needs' 'Collaboration for 'right solution''	+ 'What happens otherwise at customer site?' 'Research on customer learning' 'Social contacts to enhance understanding' 'Get new lenses for providing solutions'	Digitalization needs to be integrated with face-to-face meetings to provide understanding to create value
	- 'small part of customer business' 'go beyond the value chain – dangerous' 'No integrated systems'	- 'Takes time' 'Disturbing customers'	
Digital products/ services	+ 'Preventive maintenance' 'Track & trace documentation' No down-time of products/ services'	+ 'Add on to buyer experience – more than expected' 'How does customers use products/ services?' 'customers involved in selection of products/ services'	Digital products/ services need to be integrated with the rest of ecosystem and based on an integrated platform
	- 'No integrated products/ services' Do as we are used to do – again and again'	- 'Small orders - compared to resources used'	
SME back-end digitalization	+ 'Updated status of orders' 'Decreased costs of logistics' 'Scale calculations to others'	+	Digitalization need to provide overview for decreased costs and enhanced integrated information
	- 'System break-down'	-	
Digital systems platform	+ 'focus on the vital few data' 'Communication enhancement' 'Avoid failures in deliveries and bottlenecks' 'Digital flow internally – saves time'	+	Systems platform need to be integrated with the rest of ecosystem and based on integrated products/ services
	- 'No integrated systems'	-	
Coordination of digitalization	+ 'Image supported by frequent communication' 'framework agreements & development of standards' 'Flexible access to information for analyses - supervision' 'Enhanced learning'	+	Integrated BOD and CEO leadership for strategizing horizontal integration of organizational and network development.
	- 'how to protect own data?' 'Huge pressure for deliveries'	-	

Table 4 shows that digital transformation in SMEs is context dependent. However, overall patterns for digital SME value creation are suggested to need a combination of digitalization processes and face-to-face meetings to enhance understanding of value creation in the SME. Furthermore, digital products and services go hand in hand with physical face-to-face products and services reaching out to the rest of the ecosystem and based on digital systems platform. The SME back-end digitalization can provide overview on the vital few data to conduct business and decrease costs through integrated data. The digital systems platform need integration with the rest of the ecosystem and based on integrated products and services. Finally, the coordination of digitalization and leadership needs to strategize horizontal integration for organizational- and network development. When integration is missing this really hinders reap benefits of digitalization as shown in Table 4.

In literature hitherto, the focus has been on vertical coordination formed by SME BOD and CEO strategizing digital transformation. The analyzes conducted in this paper highlight horizontal leadership capabilities for combination of SME organizational- and network development to change the roles of SME BOD, CEO and employees for empowerment and self-management to horizontally strategize digital BMI transformation for value creation

Figure 2 shows the summarized findings in an enhanced graphic illustration developed from Figure 1. The new insights and understandings are marked in white text.

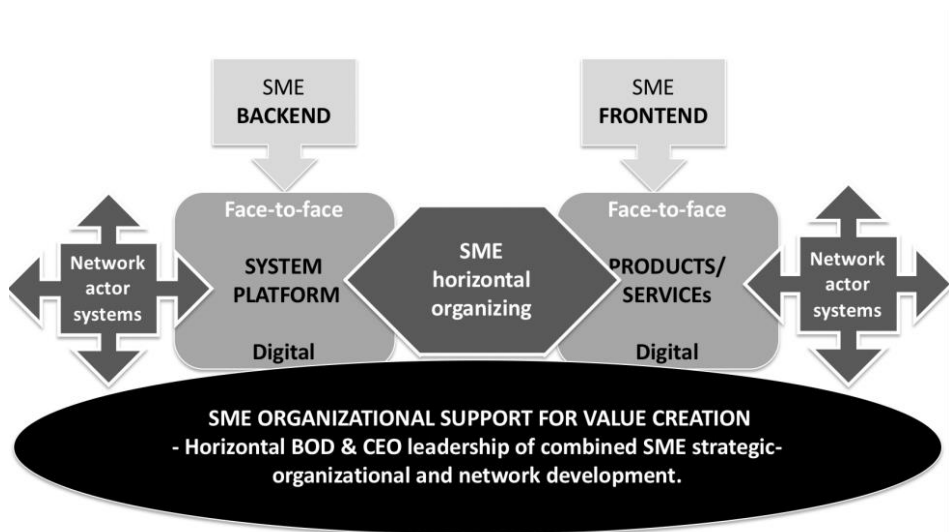


Figure 2. Graphical summary of findings for SME BOD & CEO to pursue BMI to create value.

Figure 2 shows that digitalization is perceived to go hand in hand with face-to-face meetings to create thorough horizontal opportunities, relations and knowledge for value creation – both in frontend combined face-to-face and digital products and services and backend combined face-to-face meetings and digital system platforms. The SME organizational support for value creation changes for SME BOD and CEO from vertical top-down management to horizontal leadership connecting intra- and inter-



organizational disciplines, functions and organizations for value creation. Additionally, the control issue of SME BOD and CEO are easier to conduct through transparency and visible behaviour in digital space.

This can create a dark side of digital transformation, which is not elaborated by the research participants in this research. New roles and frontiers then have to be developed in the SME organization. Hitherto, literature and practice understandings are hereby enhanced for SME CEO and BOD to take responsibility for horizontal leadership of strategic, organizational- and network development. This provide a contribution to the gap in knowledge hitherto identified between digitalization of backend and frontend in SMEs.

## **5. Discussion**

It must be noted that this research is conducted from a PAR conducted with the SME chairman of BOD and CEO to reveal their perception of digital BMI transformation to create value. It means that the research shows the aim of the SMEs when they pursue digitalization in the SME and not the challenges they actually meet when time goes by. SME challenges and limitations can be anticipated to increase in practice. The challenges can be underestimated and the advantages overestimated as revealed in project management and logistic literature [42]. Further research with long-term follow-up on the actual digital initiatives to reveal the robustness of the SME PAR perceptions to actually create value.

The findings suggest a considerable change from SME vertical top-down management to SME horizontal leadership for strategic-, organizational- and network development to pursue digital BMI to create value.

As shown in the literature review conducted by Hanna et al (2020) [41, pp. 82-83] literature on horizontal leadership use several notions for nearly the same leadership phenomenon e.g. emergent leadership, shared leadership, collective leadership, team-leadership and self-leadership. It is shown that extended organizing is needed regarding horizontal leadership and considerable further research is called for in the literature review [41] to shed more light on this new leadership phenomenon.

The digital space provides behavioral visibility, which both can be an advantage providing flexible and less expensive administration [31; 8] and a disadvantage [32; 8] creating stress for those who are looked at in digital space. Further research is needed to shed more light on the balancing between advantages and disadvantages in SMEs.

Many SME CEOs are entrepreneurs [6; 14; 43], who often naturally take a centralized vertical top-down management approach to control activities in the SME organization. However, it is found that SME CEO initiatives need to support more empowered digital BMI activities and facilitation of empowered employees to create value [44]. This delegation of decisions to employees/ systems to take decisions fast and flexible according to business needs across organizations and actors can be a severe challenge and difficult to overcome by the SME CEO [16]. Further empirical research is needed regarding SME CEO capabilities to actually use horizontal leadership in their SME.

Considerable further empirical research is thus needed to get a much more thorough insight and understanding of SME BOD and CEO strategizing digital BMI transformation for value creation.

## 6. Conclusion

The research conducted in this paper shed light on how SME BOD and CEO can strategize digital transformation to create value. The research is based on PAR with collection of empirical data from meetings conducted with the SME Chairman of the Board and CEO lasting around 4 hours each in 20 SMEs during 2018-2019 for contribution to the research question.

The findings show that SME digital BMI aim to pursue value creation along very different paths depending on business context, which provide as many paths as participating SMEs. These paths, however, reveal patterns for SME BOD and CEO to horizontally combine frontend face-to-face & digital products/ services and backend face-to-face meetings & digital system platforms with external network actors. Digital and face-to-face initiatives are then perceived to go hand-in-hand – both front end and backend - to pursue SME value creation. The SME BOD and CEO then aim to pursue digital BMI through horizontal leadership of strategic-, organizational- and network development to create value.

SME BOD and CEO in combination need to change their management approach from vertical top-down management to horizontal leadership connecting intra- and inter-organizational actors in the network for digital BMI to create value. Considerable further research in SMEs is needed as research has been limited regarding the relatively new notion of horizontal leadership.

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