Applying the positioning phase of the digital transformation model in practice for SMEs: toward systematic development of digitalization

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Abstract:
Digital transformation (DT) refers to the changes in ways of working and business offering caused by adoption of digital technologies in an organization. Small and medium-sized enterprises (SMEs) are struggling with this transformation because of their limited resources and know-how. Thus, SMEs need practical grassroots-level help for DT that allows the companies to analyze where they stand in digitalization, and how they should proceed. This article discusses how SMEs can be supported in their DT by utilizing the DT model consisting of four consecutive phases for supporting companies' systematic development of digitalization. The article focuses on the first phase of the DT model, positioning, where company's digitalization status is analyzed in detail, and development ideas are identified. The positioning phase was conducted for 19 SMEs in Northern Ostrobothnia, Finland. The results indicate that the used process and tools were suitable to support SMEs for analyzing their digitalization status and identifying areas for improvement. The DT model and piloted tools have been published as a free-of-charge ApuaDigiin.fi online service to facilitate their widespread use in the future. In this way, public regional business development authors or research organizations can utilize the online service while supporting the digitalization of SMEs.

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1. Introduction

Digitalization is one of the major trends changing business and society [1]. Previously, digital technology was seen as a niche market, but today, it is an everyday technology—the foundation of all modern innovative economic systems [2]. It is about transforming the core using digital tools and discovering and capturing new opportunities enabled by digital means [3]. Thus, digitalization can mean enhancing existing processes, finding new opportunities within existing business domains, or finding new opportunities outside existing business domains [4]. The effects of digitalization have been compared to the Industrial Revolution [5]. In this article, digitalization is referred to as a more fundamental change than just digitizing existing processes or work products. "Digitization" refers to the action or process of digitizing analogue data into digital form. According to the literature, digitalization, or digital transformation (DT), refers to "the changes associated with the application of digital technology in all aspects of human society" [6]. Parviainen et al. [4] define DT specifically as changes in ways of working, roles, and business offering caused by adopting digital technologies in an organization, or in the operation environment of the organization. Digitalization can enable and create new business opportunities and business models, change the roles of operators in a value chain, and even dislodge existing businesses [1],[7]. For example, digitalization may remove traditional players in a supply chain and create new ones.

Small and medium-sized enterprises (SMEs) represent the lifeblood of economies and are considered a driver of the European Union (EU) economy [8],[9]. Micro-enterprises, which refer to a subset of SMEs with fewer than 10 employees, represent more than 95% of European enterprises [10]. Digitalization is important for SMEs to stay competitive. DT is a key enabler for maintaining competitiveness and reacting to continuous changes and pressure. However, only 17% of SMEs in Europe are highly digitalized [10]. Whereas large companies are at the frontline of DT [11], SMEs are struggling with resource constraints and knowledge gaps that slow down their digitalization efforts [7],[12],[13]. Some of the strongest inhibitors to adopting (e-business) digital services and applications in SMEs are inadequate capabilities and limited resources to develop and maintain an e-business operation, limited information technology (IT) skills, low customer or supplier usage, and short planning horizons [14],[15],[16]. On the other hand, SMEs are agile, as they can be flexible in implementing projects and carrying out rapid openings [9]. But there seems to be a lack of guidance for SMEs to implement DT in practice [11]. Furthermore, it is important to understand that DT is not just about the technological dimension but also affects, for example, an organization's processes, culture, staff engagement, customer orientation, and business models [4],[7],[11]. Therefore, DT is characterized as multidisciplinary [17].

There are DT-related guides and models in the literature, for example [4],[11],[18]. However, there is a need for practical methods and tools to help SMEs assess their current position with respect to the DT process. Especially, there is limited research on how external organizations can help SMEs in this work [11]. The starting point for digitalization development work is to understand the overall current digitalization status of the organization and thus, create an overall picture of its strengths and weaknesses and possible improvement actions for the future; this is called the positioning phase. The aim of this research is to support SMEs to analyze their digitalization status to advance systematically in digitalization. The key question is: *How can SMEs be supported to analyze their current digitalization status and identify digitalization development ideas in their digital transformation process?*

This article is organized as follows. First, the literature background is presented in section 2. Then, the research design is introduced starting from an overview of the DT model as well as proposed tools used in the first, positioning, phase of the model. Next, the procedure for how the positioning phase was piloted in case companies is explained in detail. In section 4, the results and experiences of the company piloting are described with feedback given by case companies. Furthermore, the main lessons learned are discussed with literature reflection in section 5. Finally, the results are summarized, limitations discussed and future research targets and conclusions are suggested in section 6.

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2. Literature review

This section summarizes the background of digital transformation models or processes and the tools and methods applied in SMEs to support their digitalization cases. A survey of relevant literature was conducted focusing on published peer-reviewed research articles.

Barann et al. [11] presented a two-phase procedure model for DT consisting of orientation and iterative transformation phases. They emphasized practical approaches for DT for SMEs, not abstract and conceptual. Their process model incorporates an intensive interface with publicly funded support units and tackles DT in pragmatic steps taking into account the nature of SMEs. However, the procedure has not yet been empirically tested. Li et al. [19] presented a process model of digital transformation by SME entrepreneurs. Their model focuses on capabilities building and change practices when entering cross-border e-commerce (CBEC). In addition, the role of digital platform service providers is discussed, as they could facilitate the DT of SMEs. Parviainen et al. [4] presented a conceptual DT model with the positioning phase derived from synthesis of diverse industrial cases (including three SME cases) carried out and existing literature. They saw digitalization as a phenomenon that affects many aspects of organizations, including information technology, strategy and business models, products and services, internal and external processes, organizational culture, etc. However, the developed model is generic, is not piloted in the article, and needs more details to bring it to closer to practice. Szopa and Cyplik [18] showed two-step digital transformation model in which the first step (analyze and evaluate the current stage of digitalization) maps well to the positioning phase with the assessment and analysis of the current level of digitization in a company. They further proposed the use of a digitalization index to measure the level of digitalization and additional quality analyzes, such as the Ichikawa diagram, and SWOT analysis (Strengths, Weaknesses, Opportunities, Threats). SWOT is intended to analyze current solutions in terms of their strengths and weaknesses and then determine the opportunities and threats regarding the current extent of digitalization and potential expansion opportunities. In a case study, Szopa and Cyplik [18] calculated the digitalization index of a manufacturer company. Pan and Lee [20] exploited Lewin's [21] theory of change ("unfreeze-change-refreeze") as a framework for understanding the digital transformation process. This model emphasizes how employees feel about new ideas, explores their feasibility, and finally, comes to consensus to accept the ideas. This approach is interesting, as it tries to understand how changes occur, in the context of an individual and a collective group. Furthermore, Pan and Lee [20] piloted this model to analyze an accounting case in an SME.

Understanding the starting position is an important part of the digital transformation process [4],[22]. Digital maturity assessment tools can be used to analyze the current level of the digital readiness and performance of an organization [23]. Rauch et al. [24] examined 13 existing assessment and maturity models for SMEs and presented a matrix of Industry 4.0 concepts and maturity levels. In this approach, the current level and the target level are identified and visualized with a radar chart. A gap-potential quadrant facilitates the selection of the next steps. The authors pointed out that small companies would benefit if detailed descriptions of each maturity level and practical examples were added. This is particularly important, as many SMEs do not have highly qualified employees who have experience with all concepts [24]. Teichert [22] analyzes different maturity models developed by practitioners and academics. Their also combine the most common maturity areas identified in included studies. North et al. [25] proposed a dynamic capability-based framework for assessing the digital maturity of SMEs. The proposed framework allows SMEs to assess their digitalization maturity level. Assessment helps SMEs understand their current status, identify required capabilities, and anchor pilot initiatives in an overall picture of DT.

Räisänen and Tuovinen [26] examined diffusion and adoption of digital innovations in rural micro-enterprises and proposed a workshop method for spreading information and encouraging a positive attitude toward digital innovations. The authors also presented a real-life case that used the method. This method is interesting, because it provides a tool for influencing small companies' understanding of digitization and increasing the positivity in developing their own company's digitalization. Kotarba [27] considered DT to express the modification or adaptation of business models. He exploited the segments of business model canvases (BMCs) and mapped them with ontology elements: classical mainstream, Wave 1: 1980–2000, and Wave 2: Beyond 2000. These elements bring the characteristics of the digitization of their own era to the different dimensions of the canvas. However, he defined digitalization mainly from a

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technical point of view, that is, as information technology. He did not focus on SMEs but brought out an interesting development by combining a well-known tool (BMC) with the concept of digitalization.

Peillon and Dubruc [28] reported eight manufacturing SME servitization cases. According to the authors, servitization can lead to increased sales and productivity, as well as innovations in value creation and customer interaction. Furthermore, the authors listed three customer-related digitalization issues: how to implement CRM (Customer Relationship Management), how to monitor the use of equipment, and how to handle cyber security. Trenkle [29] focused on formulation of an SME's DT strategy and provided a framework with four strategic dimensions: use of technologies, changes in value creation, organizational changes, and financial aspects. These dimensions have a total of 14 strategic questions with prewritten multi-choice options and descriptions. The framework was piloted with seven SMEs.

The contribution of the articles discussed above are summarized in Table 1 according to how the articles addressed the following themes:

- Did the article present a model or process for digital transformation?
- Did the model or process include a phase where the current status of digitalization is discovered?
- Have the tools or methods been applied?
- Did the article contain SME cases, or were certain specific SME issues addressed?

Table 1. Contribution to the digital transformation model, its positioning phase, use of tools or methods, and SME cases or focus on SME issues

Reference	Title	Digital transformation model or process	Current status of digitalization (positioning)	Tools or methods	SME cases or viewpoints
Barann et al. [11]	Supporting Digital Transformation in Small and Medium-sized Enterprises: A Procedure Model Involving Publicly Funded Support Units	Two-phase procedure model: Orientation and Iterative transformation.	Orientation phase: position company		Eleven requirements for DT support models for SMEs
Li et al. [19]	Digital Transformation by SME Entrepreneurs: A Capability Perspective	A process model of digital transformation by an SME entrepreneur			7 SMEs, cross-border e-commerce with digital platform
Parviainen et al. [4]	Tackling the Digitalization Challenge: How to Benefit from Digitalization in Practice	Four-stage model for digital transformation	First stage: positioning a company in digitalization	SWOT tool as part of the first stage	3 SME background cases
Szopa and Cyplik [18]	The Concept of Building a Digital Transformation Model for Enterprises from the SME Sector	Two-phase digital transformation model for enterprises from the SME sector	Phase 1: Analyze and evaluate the current stage of digitalization	The digitization index with 21 sub-indexes, Ichikawa diagram, SWOT analysis	One SME case (digitalization index of a manufacturer of school and office furniture)
Pan and Lee [20]	Leveraging Digital Technology to Transform Accounting Function: Case Study of an SME	Transformation process framework based on Lewin's [21] theory of change			One SME accounting function case

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Reference	Title	Digital transformation model or process	Current status of digitalization (positioning)	Tools or methods	SME cases or viewpoints
Teichert [22]	Digital transformation maturity: A systematic review of literature		Maturity models enable the assessment of digitalization and indicate a potential development path	Presentation of different maturity models	
Rauch et al. [24]	A Maturity Level-Based Assessment Tool to Enhance the Implementation of Industry 4.0 in Small and Medium-Sized Enterprises			Maturity model-based assessment tool for industry 4.0	Field study with 17 SMEs
North et al. [25]	Promoting Digitally Enabled Growth in SMEs: A Framework Proposal	Understanding and development of capabilities for DT		Dynamic capability-based framework for assessing the digital maturity of SMEs	Framework tested with SMEs
Räisänen and Tuovinen [26]	Digital Innovations in Rural Micro-enterprises			Workshop concept	Workshops used to support the diffusion of digital innovations in rural micro-enterprises. Real-life case
Kotarba [27]	Digital Transformation of Business Models			Business model canvases and the digital transformation	
Peillon and Dubruc [28]	Barriers to Digital Servitization in French Manufacturing SMEs				Eight manufacturing SME servitization cases
Trenkle [29]	Survival in the Digital Age – A Framework for Formulating a Digital Transformation Strategy in an SME			Four strategic dimensions in the digital transformation framework with 14 questions	7 SME cases, formulating digital transformation strategy

Published digital transformation methods or approaches typically include steps for current state analysis, the target state definition, the pathway from the current state to the target state, and implementation and monitoring [9]. This sounds logical and is in line with the idea of the well-known Plan-Do-Check-Act (PDCA) cycle. However, despite the substantial research on DT, it seems that there is a need for practical grassroots-level tool-supported approaches that are suitable and carefully tried-and-tested for SMEs. Especially, there is a need for a process model incorporating external support units into DT work to support SMEs in digitalization efforts [9].

3. Research design

Our first research related to digital transformation was conducted in 2015 by gathering feedback and experiences from case companies to create and publish the first conceptual framework of the DT model [1],[4], as well as to develop the first digital maturity tool, called DigiMaturity tool [23], targeted for the positioning phase of DT. Regarding to the research presented in this article, in the beginning of 2018, an investigation of the DT phenomenon in the context of the DT model began, from the viewpoint of how companies' DT process can be guided, managed, and implemented

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systematically in the environment of SMEs. A case study research approach [30] was selected to create better understanding of applying the DT model with the proposed tools in case companies. The main goal of the research was to validate the DT model and tools with SME case companies and understand how they needed to be further developed. The research focused on the first, positioning, phase of the DT model (see the next section for the model and its phases). The work was conducted between 2018 and 2019 in the project funded by European Regional Development Fund (ERDF), four regional development organizations and one SME in Northern Ostrobothnia, Finland.

3.1 Digital transformation model

Digitalization is not a big-bang change that will be done once in a lifetime. A company typically proceeds in small steps, and in practice, digitalization means systematically taking small steps instead of one giant leap. In this research, we apply the DT model that is based on our previous research [4] identifying a four-step model for the DT process based on literature and industrial cases. The DT steps are positioning, current state review, roadmap, and implementation (Fig. 1). The model has been equipped with practical tools and process for SMEs to carry out each step, bearing in mind that DT is an iterative process. This paper focuses on the practical implementation of the positioning phase of the DT model.
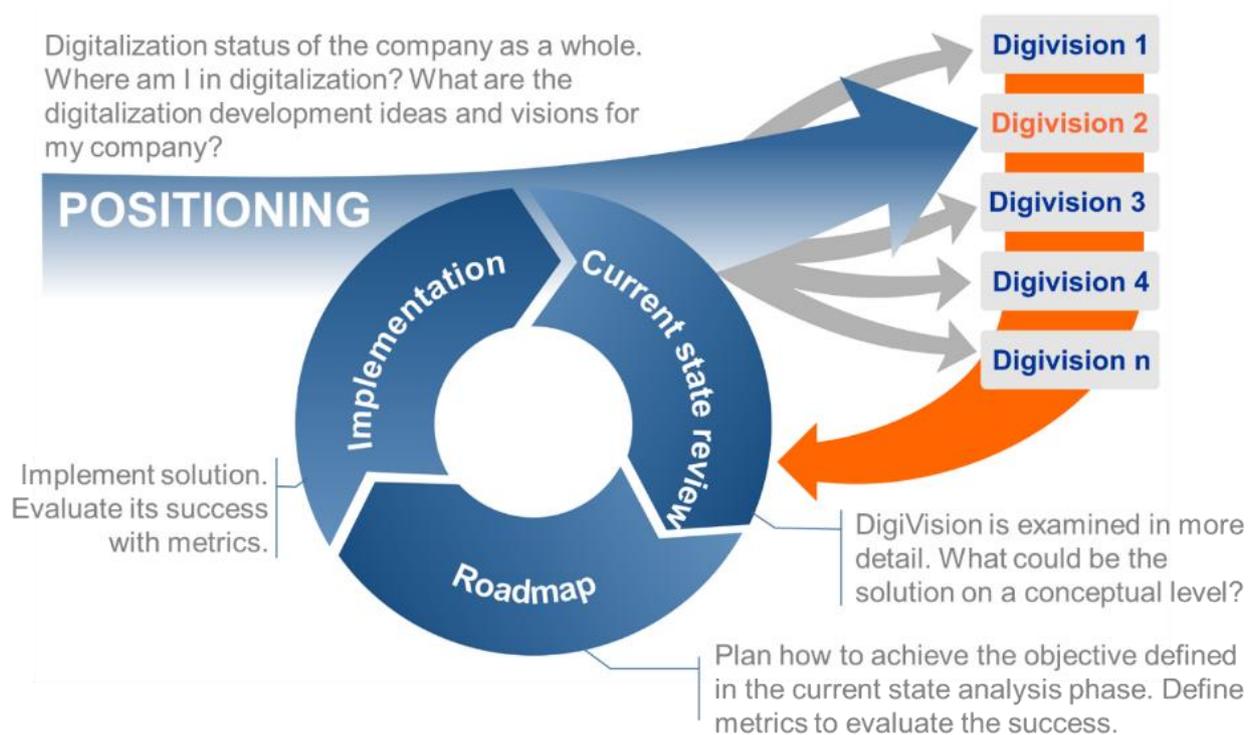
Fig. 1. Digital transformation model

The first step, the positioning phase, examines the digitalization status of the company as a whole. Where is the company with regard to digitalization? What are the digitalization development ideas and visions? Developing digitalization, usually comprising many development actions to perform at the same time, can be challenging. Therefore, it should be broken down into smaller pieces and implemented step-by-step taking one vision at a time for

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analysis and implementation. Positioning is an ongoing process and should be done periodically taking into account changes in the company's operating environment and technological developments.

In the current state review phase, the selected digitalization vision is examined in more detail. This includes identifying the functions that are affected by the digitalization vision, as well as analyzing the processes and tools currently in use in the organization. Next, the solution concept is designed for the selected digitalization vision: What could be the solution on a conceptual level (objective)? It is important to think broadly and examine different options.

The roadmap phase aims to plan how to achieve the objective defined in the current state review phase. The step should describe possible alternative implementation paths, what kinds of resources are needed to implement the solution, and define metrics for evaluating the success of the implementation. Development work typically takes place in iterations. Therefore, the work should be broken down into manageable iterations: Each iteration brings the solution closer to the objective.

In the implementation phase, the starting point is the roadmap defined in the previous phase. Different methods and models can be used in the implementation. When piloting the solution, it is important to evaluate its success with metrics. Planning and implementation are often done iteratively. In the first stage, for example, a small-scale prototype or Proof-of-Concept (PoC) solution is implemented to test the feasibility of the solution before a larger-scale implementation.

3.2 Analysis toolset for the positioning phase

The toolset for positioning phase contains three tools (Fig. 2), starting from digital maturity analysis via SWOT analysis to DigiTriangle that sums up the digitalization development visions for the company. These visions are digitalization targets that the company wants to develop within a short- or long-term period.

DIGI MATURITY

What is my organization's digimaturity level?

DIGI⁺ SWOT

Analyze digitalization threats and opportunities

DIGI△ TRIANGLE

Analyze digi development ideas using DigiTriangle

Fig. 2. Digitalization status analysis tools (positioning phase).

The DigiMaturity tool [31] is a free-of-charge web-based digitalization self-assessment tool for organizations [23]. It was created for directors, managers, and experts to better understand the concept of digitalization and to assess their current digital maturity level. The DigiMaturity tool contains questions for companies structured under six dimensions: strategy, business model, customer interface, organization and processes, people and culture, and information technology. Therefore, the tool measures the digitalization status from a broad perspective, not only technological aspects. The self-assessment is done by selecting the most suitable option of the presented written answer alternatives. The tool calculates the maturity level value (from 0 to 4) for each dimension [23],[31]. Then, the respondents get a diagram (radar chart) that shows where the company stands in digitalization and where the company is compared to the average of other respondents. A specific comparison based on the domain or size of the company can be made if there are enough respondents in the reference group. The digital maturity baseline is valuable information for the company, but further understanding and concretization are required to allocate the development resources and activities so that the best possible impact and value can be created [23].

The DigiSWOT tool is used to analyze the strengths, weaknesses, threats, and opportunities of digitization in a company. The tool is based on the SWOT template and equipped with questions about how to apply it for analyzing the

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strengths, weaknesses, threats, and opportunities of digitalization in an organization. Based on the SWOT analysis, the company should consider the following issues and define actions based on them:

- How can digitalization strengths be utilized better?
- How can digitalization weaknesses be turned into strengths?
- How can opportunities be seized?
- How can threats be avoided?

The DigiTriangle tool is used to classify the digitalization vision priorities of a company. In practice, the tool is a template that divides the digitalization visions into three areas where digitalization visions are filled in, internal efficiency, external opportunities, and disruptive change, as described in Parviainen et al. [4]:

- *Internal Efficiency:* Describes the digitalization ideas related to improving the internal company performance. For example, new IT solutions to streamline internal processes or the creation of a roadmap for information system development;
- *External Opportunities:* Describes the digitalization ideas related to the company's external capabilities when dealing with customers or partners. For example, new service ideas for customers, offering existing services in a new digital way, e-marketing, or cloud-based IT solutions for exchanging documents with partners;
- *Disruptive Change:* Describes the radical digitalization ideas of an organization that can enable completely new business for an organization or new partnerships, or lead to a completely new role for the organization in the value network.

The purpose of the triangle is to help the company structure and present its future digitalization visions as a basis for development work (successive steps of the DT model after the positioning phase). Some visions are short-term that could be practical and concrete, whereas others are long-term that are more like generic development ideas that will be specified in more detail in the future. Furthermore, it is important to outline the impact chains of solutions. For example, if a company aims for a smooth document exchange with a business partner, the company's internal document management must be in order first. Therefore, the DigiTriangle tool can also be used to outline development steps for prioritization and decision-making. In large organizations, the responsibilities of different internal and external improvement activities are typically separated. However, in small organizations, the person responsible for different improvement activities can be the same person. In the worst case, development work is done ad hoc alongside other tasks, which slows down the systematic development of digitalization. Even in this case, the DigiTriangle tool offers a framework for prioritization to advance systematically in digitalization.

In fall 2019, we published the DT model and associated tools as an open online service [32] (currently in Finnish) to allow free-of-charge access for companies and other organizations to utilize the developed DT model and tools in digitalization development. This service contains also a toolset for positioning phase making DigiMaturity, DigiSWOT and DigiTriangle tools available.

3.3 Piloting positioning phase of the digital transformation model with case companies

The tools and process for the positioning phase were tested in SME cases (Table 2). We conducted a positioning phase for 19 SMEs representing a wide range of sizes, domains, and businesses. The selection of case companies was supported by the ERDF project's four regional development organizations because they had good understanding and access to SMEs in their own area. The main issue was that companies were willing to improve their digitalization. The key digitalization person(s) in each company participated in the positioning phase. The case studies were conducted between spring 2018 and fall 2019. The company size classification was the following:

- Solo entrepreneur: one person;
- Micro-enterprises: more than one but fewer than 10 persons;
- Small companies: 10 or more but fewer than 50 persons;
- Medium-sized companies: 50 or more but fewer than 250 persons.

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Table 2. Case company profile

Company	Size	Domain/business	Position phase participant in company (company participant(s))
C1	Solo entrepreneur	ICT/IT solutions	Owner-manager
C2	Solo entrepreneur	Real estate activities/real estate business	Owner-manager
C3	Solo entrepreneur	Service/photographic studio	Owner-manager
C4	Micro	Built environment/construction	Managing director
C5	Micro	Manufacturer/steel construction	Managing director
C6	Micro	Retail/clothing store	Managing director
C7	Micro	Service/gym	Managing director
C8	Micro	Service/restaurant & hotel	Managing director
C9	Micro	Service/rehabilitation	2 owner-managers
C10	Micro	Service/restaurant and hotel	Managing director, Sales assistant
C11	Small	Electric power industry/energy	Managing director, Network manager
C12	Small	Service / property maintenance	Managing director
C13	Small	Service/business development	Managing director, Business developer
C14	Small	ICT/solutions for automating knowledge work	Chief operating officer
C15	Small	Built environment/construction	Managing director
C16	Small	Service/logistics	Managing director
C17	Medium	Manufacturer/HVAC provider	Chief information and marketing officer
C18	Medium	Built environment/construction	Senior system administrator
C19	Medium	Manufacturer/machine construction	System specialist

Practical process and tools for the positioning phase are depicted in Fig. 3. The figure presents steps and tools as well as roles that participated in the analysis. The idea was that the company conducts the analysis in cooperation with public actors (research scientists). Next, the steps for piloting the tool with 19 case companies in practice are considered in more detail:

1. In the first step of the positioning phase, the SME participant was invited to respond to the DigiMaturity tool questions (self-assessment). As a result, the company participant received a digitalization maturity profile from the tool (a radar chart).

2. Next, the research scientists (two persons) analyzed the maturity profile and then compared it with the same domain and/or similar-sized companies in the DigiMaturity tool database [31]. This analysis was based on the answers of the DigiMaturity tool from the previous year (the answer rate for the DigiMaturity tool questions is about 100 organizations per year ranging from solo entrepreneurs to large companies). Furthermore, the research scientists became acquainted with the background of the company based on its web pages and news articles.

3. Then, approximate 1.5-hour interview and workshop session were arranged for each company. The position phase participant in the case company (one or two participants) and two research scientists attended this session. One research scientist was responsible for asking questions and leading the discussion during the session, and the other was responsible for documenting the discussion. These sessions were arranged as face-to-face sessions and

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were recorded so that the research scientists could check the discussion afterward if something was left unclear when compiling digitalization status analysis summary document. The session contained the following agenda:

- Background interview questions about the company's history, business, and domain;

- Semi-structured interview with frame based on the DigiMaturity tool questions. The intention was to understand and document in more detail what was behind the respondents' answers, lessons learned from digitalization and if there were possibilities for improvement (digitalization improvement ideas);

- The DigiSWOT tool questions were answered with the company participant in workshop session indicating the strengths, weaknesses, threats, and opportunities of digitalization in the company and potential digitalization improvement ideas for the company;

- Furthermore, in the workshop session the DigiTriangle tool was filled in with improvement ideas based on the interview and DigiSWOT, and they were discussed and elaborated to express the company's short- and long-term digitalization ideas. These ideas were called the case company's digitalization visions, and they were classified and documented according to the DigiTriangle areas;

- At the end of the session, research scientists asked the companies for comments about the tools and the digitalization status analysis session: how useful they saw the analysis for the company, feedback about the tools and process used, and what kind of improvement ideas they had for the tools and process.

4. After the session, the research scientists compiled a digitalization status analysis summary document for each company containing the analysis results: Where is the company in terms of digitalization? Threats and opportunities? Digitalization visions: short-term, long-term? This summary was sent to the company participant for comments, and based on them, the research scientists finalized the summary document that was sent to the case company.
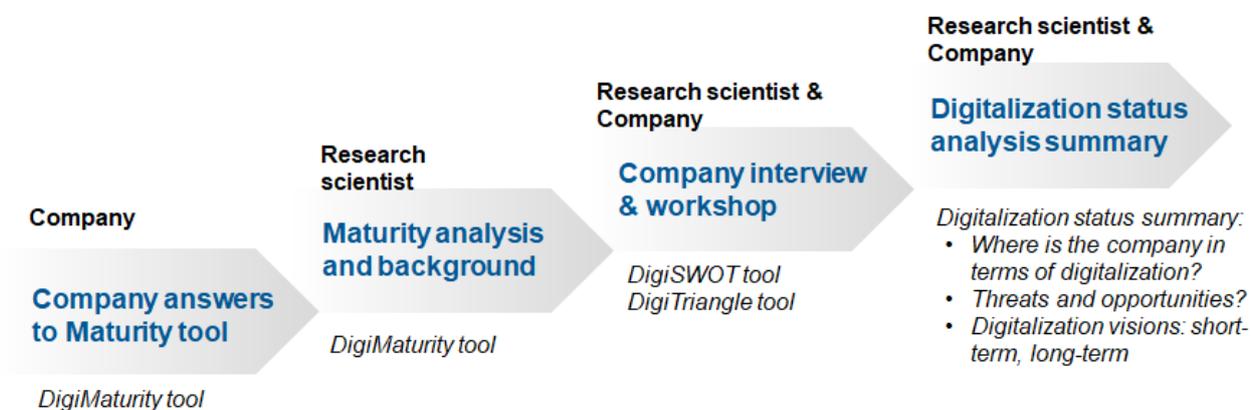

Fig. 3. Tools and process for the positioning phase of the DT model.

4. Results

4.1 Tools and process for the positioning phase of DT model

This research considers how SMEs can be supported to analyze their current digitalization status and identify digitalization development ideas in their digital transformation process. Our approach was to equip the positioning phase of the DT model with an analysis process and tools. Then we carried out 19 company cases where the tools and process for the positioning phase were applied to identify and analyze the status of the digitalization in the case companies. This resulted in a tried-and-tested positioning phase process and toolset (Fig. 3) for analyzing SMEs'

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current digitalization status and finding improvement visions for future. The comments of the case study participants indicated that companies found the systematic digitalization status analysis useful for understanding their digitalization status and initiating digitalization development. This was emphasized, for instance, by companies C17 and C14 as follows:

> *The digitalization status analysis gave us a good understanding where we stand in digitalization. The approach transforms a complicated phenomenon into a clear model that guides the assessment and development of digitalization. (Chief information and marketing officer of C17 company)*

> *We are a leading developer of license-free robotic process automation products and services. Our company obtained in the digitalization status analysis an excellent insight into our digitalization strengths and improvement needs. (Chief operating officer of C14 company)*

In the case studies, it was notable that for micro-enterprises, one bottleneck is time. Based on these case studies, it seems that micro-enterprises in particular need support in identifying digitalization opportunities and brainstorming new solutions. Furthermore, smaller companies found it useful to discuss digitalization with an external person to gain understanding and new insights. These issues were highlighted by the managing director of C6 company:

> *Systematic-supported approach in digitalization status analysis and identifying digitalization visions was important in the hectic everyday life of a small company. Otherwise, more far-reaching digitalization development work would have easily been overshadowed by acute everyday operations. The company's digitalization status has become clearer, and our understanding of the digitalization possibilities has increased. Furthermore, the digital service ideas to be developed have become more concrete.*

However, some small micro-enterprises saw the current version of the DigiMaturity tool as challenging, especially the terminology and how the questions and response options are posed. These case companies also needed concrete digitalization examples as the basis for the questions of the DigiMaturity tool. The owner-manager of C2 company stated:

> *DigiMaturity tool terminology is not clear for the solo entrepreneur ... term "strategy" could be "operational development plan" ... term "organization" means for the solo entrepreneur just one person ... practical examples related to DigiMaturity questions would make it easier to understand the questions and facilitate the selection of right answer alternative.*

DigiTriangle was found to be a good way to collect digitalization visions into one figure classifying which to target for improvement of internal efficiency, better utilization of external opportunities, or more radical disruptive change. The chief information and marketing officer of C17 company stated that "*for us, the DigiTriangle proved to be a good tool for conceptualization in our digital development*".

The open online service [32] was only published in fall 2019, but we already received positive feedback about it. "*ApuaDigiin.fi is a good start and a toolkit for companies to develop their digitalization*" told the managing director of C13 company. The tools and process that were used to analyze the digitalization status and find improvement visions are now freely available. However, the webservice needs further development and improvement in usability.

4.2 Digitalization visions and lessons learned from company cases

Next, the digitalization visions that emerged during the positioning phase are considered. Digitalization visions of companies' digitalization status analysis summaries were compared to determine whether common themes appeared in the visions of different companies. Certain themes emerged from the analysis. In Table 3, the most common themes are shown.

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Table 3. Most common digitalization vision themes in case companies.

		Internal efficiency				External possibilities			Disruptive change	
		Description of current strategy, processes and/or use of tools	Development of a roadmap to clarify the company's IT / digitalization development	Information systems, integration and document sharing	Automation of knowledge work	Offering services through digital channels or improvement of existing digital services	Exploitation of cooperation and partnerships	Digital marketing: sharing customer references in digital form, new digital channels for marketing and systematization of digital marketing	Ecosystems, networks, communities, platforms for developing solutions and providing products or services	Utilization of new technologies (IoT, real-time solutions, intelligence, augmented reality) in products and services
C1	Solo-entrepreneur						x	x		
C2	Solo-entrepreneur		x	x			x		x	
C3	Solo-entrepreneur	x					x	x		
C4	Micro	x	x					x		
C5	Micro	x	x		x		x		x	
C6	Micro						x		x	
C7	Micro		x	x		x	x	x	x	
C8	Micro		x	x			x			
C9	Micro		x					x	x	
C10	Micro	x	x			x	x	x		x
C11	Small	x		x	x	x			x	
C12	Small		x				x	x	x	
C13	Small	x		x		x			x	x
C14	Small	x				x				
C15	Small	x	x					x		x
C16	Small	x	x			x		x	x	
C17	Medium				x	x			x	x
C18	Medium	x			x	x			x	x
C19	Medium		x			x			x	x
TOTAL		**10**	**11**	**5**	**4**	**9**	**9**	**9**	**12**	**6**

Next, the digitization visions and experiences of case companies are discussed based on interview and workshop sessions.

Internal efficiency: Especially in small and micro-enterprises, a company's strategy, processes, and use of IT tools can be informal and undocumented. As a company grows, it becomes increasingly important to describe them and systematize the processes and the use of tools. Furthermore, lessons learned indicate that the digitalization basics, such as information systems, communication tools, document management, and websites, must be put in order before further digitalization. Then, a company can start to build solutions for automation and integration. In particular, we found that in medium-sized companies, automation is increasing, and new technologies, such as software robotics (robotic process automation, RPA), are already in use or are being piloted to automate routine IT tasks. The development of

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digitalization and IT systems should be carefully set out in a roadmap, and the organization must not be stifled by new solutions. Staff needs time to get used to new information systems and processes in their own work before new ones are introduced. Furthermore, it was stated that finding a good IT or digitalization partner can be difficult for small and micro-enterprises. This does not decrease the importance of a company's own digitalization planning. A company should have an understanding of its own digitalization situation and the digitalization needs of the domain and customers, so that the company can start to advance along the digitalization pathway based on its own (internal and external) situation. Some entrepreneurs said that they had utilized available online educational (e.g., Google's Digital Garage) and marketing material or watched digitalization-related webcasts to improve their digitalization skills.

External opportunities: Companies are increasingly planning to provide their services or products through digital channels or enriching services provided through existing digital channels. An example of this is enabling the purchase of additional services related to an existing service or a product. Development activities and needs related to digital marketing emerged in the interviews. Many companies are familiar with digital marketing, but especially small enterprises and solo entrepreneurs need more concrete digimarketing guidance and support (this was indicated by case companies). The versatile use of digital marketing channels, the utilization of customer references in digital form, and the systematization of digital marketing, in general, were on the companies' "to-do list." After all, digital marketing can give a small company broad visibility at a reasonable cost as stated by the owner of C9 company: "*Even a small company can be visible as well and extensively as large companies by taking advantage of digital marketing.*"

Disruptive change: Related to the disruptive change, companies' digitalization development activities often aim at a longer time period and contain many uncertainties, although some of the case companies had progressed toward disruptive solutions. According to the results, especially medium-sized companies have visions for disruptive change. In the company interviews, disruptive change was discussed at the company level as a radical new way of working in a company, for example, as a completely new business, a new kind of cooperation with other companies, or a new kind of "non-mainstream" solution for certain problem. However, this requires understanding of customer needs and purchase behavior which can be supported with digital tools. This better understanding of market needs was stated by the managing director of C13 company: "*Digitalization helps to understand customers' needs more deeply and to focus investments where the market of the future is.*"

Emerging technologies may provide new possibilities, such as the use of the Internet of Things (IoT), augmented reality (AR), or artificial intelligence (AI) in products or services, or using digital solutions to enable a completely new service business in addition to the product business. This was indicated especially by medium-sized companies. Furthermore, many companies of different sizes and in different domains indicated visions for ecosystems, networks, communities, and platforms for developing solutions and providing products or services.

5. Discussion

In this article, we explored how SMEs can be supported in the DT process in practice focusing on the positioning phase of the DT model. It and associated tools were piloted in 19 SMEs. The purpose was to test practical tools and process for the positioning phase of the DT model in real-life business cases. The need for a practical approach for DT was also emphasized by Barann et al. [11]. They stated based on their literature review that existing models are mainly conceptual, and ideal-theoretic steps are hardly aligned to actual practical needs of SMEs. The feedback received from the case companies in our research supported this interpretation. The starting point for the DT model was also generic [4] and therefore, had to be put into practice by defining tools and process and piloting them in company cases. This work started from the positioning phase of the model. According to the results of our research, the positioning phase with practical process and tools was found to be useful in analyzing digitalization as a whole in the case companies and systematizing its development.

Based on this research, solo entrepreneurs and microenterprises, in particular, seem to need practical support in identifying digital opportunities, brainstorming solutions, and structuring digital development. This is in line with the findings of Räisänen and Tuovinen [26], who stated that microenterprises, especially, need help with exploiting

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digitalization. To support this, they presented a possible workshop method for promoting the diffusion and adoption of digital innovations. Such workshops are one opportunity for the public actor to inform SMEs about the potential of digitalization and to help change attitudes toward digitalization. This method might be used to orientate and motivate micro-enterprises for improving their digitalization and scan potential candidates for public actor supported DT in future. Barann et al. [11] discussed how to incorporate external organizations, such as competence centers or research institutions (i.e., support units), to help SMEs to understand and implement DT initiatives. The authors stated that small companies require a practical approach for digitalization focusing on feasible and tangible goals. The approach is highly iterative and includes the formation of an inter-organizational planning team (the company CEO and members of the support unit) to analyze the digitalization of the company in practice [11]. Our approach presented in this article involves company representative(s) and research scientists in analyzing the digitalization status of the company and determining improvement targets. Furthermore, this approach has been published as an open online service [32] making the DT method and tools available to other publicly funded organizations to help SMEs in their digitalization efforts. A future target is that publicly funded support organizations could also enrich the online service with new digitalization-related tools, methods, and experiences. The openly available tools and the DT method can also be used by SMEs that want to analyze their digitalization status and find improvement ideas on their own without support from external organizations. However, this kind of "self-service" should be considered and tested in future company cases (i.e., are the tools and process consistent and easy to use so that companies can perform the whole analysis as a self-service without support from external organizations?).

In our approach, the companies responded to the DigiMaturity self-assessment tool. The feedback showed that the use of the tool was challenging for some micro-enterprises and especially for solo entrepreneurs. They commented that there are development needs regarding the vocabulary/terms and how the questions and response options are posed. Furthermore, some respondents needed concrete digitalization examples to clarify the questions. Similar attention was paid by North et al. [25] who stated that a framework designed for SME entrepreneurs must have a simple structure, utilizing visualization, and maturity levels should be described in comprehensible language. Rauch et al. [24] stated that detailed descriptions and practical examples in maturity models make it easier for SMEs to determine their own maturity level. The authors emphasized that this assistance is particularly important, as many SMEs do not have highly qualified employees who have experience with all concepts. Digital maturity assessment can be as self-assessment or 3rd party assisted assessment [22]. In our model DigiMaturity tool is intended to be self-assessment and must therefore be clear and simple. Based on the results, we are developing a new variant of the DigiMaturity tool for micro-enterprises and solo entrepreneurs to make it easier for them to answer the DigiMaturity tool questions. This ongoing research will be presented in Kuusisto et al. [33].

Based on the positioning phase pilots, it can be stated that the case companies that participated in this research have digital development activities planned or ongoing, which are related to the companies' internal efficiency and external opportunities. In addition, some companies are pursuing a more radical change, such as a completely new type of business or service. In the longer time period, many companies seek collaboration networks or ecosystems with other companies, or even platform business. It has been stated that the most prominent digital growth strategy involves the use of digital platforms, as two key drivers behind growth are the platform's high scalability potential and network effects [17]. Verhoef et al. [17] further illustrated business growth opportunities enabled by digital platforms. For SMEs, digital platforms enable many opportunities for joining in an ecosystem based on digital platforms created by someone else and for creating potential ecosystems based on their own digital platform (make or join decisions). Doing business on someone else's platform comes with a cost, such as sharing revenues with the platform provider and being under its control, as the platform provider usually sets out the rules of the platform (and the way business is conducted on the platform). However, Li et al. [19] discussed that digital platform service providers can also help SMEs in DT when joining a digital platform (by mentoring, facilitating and rulemaking).

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6. Conclusions

This article considered digital transformation (DT) in the context of SMEs. Digitalization is not just about making existing manual processes digital. Companies should rethink their current operations and business models from new perspectives enabled by digital technologies. This could lead to completely new businesses or new partnerships or to a completely new role in the value network. It is important to understand that DT is not just about the technological dimension. DT also affects an organization's processes, culture, staff engagement, customer orientation, and business models, all of which must be considered in DT. The goal of the article is to support SMEs to analyze their digitalization status and advance systematically in digitalization, that is, how SMEs can be supported to analyze their current digitalization status and identify digitalization development ideas in their digital transformation process.

This article explored how to help SMEs in DT, especially during the positioning phase, in practice. The DT model and associated tools for the positioning phase were piloted in 19 SME case companies. Based on the results of the research, the positioning phase with tools and process were proven to be useful and suitable for analysis when a company representative does it in cooperation with a support organization (in this case, with the research scientists of a research institute).

The research has certain limitations. First, the results of the evaluation are based on cases with 19 companies which is limited sampling, and more evidence is needed. Second, digitalization visions represent artefacts that are plans for future; it is not self-evident that they are exactly the right actions that the company should take. Therefore, it would be interesting to follow company cases as longitudinal cases to verify their business impact on the company in the future (i.e., did we find the right digitalization visions with DT positioning process and tools?).

The research increased understanding of DT in SMEs but also opened up new research questions as well as development paths. The following future research and development actions have been identified:

- More company cases should be conducted to get more evidence about the tools and process, as well as longitudinal case studies to see how identified digitalization visions have been realized in case companies and what kind of business impact they have had;
- There is a need to expand the study to the other stages of the DT model defining detailed practical tools and processes and piloting them in company cases. This research should utilize existing models and approaches that have been reported in literature;
- Other publicly funded organizations should be involved to validate the approach to get evidence about its suitability for different types of publicly funded organizations (e.g., regional business development organizations, universities, universities of applied science). What kind of guidelines do these organizations need for using positioning-tools, to be able to help SMEs in digitalization status analysis and identification of improvement visions?
- Openly available tools and DT method can also be used by SMEs that want to analyze their digitalization status and find improvement ideas on their own without support from external organizations. Company "self-service" should be examined and piloted in future company cases (i.e., are the tools and process consistent and easy to use so that companies can perform the whole analysis as a self-service without support from external organizations?);
- The new variant of the DigiMaturity tool that is under construction for micro-enterprises and solo entrepreneurs should be piloted, and experiences collected in case companies;
- Case companies brought out the important role of ecosystems and platforms as a disruptive goal. Therefore, there is a research need for guidelines, tools, and case examples to help SMEs better understand ecosystems and platforms, what kind of business opportunities they may provide, and how to build this kind of business.

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This article summarized the main findings and lessons learned in applying the positioning phase of the DT model in challenging environments of SMEs. The results showed that the proposed process and tools were useful and suitable for digitalization status analysis and identifying potential digitalization development visions.

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