Digital Transformation of SMEs: Capturing Complexity

John Jeansson

Krister Bredmar

University of Maribor Press

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JOHN JEANSSON & KRISTER BREDMAR

Abstract The purpose of this paper is to study the ongoing digitalisation of SMEs in order to gain a richer understanding of the complexity of digital transformation. Six Swedish SMEs have been studied using a basic qualitative research approach. Main results of the study are the identification of internal as well as external drivers of value creation, categories of digital transformation actions and the presence of a strategic tension that SMEs had to manage in order to conduct their digital transformation. One conclusion is a proposed framework which supports a rich understanding of SMEs digital transformation.

Keywords: • Digitalisation • Digital Transformation • Small and medium-sized enterprises (SME) • Digital Competitiveness • Complexity •

CORRESPONDENCE ADDRESS: John Jeansson, PhD, Assistant Professor, Linneaus University, School of Business and Economics, Växjö, Sweden, e-mail: john.jeansson@lnu.se. Krister Bredmar, Ph.D., Associate Professor, Linneaus University, School of Business and Economics, Växjö , Sweden, e-mail: krister.bredmar@lnu.se.

1   Introduction

The ongoing digitalisation of society challenges existing business logic, models and knowledge of companies within almost every industry. In its footsteps follows both promises of great possibilities and value for those who successfully adapt and change, as well as great challenges and risk for those who lag behind (Carr, 2003). Digitalisation has thus, regardless of company size and shape, emerged as a necessity in order to stay competitive, providing strong incentives for companies to take action (Johnston, Wade, & McClean, 2007). However, successful digitalisation does not follow one recipe for all (Andal-Ancion, Cartwright, & Yip, 2003; Heavin & Power, 2018). Research within the field shows that companies need to invest in digital technologies but implement digital transformation in order to take hold of possibilities and value. This implies that competitive advantage due to digitalisation is not the result of merely technology installation, but have everything to do with how each company: (1) integrate technology, people, processes and strategies (Markus & Benjamin, 1997), and (2) capture the elusive nature of potential value from digital initiatives (Jeansson, 2014). Previous research and empirical findings depict such digital transformation as a highly complex matter, and a knowledge gap in need of further attention (Besson & Rowe, 2012; Fortune, 2018; Hess, Matt, Benlian, & Wiesböck, 2016).

This paper focus on digital transformation within the context of SMEs and this for two reasons: *one*, SMEs make up for 99.9% of all companies in Sweden and 99.8% in EU and accounts for 65.5% (Sweden) 66.4% (EU) of all employees, which speaks of relevance (Muller et al., 2018); two, characteristics of SMEs provide a complex and at times conflicting context of digital transformation, which calls for further studies (Li, Su, Zhang, & Mao, 2018; Zach, Munkvold, & Olsen, 2014). The purpose of the paper is thus to study the ongoing digitalisation of SMEs in order to gain a richer understanding of the complexity of digital transformation, so that future digital initiatives of SMEs could be supported. The paper addresses two research questions: (1) what is the character and nature of digitalisation in an SME context? (2) how do SMEs act in order to achieve their digital transformation?

2   Theoretical Lens

The paper is positioned between the phenomenon of digitalisation, the context of SMEs and the field of digital competitiveness. As these three fields converge they constitutes the theoretical lens of SMEs´ digital transformation.

2.1   The Nature of Digitalisation and Digital Transformation

As we connect digital to different social settings (e.g. digital society, digital culture, digital divide, digital disruption, digital business, digital customers) we state that there is more to digital than technology (Reed, 2014). In fact, it could be argued that it is a digital-social duality that we seek to understand and depict (Orlikowski, 1992). Within the field of organisational transformation, transformation denotes change, which could take on two main shapes: (1) continuous, slow and patchy or (2) discontinuous, fast and systemic (Besson & Rowe, 2012). When connecting digital and transformation Dehning, Richardson, and Zmud (2003, p. 654) speak of something *"fundamentally altering traditional ways of doing business by redefining business capabilities, business processes and relationships"* as well as enabling a company to enter *"a new marketspace"*, or *"enabling firm to operate in different markets, serve different customers…gain considerable competitive advantage by doing things differently"*. Lucas Jr, Agarwal, Clemons, El Sawy, and Weber (2013) further refine the degree of digital transformational in relationship to the level and nature of: business process change, creation of a new organisation, change in relationships, customer reach, and changed market position. The Global Centre for Digital Business Transformation define digital business transformation to be *"organisational change through the use of digital technologies and business models to improve performance"* (Wade, 2015). To speak of digital transformation is then to speak of: (1) the use and alignment of digital technologies within a company, (2) conducting organisational change, (3) enabling activity (4) creating and capturing new opportunities and value. To conclude and provide a definition of digital transformation for this paper: *"digital transformation is to be understood as the process of reshaping the business model of a company due to, and through, the adoption and use of digital technologies, in order to create a setting where new possibilities are enabled and value created"*.

2.2   Strategic Tension of Digital Transformation

As companies embark on their digital transformation journey there is an underlying strategic tension to pay attention to. A tension between an internal resource/capability perspective and an external market-based perspective, which have implications for why and how a company acts in order to gain competitive advantage or competitive parity. An internal resource/capability perspective stresses the importance of playing to a company´s strengths when devising strategies and digital initiatives. It emphasizes: (1) the need to build a strong and exclusive digital resource base consisting of both tangible and intangible assets (Prahalad & Hamel, 1990); (2) the need to develop hard-to-imitate competencies and digital capabilities (Peppard & Ward, 2016; Teece, Pisano, & Shuen, 1997; Wang & Ahmed, 2007). Companies with a predominantly internal drive set out to first identify their unique resources then find a suiting market or shape an existing one (De Wit & Meyer, 2010).

A market-based perspective stresses the company´s external environment as the main starting point when devising strategies and digital initiatives. It places great emphasize on understanding customers and competitors (existing as well as potential), and to adapt to emerging threats and opportunities within a company´s industry. Its main focus are: (1) to design a digital value proposition that matches the changing nature of customers' needs, demands and behaviours (Berman, 2012); (2) to use digitalisation in order to gain an advantageous market position (Carr, 2003; Porter Michael, 2001). Companies with a predominantly external drive set out to first analyse and gain insight into the attractiveness and profitability of a market, then adapt or develop needed resources and capabilities to align with market opportunities (De Wit & Meyer, 2010; Porter Michael, 1985).

2.3   Understanding SMEs going Digital

The nature of SMEs provides a specific backdrop to digital transformation. An SME is by the European commission defined as a company having: (1) less than 250 employees; (2) less than €50 million in turnover; (3) less than €43 million in balance sheet total (Muller et al., 2018). Because of their size SMEs have specific characteristics that differs from their larger counterparts (Ghobadian & Gallear, 1997; Welsh & White, 1981). Characteristics that have implications for digital transformation as they affect SMEs´ management (Cragg, Mills, & Suraweera,

2013), investment (Levy, Powell, & Yetton, 2001), adoption (Ifinedo, 2011), implementation and usage (Zach et al., 2014) of digital technologies. Table 1, provides a shortlist of characteristics to support a richer understanding of challenges and opportunities faced by SMEs during digital transformation.

Table 1: SME characteristics

SME Characteristics		
Environment	Organisation	Digitalisation
• Mostly local and regional markets-few international. • Prone to be financial sensitive to external forces and environmental changes. • Dependent on small customer base. • Close and frequent contact with customers. • Limited external contacts. • Affected by powerful partners in their supply chain.	• Time constraints of owner-mangers. • Low degree of standardisation and formalisation. • Low resistance to change. • Organic and fluid culture. • Modest financial resources. • Modest human capital and know-how.	• Limited knowledge of IS. • Lack of strategic planning. • Limited in-house IT expertise. • Emphasis on packaged applications. • Adoption driven by perceived relative advantage, competitions´ pressure and management support. • Adoption related to prior use of digital technologies.
(Ghobadian & Gallear, 1997; Wong & Aspinwall-Roberts, 2004; Zach et al., 2014)	(Ghobadian & Gallear, 1997; Wong & Aspinwall-Roberts, 2004; Zach et al., 2014)	(Ifinedo, 2011; Wilson, Daniel, & Davies, 2008; Zach et al., 2014)

2.4   Framing Digital Transformation

In order to discuss the nature and actions of SMEs digital transformation based on previous research three intertwined themes, each having a set of sub-themes, are proposed. The first theme aims to capture the degree of digitalisation within a company's external environment, and to what extent and in what way it affects the company. The nature of the environment could either enable or hinder a company's possibilities to conduct its digital transformation as well as to compete (Baker, 2012; Oliveira & Martins, 2011). The theme consists of four sub-themes, two at a macro level: (1) digital infrastructure, which is the available external digital technology and services necessary for a company to function (Tilson, Lyytinen, & Sørensen, 2010); (2) regulations and policies, which is government as well as industry provided regulations/policies and incentives (Gibbs & Kraemer, 2004); and two at a micro level: (3) industry climate, which is the competitive structure within an industry and the nature of collaboration between companies (Baker, 2012); (4) customers, which is the digital behaviour and maturity of existing as well as potential customers (Berman, 2012).

The second theme aims to capture the degree of digital transformation within a company, and to capture SMEs´ perceptions and actions of digital transformation. Companies perception of digital is very much a matter of prevailing organisational culture and strategy, which affects adoption and usage of digital technologies as well as development of digital competence (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013; Leidner & Kayworth, 2006; Middleton & Harper, 2004). The transformation theme consists of four sub-themes: (1) culture, which is a company´s prevailing organisational and information culture (Cameron & Quinn, 2011; Choo, 2013); (2) strategy, which is the character of a company´s digital strategies (Peppard & Ward, 2016); (3) capabilities, which is a company´s digital competence and capability (Peppard, Lambert, & Edwards, 2000; Wang & Ahmed, 2007); (4) digital technology usage, which is a company´s adoption and usage of digital technologies and services (Carr, 2003; Renkema, 2000).

The third theme aims to capture the degree and nature of business value gained from investments in digital initiatives and the ongoing digital transformation. Achieving potential digital business value has proven to be a challenging task in need of a structured approach. One challenge being its elusive nature as it is:

dynamic, take on different shapes, and emerge throughout the whole company (Farbey, Land, & Targett, 1999; Jeansson, 2014; Ward & Daniel, 2006). The digital business value theme consists of two sub-themes: (1) internal performance, which is the perceived benefits and value related to internal efficiency and effectiveness (Melville, Kraemer, & Gurbaxani, 2004); (2) external relationships, which is the perceived benefits and value related to market position, customers and business partners (Porter Michael, 2001).

3 Research Method

The study is part of a larger research project and has been conducted using a basic qualitative research approach (Merriam, 2009). In such an approach, a researcher aims to paint a rich picture of the complexity of that which is to be studied, and to better understand a phenomenon from a participant's perspective (Creswell, 2007; Merriam, 2009). In our case, to gain a richer understanding of actions taken by companies within their natural environment as they make sense of their ongoing digitalisation.

3.1 Sample Selection

Participating companies were selected using a purposeful sampling strategy. The logic of such a strategy is to select: *"information rich cases for study in depth"* (Patton, 1990, p. 169). Companies were further selected using a combination of variation and criterion sampling. In order to be included in the study companies had to meet four criteria: *one*, qualify as an SME according to the employment definition of European commission (Muller et al., 2018); *two*, perceived to provide an interesting and rich picture of digitalisation; *three*, be active and have a head office within the Kalmar county of Sweden; *four*, have more than one employee. Within these four criteria companies were further selected in order to gain variation of industries, municipalities and degrees of digitalisation (Creswell, 2007; Patton, 1990). For this paper a total of six companies were selected, see table 2. In order to gain as rich information as possible interview respondents were selected based on their role within the company. In order to be selected they had to be either the CEO of the company or the person responsible for its digitalisation/digital initiatives.

Table 2: Selected companies.

Company	Industry	Employees/turnover	Respondent
Company A	Processing and wholesale of timber.	Employees: 117 Turnover: €74.7 million	CIO
Company B	Logistics and freight traffic.	Employees: 104 Turnover: €21.9 million	CEO
Company C	Conference and golf resort.	Employees: 55 Turnover: €6.2 million	CEO
Company D	Industrial cleaning and dry-cleaning.	Employees: 38 Turnover: €4.1 million	Production manager
Company E	Manufacturing of steal parts.	Employees: 56 Turnover: €8.9 million	CFO/CIO
Company F	Retailer of books and office supplies.	Employees: 12 Turnover: €1.7 million	CEO

3.2   Data Collection

Data were collected through interviews and public documents. All interviews were semi-structured, and although the same interview guide was used in all interviews the order and wording could vary between interviews depending on the situation at hand. Additional questions were asked in response to respondents' answers (Merriam, 2009). Each interview was approximately one hour long and were conducted at the facilities of each company. All respondents approved to have their interview digitally recorded, and all interviews were transcribed verbatim afterwards. In addition to interviews public documents (i.e. financial reports, news articles and company webpages) were gathered in order to gain a richer picture of the company and its environment (Merriam, 2009; Yin, 2003).

3.3   Data Analysis

The interview transcripts were analyzed by two researches both manually and using software tools (Atlas.ti). The main focus of the analysis was not to study actual words themselves, but rather the meaning they conveyed (Miles & Huberman, 1994). The analysis contained four phases. Even though the different phases were to some degree conducted in a sequential manner, the analysis

process was highly iterative. During the *initial* phase transcripts were read in light of posed research questions and text segments of different sizes were coded in an inductive, open manner (Merriam, 2009; Miles & Huberman, 1994). During the *second* phase coded segments of data were grouped as categories and themes emerged. In a *third* phase themes were further analyzed in light of defining features, structures and processes, causes and consequences and participation and relationships (Lofland, Snow, Anderson, & Lofland, 2006; Miles & Huberman, 1994). In a fourth phase data was analyzed through proposed theoretical lens.

4   Results

4.1   Nature and Impact of External Environment

SMEs described their digital infrastructure as (1) access to high-speed broadband internet, (2) mobile phone connectivity and (3) access to external digital competence. A well-functioning internet connection was regarded as important, if not critical, to most companies. Company E described how they currently were using ADSL-based internet connection, which did not meet their needs, and how they joined forces with other local companies in order to put pressure on the municipality to invest in fixed high-speed internet connectivity. Apart from company E, all SMEs regarded their digital infrastructure to be sufficient and all companies were able to find sufficient external digital competence within or outside the region when needed.

SMEs perceived regulations and policies to have a limited impact on their digital transformation. Company A, however, described how strict industry regulations regarding information security affected investments. Company F described how they, when developing their website, received financial support from regional development funds due to policies aimed at encouraging companies to invest in digital initiatives.

In general, SMEs described their industry climate as highly competitive and painted picture of digitalization and the way it impacted them as dynamic. Company A and B both described a current on-going industry shift with increased digitalisation. Company F described a highly digital industry with a never-ending presence of e-commerce and with several competitors having

advantages that they could not compete with. However, they also described the world of physical bookstores and how they regarded themselves to be quite in the forefront digitally compared to other physical bookstores. Company C described a similar condition, on one hand a highly digital business environment competing on several online booking platforms, on the other hand, international markets with low degree of digitalization, which required the company to be able to offer their digitally transformed processes manually. Company D and E painted a picture of digital technologies being industry standard used by all in order to do business.

Customers were perceived, in general, to be digitally mature. Customer behaviour and expectations acted at times as drivers for change and new digital initiatives. This was understood to be necessary but not always enjoyed. The CEO of company F: *"There are many customers coming to the store with their mobile phones showing a book and asking if we have it. People are very well-informed."; "If we do not have a book in store we ask the customer if they want us to order it for them. Some respond that they just as well could order it themselves online from another store. But when we tell them that we offer a twenty percent discount on ordered books then nine out of ten want the book…this is something we are a little proud of."* Company B spoke of customers expecting them to change the way they did business from physical interactions to B2B exchanges: *"I'm not really happy about this if I am to be honest. You don't get the chance to have a personal contact and prove that you are better and more than numbers and boxes. It is boring."* Company A, E and C all described, in various ways, how they were pressured by customers to have a certain level of digital transformation in order to be able to do business and to satisfy customers.

4.2   Internal Digital Transformation

Each SME had their unique organisational culture in which digital transformation took place. Two companies displayed an interesting contrast: Company E described themselves as a company with a low degree of digital maturity amongst employees, hesitating to take digital initiatives, prone to be reactive rather than pro-active to changes and demands. Company B on the other hand described themselves as a company with employees actively suggesting digital initiatives, managers curious and interested to try out new technologies, a willingness to change and to improve. There were characteristics that SMEs spoke of as favourable related to digital transformation, such as: a family-like culture where

everyone helped each other; a solution-oriented approach where employees were not afraid to step up and take initiatives; a willingness to change and to improve; the ability to identify more efficient and effective ways of performing tasks; curiosity and interest in new technologies. There were also characteristics that SMEs spoke of as challenging related to digital transformation: lack of management support; lack of understanding or digital competence; lack of alignment between digital and business strategies; negative or non-existing experience of digital initiatives.

SMEs tended to have a limited approach to strategies of digital initiatives and digital transformation. Company A was the only company with a formal and communicated strategy. Despite lack of formal strategies SMEs made strategic choices related to their digital transformation. Company C and F both decided to scale down digital and instead enhance non-digital, physical attributes. Company C made a strategic decision to associate themselves with attributes such as the local nature, outdoors, health and recreation rather than being perceived as a high-tech, digital resort; company F made a strategic decision to be a physical bookstore where customers could connect with authors, enjoy events and explore local artists rather than to offer all their products online and become an e-commerce, multichannel company. Company B, on the other hand, made a strategic decision to scale up digital and expand their third-party logistics service, working with drop-shipping and to develop their own e-commerce platform. As a result, they collaborated with fellow logistics companies and competitors in order to offer their customers third-party logistics services. No SME undertook a structured benefits management approach. The CIO of company A expressed lack of incentives as reasons to why they did not evaluate their digital initiatives.

SMEs acted in different ways to make sure they had access to sufficient digital competence. In general, SMEs´ combined in-house competence of more or less digitally skilled employees with outsourcing. Company A combined a full-time CIO and a full-time employee dedicated to technical support with external competence. Company B recruited their own systems and software developers in order to pursue new digital initiatives, and company F gained social media skills when company owners´ daughter moved back to join the company. Company E decided to let go of a full-time employee responsible for digital technologies and appointed the CFO to be responsibility for overseeing everything digital. The CEO of Company C described how they, as they grew,

decided to stop using a local restaurant owner who offered technical support on the side, and to instead outsource most of their needed digital competence to established companies. Company D, having groups of employees with a low degree of digital competence, devised a solution limiting the amount and character of work these groups needed to do in the digital application to a minimum - *"so that nothing could go wrong."* (Production manager company D). Even though SMEs recognized the importance of digital competence none worked intentionally to develop digital skills and competence of existing employees.

SMEs described different drivers that initiated their digital technology usage. Dominant drivers were: increasing efficiency, enhancing customer communication, improving performance measurement, responding to external pressure and changed customer demands, and integrating processes. Less dominant, but not insignificant, drivers were: acting environmentally friendly and reducing information security threats. All SMEs used a plethora of digital technologies. Some digital technologies were cross-industry technologies and used by a majority of SMEs (e.g. websites, mobile devices, social media platforms, cloud computing, enterprise systems, EDI, data analytics, online third-party platforms), some were used by only one SME (e.g. CRM-applications, company E; internet of things applications, company B; intranet, company C), and some being industry specific (e.g. laundry software solutions, company D; vehicle management applications, company B; golf course watering systems, company E). SMEs main investment approach was to purchase standard applications and then pay for some level of individual configuration. However, company A and C both developed custom-made applications with support from external competence, and company F collaborated with other physical bookstores on a national level in order to develop needed technical solutions.

4.3   Creating and Capturing Business Value

Perceived benefits and value of internal performance mainly related to: (1) increased efficiency; (2) doing things better. Company D spoke of their digital applications supporting capacity growth as they expanded their physical production location: *"The system has no limits so it has nothing to do with it, it is all about how much capacity we (physically) could manage."* (Production manager, company D). Company B described how they were able to grow without having to recruit due to their enterprise system usage and digital procurement and invoice processes.

Company A spoke of value in terms of reducing the number of employees but still be able to maintain a high level of capacity. SMEs described benefits and value in terms of being able to do things better. Company C could access the same product data and price information throughout all locations due to integrated information systems, reducing data redundancy. The CEO of company B was able to do his job better as he had access to information no matter his geographical location. Company A spoke of several benefits such as better logistics, increased control of shipments, increased inventory control and improved decision making. Company D and E both perceived an increased ability to measure performances.

Three categories of perceived external value emerged. Category one: increased competitive advantage and market position. Company A pointed out the integration and alignment of digital technologies, people and business processes as the main reason for their advantage: *"Yes, I can see that the way we work, because there are many sawmills that have the same digital applications as we have. But the way we work and use (the digital application) enables us to follow a package all the way from production which I feel provides a competitive advantage - as we have made that change, which I do not think the others have done yet, even if they have the opportunity to do so."* (CIO company A). Company B pointed out the digital communication between their trucks and the head office as a source of competitive advantage. Company C spoke of digital initiatives as a hygiene factor and how it enabled competitive parity. Category two: increased customer value. Company F perceived online communication channels as strong customer value creators. The CEO described how working with newsletters and email lists created tangible benefits in terms of increased sales, and intangible benefits in terms of increased customer satisfaction, engagement and commitment. Company E described increased customer value as digital technologies enabled them to provide higher information quality. Category three: new products/services. Company B gained new customers, new business opportunities and increased revenues as a result of participating on online exchange platforms. Company C perceived increased bookings with 23% due to online booking platform participation and a new branding approach. Company A described how digital applications enabled relationships and transactions with international customers. Company B described how developing new digital products and services made it possible to: enter a new market, reach new customers, provide a new range of services to existing customers, and gain new revenues.

5 Discussion and Conclusions

Overall, the results painted a picture of the nature of SME digital transformation as a complex, dynamic, and on-going phenomenon (figure 1). Digital transformation does not follow a set of pre-determined steps for all SMEs to follow, instead participating SMEs had to find their own way of combining digital technologies, people and processes. As stated by previous research, digital transformation requires companies to alter traditional ways, redefine competencies, processes and relationships with business partners as well as customers (Lucas Jr et al., 2013). This held true in all studied companies and indicates the presence of a deep structure change where SMEs have to re-think business models and key processes. Most SMEs spoke of change as continuous and rather slow in contrast to a discontinuous, fast change (Besson & Rowe, 2012). Most SMEs displayed a low resistance to change, which acted as an enabler (Zach et al., 2014). When employees displayed resistance towards change initiated by digital initiatives, managers tended to find a solution and follow through with intended digital initiatives.

The results indicate that SMEs need to manage the impact of their external digital environment at the same time as they manage internal digital transformation in order to create and capture potential digital business value. In doing so SMEs tend to have two sets of drivers: (1) external drivers of strategic benefits to (a) increase reach and richness of offered value proposition and (b) adapt to customer and competitor pressure; (2) internal drivers of operational/management benefits to (a) increase capacity and (b) do things better.
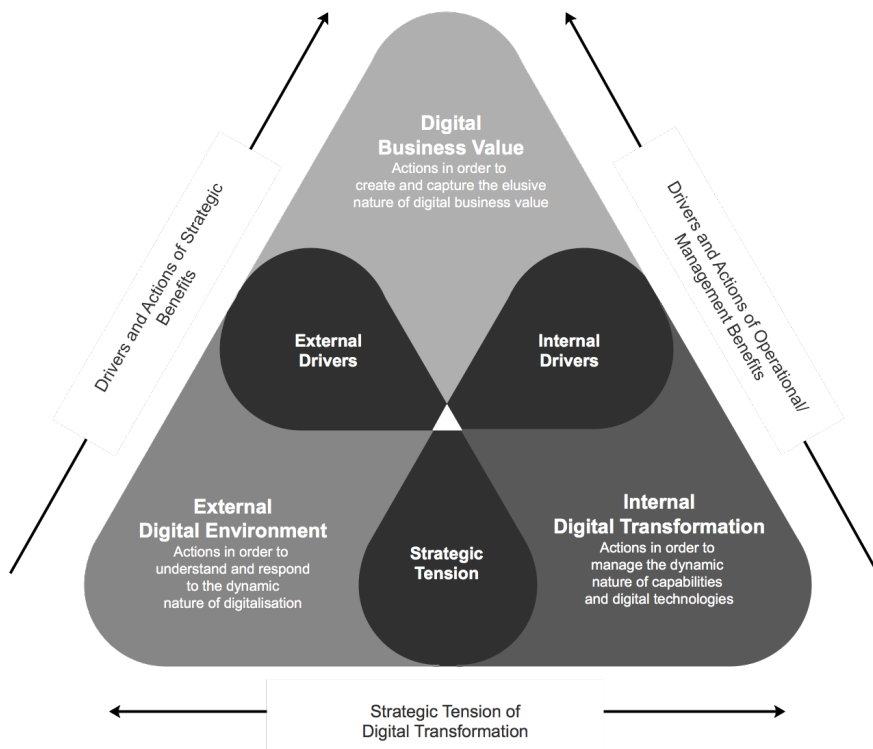
Figure 1: The nature and complexity of SME digital transformation, the SMEdit-framework.

Actions of digital transformation follow three categories: (1) actions of understanding and responding to the dynamic nature of digitalization (e.g., collaborating with other companies in order to promote change, applying for external government funding in order to conduct digital initiatives, adapting to digital technologies suggested by customers); (2) actions of managing the dynamic nature of capabilities and digital technologies (e.g., recruiting digitally skilled employees, re-structure work to suit employee levels of digital competence, develop, configure and adapt digital technologies); (3) actions of creating and capturing the elusive nature of digital business value (integrating digital technologies, people and company processes). Results indicate that SMEs need to be able to act within all three categories, sometimes simultaneously, in order to conduct their digital transformation successfully. Something that poses a challenge as most studied SMEs tended to lack clear strategies for digital initiatives and due to size related challenges (Wong & Aspinwall-Roberts, 2004).

Results further showed the presence of three strategic tensions that SMEs needed to pay attention to as they conducted their digital transformation. In practice, the first tension resembled the tension suggested by De Wit and Meyer (2010) the most: (1) balancing actions of adapting to external pressure of digitalisation versus holding on to internal capabilities and desires (e.g., turning physical store into an e-commerce business versus running in-store events and promoting physical customer interactions). The second tension is one of competencies: (2) balancing the nature and level of having in-house versus outsourcing digital competence (e.g., employing systems developers and having high degree of control versus paying external consults having less control). The third tension is one of: (3) balancing the role and level of digital versus physical in all aspects of the company (e.g., focus on being perceived as a high-tech, digital business versus focus on being perceived as a low-tech, physical nature and sports business). Identified tensions were on-going in their nature and emerged as SMEs had to make strategic choices. All tensions are understandable in light of faced challenges due to SMEs´ size (Zach et al., 2014).

In the end, a richer understanding of the complexity of SMEs digital transformation has been gained through identified drivers, categories of actions and strategic tensions. Used theoretical lens provided added support and a richer picture. Based on the results a framework SMEdit (SME digital transformation) is proposed and summed up in figure 1. The framework offers thoughts and structure for further research as well as a way for SMEs to discuss and approach the complexity of digital transformation.

The paper is not without limitations and should be understood based on its context. Interviews were made with the CEO of the company or the person responsible for its digitalisation/digital initiatives. Including a number of employees from each company could have provided added value to understanding the complexity of digital transformation.

Acknowledgments

References

Andal-Ancion, A., Cartwright, P. A., & Yip, G. S. (2003). The digital transformatior of traditional businesses. MIT Sloan Management Review, 44(4), 34.

Baker, J. (2012). The Technology–Organization–Environment Framework. In Y. K. Dwivedi, M. R. Wade, & S. L. Schneberger (Eds.), Information Systems Theory, Explaining and Predicting Our Digital Society, Vol.1 (Vol. 28, pp. 231-245). New York: Springer.

Berman, S. J. (2012). Digital transformation: opportunities to create new business models. Strategy & Leadership, 40(2), 16-24. doi:10.1108/10878571211209314

Besson, P., & Rowe, F. (2012). Strategizing information systems-enabled organizational transformation: A transdisciplinary review and new directions. Journal of Strategic Information Systems, 21(2), 103-124. doi:10.1016/j.jsis.2012.05.001

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy, toward a next generation of insights. MIS Quarterly, 37(2), 471-482.

Cameron, K., & Quinn, R. E. (2011). Diagnosing and changing organizational culture based on competing values framework (3 ed.). San Francisco: Jossey-Bass/Wiley.

Carr, N. G. (2003). IT Doesn't Matter. Harvard Business Review, 81(5), 41-49.

Choo, C. W. (2013). Information culture and organizational effectiveness. International Journal of Information Management, 33(5), 775-779. doi:https://doi.org/10.1016/j.ijinfomgt.2013.05.009

Cragg, P., Mills, A., & Suraweera, T. (2013). The Influence of IT Management Sophistication and IT Support on IT Success in Small and Medium-Sized Enterprises.(information technology)(Report)(Author abstract). Journal of Small Business Management, 51(4), 617. doi:10.1111/jsbm.12001

Creswell, J. (2007). Qualitative Inquiry and Research design, choosing among five traditions (2 ed.). Thousand oaks: Sage Publications.

De Wit, B., & Meyer, R. (2010). Strategy - process, content, context. Andover, UK: Cengage Learning EMEA.

Dehning, B., Richardson, V. J., & Zmud, R. W. (2003). The value relevance of announcements of transformational information technology investments. MIS Quarterly, 27(4), 637-656. doi:10.2307/30036551

Farbey, B., Land, F., & Targett, D. (1999). The moving staircase: Problems of appraisal and evaluation in a turbulent environment. Information Technology & People, 12(3), 238-252.

Fortune, N. (2018). Review and Comparison of Conceptual Frameworks on Digital Business Transformation. Journal of Competitiveness, 10(3), 86-100. doi:10.7441/joc.2018.03.06

Ghobadian, A., & Gallear, D. (1997). TQM and organization size. International Journal of Operations, 17(2), 121-163.

Gibbs, J. L., & Kraemer, K. L. (2004). A Cross-Country Investigation of the

Determinants of Scope of E-commerce Use: An Institutional Approach. Electronic Markets, 14(2), 124-137. doi:10.1080/10196780410001675077

Heavin, C., & Power, D. J. (2018). Challenges for digital transformation – towards a conceptual decision support guide for managers. Journal of Decision Systems, 27, 38-45. doi:10.1080/12460125.2018.1468697

Hess, T., Matt, C., Benlian, A., & Wiesböck, F. (2016). Options for formulating a digital transformation strategy. MIS Quarterly Executive, 15(2), 103-119.

Ifinedo, P. (2011). An empirical analysis of factors influencing internet/e-business technologies adoption by smes in canada. International Journal of Information Technology & Decision Making, 10(4), 731-766.

Jeansson, J. (2014). Information Systems Valuescape. International Journal of Business Information Systems, 17(1), 49-66.

Johnston, D., Wade, M., & McClean, R. (2007). Does e-Business matter to SMEs? A comparison of the financial impacts of internet business solutions on European and North American SMEs. Journal of Small Business Management, 45(3), 354-361.

Leidner, D. E., & Kayworth, T. (2006). Review: A review of culture in information systems research: Toward a theory of information technology culture conflict. MIS Quarterly, 30(2), 357-399.

Levy, M., Powell, P., & Yetton, P. (2001). SMEs: aligning IS and the strategic context. Journal of Information Technology, 16(3).

Li, L., Su, F., Zhang, W., & Mao, J. Y. (2018). Digital transformation by SME entrepreneurs: A capability perspective. Information Systems Journal, 28(6), 1129-1157. doi:10.1111/isj.12153

Lofland, J., Snow, D., Anderson, L., & Lofland, L. H. (2006). Analysing social settings. Belmont: Wadsworth, Cengage Learning.

Lucas Jr, H. C., Agarwal, R., Clemons, E. K., El Sawy, O. A., & Weber, B. (2013). Impactful research on transformational information technology: An opportunity to inform new audiences. MIS Quarterly, 37(2), 371-382.

Markus, M. L., & Benjamin, R. I. (1997). The Magic Bullet Theory in IT-Enabled Transformation. Sloan Management Review, 38(2), 55-68.

Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Review: Information technology and organizational performance: An integrative model of it business value. MIS Quarterly, 28(2), 283-322.

Merriam, B. S. (2009). Qualitative Research, a guide to design and implementation. San Francisco: Jossey-Bass.

Middleton, P., & Harper, K. (2004). Organizational alignment: a precondition for information systems success? Journal of Change Management, 4(4), 327-338. doi:10.1080/1469701042000303820

Miles, M., & Huberman, M. (1994). Qualitative Data Analysis: An Expanded Sourcebook. (2 ed.). Thousand Oaks: Sage publications.

Muller, P., Mattes, A., Klitou, D., Lonkeu, O.-K., Ramada, P., Ruiz, F. A., . . . Steigertahl, L. (2018). Annual Report on European SMEs 2017/2018: SMEs growing beyond borders. Retrieved from European Commission:

Oliveira, T., & Martins, M. F. (2011). Literature Review of Information Technology Adoption Models at Firm Level. The Electronic Journal Information Systems Evaluation, 14(1), 110-121.

Orlikowski, W., J. (1992). The Duality of Technology: Rethinking the Concept of

Technology in Organizations. Organization Science, 3(3), 398-427.

Patton, M. Q. (1990). Qualitative evaluation and research methods. Beverly Hills, CA: SAGE.

Peppard, J., Lambert, R., & Edwards, C. (2000). Whose job is it anyway?: organizational information competencies for value creation. Information Systems Journal, 10(4), 291-323.

Peppard, J., & Ward, J. (2016). The strategic management of information systems, building a digital strategy (4 ed.). Chichester, United Kingdom: Wiley.

Porter Michael, E. (1985). Competitive Advantage (First Free Press Export edition ed.). New York: Free Press.

Porter Michael, E. (2001). Strategy and the Internet. Harvard Business Review, 79(3), 62-78.

Prahalad, C. K., & Hamel, G. (1990). The Core Competence of the Corporation. Harvard Business Review, 68(3), 79-91.

Reed, T. (2014). Digitized lives; culture, power and social change in the Internet era. New York, USA: Routledge.

Renkema, T. J. W. (2000). The IT value quest. Chichester: John Wiley & Sons.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. Strategic Management Journal, 18(7), 509.

Tilson, D., Lyytinen, K., & Sørensen, C. (2010). Research commentary-digital infrastructures: the missing IS research agenda. . Information Systems Research, 4(21), 748-759.

Wade, M. (2015). Digital Business Transformation: A Conceptual Framework. Retrieved from http://www.imd.org/dbt/insights/digital-transformation-insights/?mrk_cmpg_source=test:

Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. INTERNATIONAL JOURNAL OF MANAGEMENT REVIEWS, 9(1), 31-51. doi:10.1111/j.1468-2370.2007.00201.x

Ward, J., & Daniel, E. (2006). Benefits Management: Delivering Value from IS & IT Investments, . Chichester: John Wiley & Sons.

Welsh, J. A., & White, J. F. (1981). A small business is not a little big business. Harvard Business Review, 59, 18.

Wilson, H., Daniel, E., & Davies, I. A. (2008). The diffusion of e-commerce in UK SMEs. Journal of Marketing Management, 24(5-6), 489-516.

Wong, K. Y., & Aspinwall-Roberts, E. (2004). Characterizing knowledge management in the small business environment. Journal of knowledge management, 8(3), 44-61.

Yin, K. R. (2003). Case Study Research, design and methods (3 ed.). Thousand Oaks: SAGE publications.

Zach, O., Munkvold, B. E., & Olsen, D. H. (2014). ERP system implementation in SMEs: exploring the influences of the SME context. Enterprise Information Systems, 8(2), 309-335.