Strategizing for Successful IT Projects in the Digital Era

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ABSTRACT

The objective of this paper is to increase our understanding of how organizations strategize with a view to making their digital investments successful and the impact such digital strategies actually have on business outcomes. We examined 2940 papers related to digital business strategies, of which 31 were included in relevant empirical research. These papers were reviewed and subjected to thematic synthesis. Many organizations appear to initiate scattered digital initiatives without a clear idea of where they are going. Companies can benefit from a deliberate digital strategy that enhances the ability of businesses to quickly adjust to new trends, possibilities, and threats, as well as a constant balancing of new possibilities with the exploitation of current assets.

Keywords

IT project, digital business strategy, digital transformation strategy, digital strategy.

INTRODUCTION

Organizations find themselves in the midst of rapid digital change, and traditional companies face challenging competition from new entrants as well as stiff competition from other established companies. In this paper we will investigate how organizations strategize with a view to making their digital investments successful, realizing organizations have been striving to improve return on IT investments ever since the early days of computing, as exemplified by the term *software crisis*, which was coined by attendees at the NATO Software Engineering Conference in 1968 (Dijkstra, 1972). Researchers have studied why transformations enabled by software projects are so difficult to achieve (e.g., Karvonen et al., 2018) and why software projects fail (e.g., Flyvbjerg and Budzier, 2011; Holgeid and Thompson, 2013). Both researchers and practitioners have been seeking to address this issue from several angles: for example, from a software economics point of view (Boehm, 1984), Value-Based Software Engineering (Boehm, 2003), and management practices such as benefits management (Ababneh et al., 2017; Ward et al., 2007).

Strategy is defined as "*[a] plan of action designed to achieve a long-term or overall aim*" (Oxford Dictionary). Researchers have suggested that the digital era, characterized by rapid change in technological possibilities, might call for a different approach to strategy (Bharadwaj et al., 2013; Kahre et al., 2017). Academic research into digital strategies has been reported to be lagging behind practice (Holotiuk and Beimborn, 2017), which makes it particularly interesting to investigate what empirical knowledge we currently have on digital strategies. Motivated by a wish to improve the return from digital initiatives, we set out to investigate the following research questions from an empirical point of view:

RQ1: How do organizations scope and structure digital strategies?

RQ2: How do organizations form and implement their digital strategies?

RQ3: How effective are digital strategies in leading to business outcomes?

A prior literature review of digital strategies uncovered scarce relevant empirical research up until 2015 (Kahre et al., 2017). Kahre et al. encourage researchers to conduct more empirical studies on digital strategies, and we observe an increase in such empirical studies after 2015. Given the rapid development of research and practice in relation to digital strategies, we focus this paper on empirical studies after the period reported by Kahre et al. (i.e., 2016-2018).

BACKGROUND

To improve the return on IT investments, several studies have addressed misalignment between business and IT initiatives, including Noce and Carvalho (2011), who suggest a business and technology integrated model, and Pombinho et al. (2012), who propose a value-oriented approach to business-IT alignment. IT-business alignment has been a focal point of IT strategy for many years. IT strategy can be seen as a functional-level strategy that needs to be in alignment with the firm's overarching business strategy (Bharadwaj et al., 2013). In contrast, Bharadwaj et al. argue that as the business infrastructure has become digital with increased integration among products, processes, and services, digital technologies are fundamentally transforming business strategies. Therefore, the authors suggest that rather than viewing IT strategy as a functional strategy subordinate to the business strategy, there is a need to merge the two into a Digital Business Strategy (DBS) defined as an "*organizational strategy formulated and executed by leveraging digital resources to create differential value*" (Bharadwaj et al., 2013, p. 472). We use the term *digital strategy* as a synonym for both *digital business strategy* and *digital transformation strategy*.

Matt et al. (2014) suggest that to achieve the intended effects from digital strategies, four different dimensions need to be aligned: (1) the use of technologies (a firm can decide to be a market leader in technology usage or rather view technologies as a means to support business operation); (2) changes in value creation (i.e., the impact of digital strategies on firms' value chains); (3) structural changes (changes in firms' organizational setup such as the placement of new digital activities); and (4) financial aspects (such as urgency to act due to diminishing core business as well as ability to finance a digital initiative).

Additional layers of complexity associated with digital strategies emerge when we investigate how the digital era brings opportunities to innovate, collaborate, and compete in new ways. One example is the phenomenon of industry platforms: "building blocks" of products, technologies, and services that form a base on which several firms and individuals can create complementary offerings (Ceccagnoli et al., 2012; Eaton et al., 2015; Gawer, 2011). Mandrella et al. (2016) argue that after two decades of IT value research, there is a fundamental change taking place in business value creation as multiple organizations collectively leverage IT in the context of interorganizational collaboration. Accordingly, value creation can be seen as shifting outside the direct control of a single organization/IT function/IT project and towards the collation of diverse ecosystems of value chain partners, often involving leveraging/reuse of existing assets where possible.

Kane et al. (2015) found that less digitally mature organizations lacked a clear and coherent digital strategy, in contrast to their more digitally mature counterparts. The less mature tended to focus on individual technologies and operationally focused strategies, while the mature took a more holistic approach in their digital strategies that was aimed at transforming the business. Kane et al. (2015) further suggest that the mature organizations typically build skills to realize their digital strategy, and attract talent more easily.

In sum, it is evident that digital strategies have moved a long way from simply realizing value from IT investments, and are now inextricably linked to the future of the business and operating model of the organization itself.

RESEARCH METHOD

Kitchenham (2007) and Brereton et al. (2007) prescribe three phases that can help guide systematic literature reviews (plan review, conduct review and document review). Brereton et al. (2007, p. 572) present the following steps to be followed within each of the phases: plan review (specify research questions, develop review protocol, validate review protocol), conduct review (identify relevant research, select primary studies, assess study quality, extract required data, synthesize results), document review (write review report, validate report). Our review was inspired by the three mentioned phases.

Review Protocol

We included primary peer-reviewed empirical studies from 2016, 2017, and 2018. We excluded books and gray literature (such as discussion papers, technical reports, academic statements, lecture notes, and presentations) and contributions that lacked relevance. Relevance is considered in relation to our research questions. No papers were excluded due to rigor, but we extracted information related to rigor such as number of respondents (see Table 2).

Literature Review Search String and Search Stages

We established the following search string after an exploratory review of the literature. As we are specifically interested in the phenomenon of digital strategy with reference to Bharadwaj et al. (2013), the focal point of the search string is simply "digital strategy" or "digital business strategy." For clarity, the traditional IT business alignment school of thought is not a particular focus in our study. Associated potential search words such as "IT business alignment" are therefore not included in the search string: ("digital strategy" OR "digital business strategy") AND ("empirical" OR "case study" OR "survey" OR "action research" OR "interview" OR "delphi research" OR "document study") [studies written in English, published after 2015]. We used Google Scholar (GS) as our search engine. This comes with strengths and weaknesses (see, for example, Halevi et al. (2017)). Gehanno et al. (2013) support GS for use in systematic reviews: The researchers found 100% coverage in GS of the papers included in 29 prior systematic reviews.

We filtered the search results through a four-stage process while applying the review protocol (see Table 1). We also undertook snowballing (exploratory, not systematic), which did not result in additional studies being included in our review but helped uncover some valuable papers referenced as part of the introduction and background sections.

Stage 1	Identify potentially relevant papers (Google Scholar search May 2018) - Exclude papers not matching search string	n = 2940
Stage 2	Review titles and casual abstract review - Exclude papers according to protocol	n = 220
Stage 3	Review abstract - Exclude papers according to protocol	n = 38
Stage 4	Assess full papers - Exclude papers according to protocol	n = 31

Table 1: Research Contribution Filtering Process

Quality Assessment

Quality considerations of the reviewed literature are included as part of the results section, with a focus on relevance by presenting information such as study method and context. None of the papers considered were rejected purely based on a lack of rigor.

Synthesis of Results

When reviewing the selected papers, we extracted data in an iterative manner, with a particular focus on the following items: context, type of publication (journal/conference paper), research method; and where relevant and available: number of respondents, place of study (country), time of study (year), and quantitative and qualitative empirical data relevant for our research questions (RQ1-3). The results are structured based on themes emerging from the literature review, inspired by the method of thematic synthesis of the results, which is claimed to be one of the predominant methods for synthesizing systematic review data (Huang et al., 2018). The themes emerged through an iterative process assessing the Stage 4-papers. Appendix A presents the selected papers and corresponding main themes and aspects used during the iterative review process.

RESULTS

In this section, we present the results from our review of the identified papers as they pertain to our research questions. The 31 studies included in this literature review are listed in Table 2, with 26 being categorized as case studies, four as surveys, and one as a document review. The studies were reported in 13 journal papers and 18 conference papers (Table 3 and Table 4). The themes emerging from our literature reviews are summarized in Table 4.

Publication	Source[a]	Study type[b]	Context
(Becker et al., 2018)	C	CS	Analysis of what role the Chief Digital Officer (CDO) plays in digital transformations, based on several case studies
(Berghaus and Back, 2017)	C	CS	Analysis of qualitative data from 11 organizations with ongoing digital transformations, uncovering patterns of typical activities at the beginning of digital transformation
(Bughin and van Zeebroeck, 2017)	J	S	Survey on aspects of digitalization with responses from 2,000 traditional companies in more than 60 countries
(Carcary et al., 2017)	C	S	Survey of 152 business and IT leaders, investigating extent of digitalization, barriers and drivers
(Chanias and Hess, 2016)	C	CS	A multiple-case study at three European car manufacturers investigating what processes and strategizing activities affect the formation of digital transformation strategies
(Chanias, 2017)	C	CS	Case study of the formation of a digital transformation strategy at a financial services provider
(Duerr et al., 2018)	C	CS	Analysis of data from 11 cases across a number of industries to identify aspects of digitalizing organizations' organizational cultures
(El Sawy et al., 2016)	J	CS	Case study of a decade-long digitalization journey of the LEGO Group, focusing on enhancing enterprise capabilities for the strategic success of digitalization
(Gimpel et al., 2018)	J	CS	A framework for structuring digital transformations based on exploratory interviews in 50 organizations, applied to an organization (ZEISS)
(Haffke et al., 2017)	C	CS	Field study, analyzing data from 19 European companies, investigating the role of bimodal IT in the digital business era
(Hess et al., 2016)	J	CS	Case study of three German media companies successful in approaching digital transformations
(Holotiuk and Beimborn, 2017)	C	D	Review of 21 industry reports resulting in success factors for digital business strategies
(Horlach et al., 2017)	C	CS	Interviews of practitioners to understand different types of bimodal IT
(Horlacher and Hess, 2016)	C	CS	Case study across several industries to assess the role of the CDO
(Horlacher et al., 2016)	C	CS	Multiple-case study analysis of CDO's role in the organization
(Islam et al., 2017)	C	CS	Interviews with 35 experts to investigate the collaboration between start-ups and incumbent firms in the context of digitalization
(Kane et al., 2017)	J	S	Survey of more than 3,500 business practitioners around the world, investigating aspects of digital maturity
(Leischnig et al., 2016)	C	S	Survey of practitioners (121 responses) investigating when digital strategy matters to market performance
(Leischnig et al., 2017)	J	CS	This paper explains how a firm's digital strategy transforms into market performance, analyzing data from 161 firms from different industries
(Luger et al., 2018)	J	CS	Longitudinal data set of companies from the global insurance industry (1999-2014) to test hypotheses related to exploration and exploitation
(Niemand et al., 2017)	C	CS	A study of banks in Germany, Switzerland, and Liechtenstein investigating how banks can use the tactics and strategies associated with entrepreneurial orientation to achieve performance in the digital era
(Parviainen et al., 2017)	J	CS	Case study analysis resulting in a four-step model to systematically approach digital transformations
(Planing and Pfoertsch, 2016)	C	CS	Analysis of strategic options for large firms towards digitalization through investigation of 40 case studies
(Ross et al., 2016)	C	CS	Interviews with senior executives at 27 companies in different industries to explore the strategies and organizational initiatives related to digital technologies
(Schreieck and Wiesche, 2017)	C	CS	Investigating value co-creation through exploratory field study of a European bank introducing an IT platform
(Sebastian et al., 2017)	J	CS	Study of digital strategies by analyzing data from 25 companies embarking on digital transformation journeys
(Sia et al., 2016)	J	CS	Case study of how a large Asian bank responded to digital threats and opportunities by adopting a digital strategy
(Svahn et al., 2017)	J	CS	A longitudinal case study of Volvo to investigate how incumbent companies can address competing concerns when embracing digital innovation
(Tumbas et al., 2017)	J	CS	Interviews with 35 CDOs from various sectors, investigating different types of CDOs
(Tumbas et al., 2018)	J	CS	35 exploratory interviews with CDOs in a variety of industries, to see how they make sense of their roles and how the roles are integrated into the existing organization
(Weill and Woerner, 2018)	J	CS	Case study of four banks that have taken different pathways to digital transformation

[a]J=Journal; C=Conference, [b]CS=Case Study; S=Survey; D=Document Analysis

Table 2: Papers Included in this Literature Review

Journal	#
Journal of Information Technology	1
Organization Science	1
Journal of Information Technology Theory and Application	1
International Journal of Information Systems and Project Management	1
MIS Quarterly	6
MIT Sloan Management Review	3

Table 3: Number of Papers per Journal

Conference	#
Hawaii International Conference on System Sciences	5
European Conference on Information Systems (ECIS)	3
International Conference on Wirtschaftsinformatik	2
International Conference on Information Systems (ICIS)	4
Americas Conference on Information Systems	1
Allied Academies Summer Internet Conference	1
European Conference on Information Systems Management	1
Pacific Asia Conference on Information Systems (PACIS)	1

Table 4: Number of Papers per Conference

RQ1	**A. Scoping and structuring digital strategies** - Key dimensions to help companies strategize - Value co-creation - Scoping and structuring digital transformation initiatives
RQ2	**B. Forming digital strategies** - Approaches to initiating digital transformations - The tendency of bottom-up strategy formation - A structured approach to strategy formation
	C. Implementation of digital strategies - Potential pitfalls and critical success factors - Barriers, competing concerns, and lessons learned - Bimodality
	D. Supporting organizational culture and constructs - Facets of culture in digitalizing organizations - Emerging organizational construct
RQ2	**E. Effectiveness of digital business strategies** - Organizational and environmental factors - Strategic responses to digitalization of industries

Table 5: Themes Emerging from the Literature Review

Scoping and Structuring Digital Strategies (RQ1)

Key dimensions to help companies strategize

Different models have emerged to help companies strategize, with an emphasis on different dimensions: for example, Sebastian et al. (2017) and Ross et al. (2016) use customer engagement and digitalized solutions as key dimensions; Planing and Pfoertsch (2016) use digitalization of products and digitalization of business models; Weill and Woerner (2018) use customer experience and operational excellence; and Luger et al. (2018) look into balancing exploration and exploitation. Proper balancing can be rewarding and Luger et al. (2018) suggest that balancing is concerned with: "*[..] combining capability-building processes (to balance exploration and exploitation) with capability-shifting processes (to adapt the exploration-exploitation balance)*" (Luger et al., 2018).

Value co-creation

Inter-firm value co-creation can be a pathway towards digital business transformation. Islam et al. (2017) found that incumbent firms and start-ups complemented each other as, for example, large incumbent firms might have low innovative performance due to inertia and also several inhibiting factors in terms of adopting digital technologies. Further, start-ups might need the incumbent firms to expand their digital innovation efforts. Schreieck and Wiesche (2017) suggest that established companies can benefit from such approaches, but need to balance openness with control. While openness and collaboration enable value co-creation, they also create areas of conflicts and potential benefits: for example, openness exposes technology and can create internal resistance, while also facilitating internal transparency and standardization.

Scoping and structuring digital transformation initiatives

Parviainen et al. (2017) propose a model to help companies systematically approach digitalization, comprising four main iterative steps: (1) defining a company's position with respect to digitalization and the goals the company wants to achieve (e.g., using digital means to improve internal efficiency, chasing new external business opportunities in existing business domains, or aiming to cause disruptive change); (2) defining the work needed to reach the goals based on the gap between the goals and the current state; (3) systematically planning a roadmap for success; (4) implementing the roadmap. Organizations typically lack knowledge of how to scope digital transformation initiatives and might benefit from a framework to help scope and structure related transformation initiatives (Gimpel et al., 2018, p. 38).

Forming Digital Strategies (RQ2)

Approaches to initiating digital transformations

Berghaus and Back (2017) revealed five main approaches to initiating digital transformation initiatives: (1) the centralized approach, where companies take a holistic view on digital transformations and start by crafting a digital strategy typically by analyzing as-is, identifying gaps, and creating a roadmap; (2) the bottom-up approach, where digital strategies start with several pioneering initiatives in the business units, which might require leadership to consider alignment of the initiatives in a more holistic and synchronized program; (3) the IT-centered approach, where a digital transformation is initiated as a technology-driven initiative, e.g., by building a digital infrastructure; (4) the innovation-centered approach, adopted by companies wanting to be an innovation leader in their industry; this is contrasted with the approaches of most other companies, which instead monitor trends and innovations and are ready to implement them when/if they are proven successful and feasible; (5) finally, the channel-centered approach is focused on improving digital channels. Berghaus and Back propose that managers typically decide intuitively which of the five approaches to take based their situational context. We refer to Berghaus and Back (2017, p. 10) for presentation of the five approaches to digital strategies, including references to case examples.

The tendency of bottom-up strategy formation

Chanias and Hess (2016) found that digital strategies are typically shaped through a bottom-up process taking place in separate organizational subcommunities before top management initiate a more holistic digital strategy. Chanias (2017) observed similar tendencies in his case study of financial service providers: First various organizational units created their own initiatives and digital strategies before a more holistic digital strategy was formed.

A structured approach to strategy formation

Hess et al. (2016) argue that managers often lack clarity of what they need to consider in their digital transformation efforts, and that the most important thing for managers in their formulation of digital strategies is knowing what questions to ask. The authors propose that such complexity should be met with a structured approach to strategy formulation and they uncovered 11 strategic questions and potential answers (such as "*how will you create revenue from future business operations?*"), grouped by the dimensions suggested by Matt et al. (2014) and potential answers to help guide the formulation of digital strategies. We refer to Hess et al. for presentation of the questions.

Implementing Digital Strategies (RQ2)

Potential pitfalls and critical success factors

Kane et al. (2017) found that creating an effective digital strategy linked to the overall business objectives is one of the major challenges companies need to overcome to become more digitally mature. A similar finding was reported in Kane et al. (2015). Interestingly, Kane et al. (2017) found that digitally mature organizations consistently take a longer-term view as they strategize than the less mature. This is also supported by Holotiuk and Beimborn (2017), who analyzed

industry reports and distilled 40 critical success factors for digital strategies, one of them being "*Long-term orientation, but short, intense sprints to change*."

Kane et al. (2017) found that the top three biggest mistakes managers make with respect to digital is that they lack understanding of digital trends and the impact on the company, and have a lack of strategic direction and a resistance to change. The top three actions organizations needed to perform differently to progress towards digital maturity were to improve digital strategy and innovation, develop a stronger talent model (recruiting, managing, and developing talent), and better develop digital capabilities such as cloud and analytics.

Barriers, competing concerns, and lessons learned

In implementing digital strategies, organizations need to overcome certain barriers. Carcary et al. (2017) found that the top five barriers were "*cultural issues*," "*siloed implementation in business units*," "*competing priorities*," "*insufficient funding*," and "*skills shortages and difficulty in finding digital talent*." When implementing digital strategies, Svahn et al. (2017) suggest that organizations need to manage competing concerns related to digital innovation. Svahn et al. report a longitudinal case study of Volvo Cars' connected car initiative, and suggest that incumbent firms embracing digital face four competing concerns that should be continuously managed by balancing new opportunities and established practice: (1) capability (existing versus requisite innovation capability): for example, Volvo established an "innovation hub" to cross-fertilize an organization organized for division of labor; (2) innovation focus (product versus process): for example, Volvo reinforce continuous evolution of products while current practices are focused on new product attributes; (3) innovation collaboration (internal versus external): for example, Volvo engages in external collaboration to access new revenue streams while at the same time maintaining existing value chains; and (4) innovation governance (control versus flexibility): for example, Volvo seeks to balance incentives for stimulating value co-creation with external partners and formal contracts for validation of requirements and cost control.

Rather than having a holistic strategy, Sia et al. (2016) propose that most organizations respond to digital threats and opportunities in an ad hoc manner within some of the organizational functions (siloed implementation in business units has been found to be one of the top barriers impeding digitalization according to Carcary et al. (2017)). Sia et al. provide several lessons learned from a case study of a bank pursuing a digital strategy, including the importance for organizations of continuously navigating an emergent digital landscape to assess digital disruption and potential responses. This is supported by Kane et al. (2017) as digitally maturing companies are continuous and ongoing in the process of adapting to a changing digital landscape.

Bimodality

The ability to balance exploration and exploitation was studied empirically by Luger et al. (2018), who found evidence that maintaining a high level of such balancing was positively associated with long-term firm performance in a period of incremental change, while it was negatively related in a period of discontinuous change.

To support rapid innovations in the digital era, researchers and practitioners have suggested a two-speed approach to digital strategies when considering digital transformations in traditional organizations. This is often presented as "*two-speed IT*" or "*bimodal IT*" defined as "*the practice of managing two separate, coherent modes of IT delivery, one focused on stability and the other on agility. Mode 1 is traditional and sequential, emphasizing safety and accuracy. Mode 2 is exploratory and nonlinear, emphasizing agility and speed*" (Horlach et al., 2017 referencing Gartner, 2015). Traditional organizations typically have legacy applications that might be subject to Mode 1, and an ambition to leverage new digital possibilities that might call for a more exploratory approach (Mode 2). Organizations typically run into a dilemma: how to continuously balance the need to exploit the legacy systems that serve core business processes today while also exploring digital possibilities for achieving competitive advantage tomorrow. As an example of bimodal IT we refer to a case study of the LEGO Group (El Sawy et al., 2016). In relation to bimodal IT, Sebastian et al. (2017) suggest two essential technology-enabled assets (operational backbone and a digital services platform) for implementing a digital strategy (see also Ross et al., 2016). We further refer to Horlach et al. (2017), who present five main types of bimodal IT, and Haffke et al. (2017), who suggest three archetypes of bimodal IT.

Organizational Culture and Constructs (RQ2)

Facets of culture in digitalizing organizations

Kane et al. (2017) found that digitally mature organizations have a distinct culture characterized by accepting risks of failure when experimenting with new initiatives, actively seek to increase agility as a response to rapidly changing markets, encourage experiments as a means to continuous organizational learning, recognize and reward collaborations across teams and divisions, and increasingly implement digital business with cross-functional teams. Both Holotiuk and Beimborn (2017) and Kane et al. (2017) highlight critical success factors such as the importance of culture, fostering a

digital mindset, and acceptance of failure. Kane et al. (2017) propose that "*[l]eaders can't just command that the organization become more digital. They need to build a supportive culture that embraces collaboration, risk taking, and experimentation*" (p. 16). We refer to Duerr et al. (2018) for further aspects of organizational culture and digitalization.

Emerging organizational construct

We found several empirical studies investigating the role of the relatively new organizational construct of the role of the Chief Digital Officer (CDO), which is adopted to support the progress of digital transformations (see, for example, Becker et al. (2018); Horlacher and Hess (2016)). Tumbas et al. (2017) identified different types of CDOs, Tumbas et al. (2018) looked at how CDOs can manage tension between existing and new ways to innovation, and Horlacher et al. (2016) report different organizational governance architectures for the CDO.

Effectiveness of Digital Business Strategies (RQ3)

Organizational and environmental factors

Leischnig et al. (2016) found that the impact of digital strategy on market performance seemed to be contingent on organizational factors (two dimensions of the chosen market approach: customer focus and offer focus) and environmental factors (heterogeneity of the customer base and technological turbulence). For example, digital strategies helped firms outperform competitors and achieve superior market performance when they were primarily serving consumer markets (not business markets), had a heterogeneous customer base, and experienced frequent technology changes; an example is online retailers. Leischnig et al. also found that digital strategy contributes to high market performance for firms experiencing a stable technological environment that serve business customers. We refer to Leischnig et al. (2017) for further observations related to digital strategy and market performance, and to Niemand et al. (2017), who found a connection between high performance and firms with an entrepreneurial orientation.

Strategic responses to digitalization of industries

Bughin and van Zeebroeck (2017) report findings from a survey with responses from 2000 traditional companies in more than 60 countries, suggesting that bold offensive strategies can be beneficial for companies facing industry digitalization. Digitalization was found to have a negative effect on incumbents' profits due to disruptive competition from new entrants and increased competition between other incumbents (e.g., by imitation). The authors suggest that companies should consider bold strategies focusing on new customer segments, rather than maintaining an exclusive focus on existing customers, as well as trying new ways of resegmenting the market to avoid a pure focus on cost cutting for increased competitiveness.

DISCUSSION

In response to our RQ1, we searched for answers on how organizations scope and structure their digital strategies, and we found no unified approach. Rather, we found empirical studies exemplifying various types of digital strategies,which placed emphasis on different dimensions such as customer engagement versus digitized solutions (Sebastian et al., 2017), digitalization of products versus business models (Planing and Pfoertsch, 2016), customer experience versus operational excellence (Weill and Woerner, 2018), and exploration versus exploitation (Luger et al., 2018). Some organizations also seek inter-firm value co-creation (Islam et al., 2017; Schreieck and Wiesche, 2017). To simplify the plethora of different approaches, researchers have recently suggested ways to systematically approach digitalization (Gimple et al., 2018; Hess et al., 2016; Parviainen et al., 2017), but we have not yet found evidence of take-up of these ideas in industry.

RQ2 focused on how organizations form and implement digital strategies. A study suggests that approaches towards digital transformation are typically decided on the basis of managers' intuition, given the situational context (Berghaus and Back, 2017). Organizations have been reported to embark on their digital journeys based on uncoordinated digital initiatives in the various departments before a more holistic strategy is formed (Chanias, 2017; Chanias and Hess, 2016). With the lack of a holistic strategy, researchers have suggested that most organizations respond to digital threats and opportunities in an ad hoc manner within some departments (Sia et al., 2016). Indeed, siloed implementations in business units have been found to be one of the top five barriers to implementing digital strategies (Carcary et al., 2017). Other pitfalls have also been reported, such as the importance of linking the digital strategy to the overall business objectives (Kane et al., 2017), and the importance of taking a long-term view even though implementation might occur in quick cycles (Holotiuk and Beimborn, 2017; Kane et al., 2017). Technology-enabled assets for bimodality have been suggested as essential in implementing digital strategies (El Sawy et al., 2016; Horlach et al., 2017 Sebastian et al.,

2017). To facilitate the formulation of digital strategy and implementation, organizational culture is of importance (Carcary et al., 2017), and digitally mature organizations have been found, for example, to have a culture characterized by acceptance of the risk of failure, and seeking to increase their agility in the face of rapidly changing markets (Duerr et al., 2018, Kane et al., 2017). To assist the formulation and implementation of digital strategies, a new role of CDO has emerged (Becker et al., 2018; Horlacher and Hess, 2016; Horlacher et al., 2016).

RQ3 deals with the effectiveness, or otherwise, of digital strategies in creating desired business outcomes. The research in this area appears sparse, but we identified some relevant contributions. Digital strategies have been found to impact a firm's market performance contingent on organizational and environmental factors. For example, digital strategies have helped firms outperform competition when they are primarily serving consumer markets with a heterogeneous customer base, and experiencing turbulent technological changes (Leischnig et al., 2016). Implementing business strategies in a business-to-business context can increase firms' vulnerability to imitation, so one must find a tradeoff between visibility and the ability to appropriate value (Grover and Kohli, 2013). Leischnig et al. (2017) found digital strategies to be positively associated with the ability to process market information, which can improve value creation by enhancing customer knowledge and capture value through improved competitor knowledge and effective pricing capabilities. Others have found positive associations between entrepreneurial orientation and firm performance in the digital era (Niemand et al., 2017). Bold and offensive strategies have been reported to be effective for companies in industries faced with digitalization (Bughin and van Zeebroeck, 2017).

VALIDITY AND LIMITATIONS

This research has several limitations, which we consider here. First, the search string has limitations: We have searched large parts of the literature, but cannot claim to have covered all relevant publications to help us answer the research questions. Our filtering might also have flaws, such as excluding relevant papers that do not clearly provide information in the title and/or abstract that we find of enough relevance to our research questions. Another threat we considered when crafting the review protocol is paper selection consistency.

The thematic synthesis was performed in an iterative manner, as explained in the research method section. Other themes could have been chosen from the rather varied set of papers included in our review. Our aim was never to present all aspects of all selected papers. Future literature studies might shed more insight by including additional themes such as dynamic capabilities.

There is a risk with comparing results from studies that have taken place in different contexts (e.g., different countries, different time, different industry, etc.), which sometimes also use slightly different terms and, for example, ask survey questions in a slightly different way. In addition, comparing case studies that we found to be the predominant type of study among the selected papers and aggregating knowledge from these comes with particular considerations. We have tried to mitigate the associated risks by introducing each study with a short contextual description.

CONCLUSION

Thanks to the recent emergence of more empirical studies of digital strategy, we were able to distill some core themes that add to the body of knowledge on how to strategize with a view to achieving success from IT projects in the digital era. One of the main findings from our review is the tendency of organizations to initiate scattered initiatives leveraging new digital technologies in an unsynchronized manner, without an overarching strategy in place. We uncovered a plethora of new approaches to digital strategies and ways to systematically approach digitalization.

Traditional companies typically find themselves in stiff competition both with other established companies and new disruptive entrants. Companies need to adapt to the digital era, one way or another, but seem to struggle in the face of constantly emerging digital technological possibilities and threats. Given the additional complexity associated with the digital era as a result of new challenges to innovate, collaborate, and compete in new ways, it appears intuitive that organizations need to think hard about how to position themselves in the new digital landscape. We suggest that companies can benefit from forming and implementing a deliberate digital strategy that encompasses a) facilitation of business agility to quickly adjust to new trends, possibilities and threats as necessary, and b) constantly balancing exploration of new possibilities with exploitation of current assets.

We contribute to practice by highlighting several key themes to be considered when seeking the best path towards digitalization. In particular, organizations should consider forming digital strategies linked to their overall objectives, and take a long-term view while continuously balancing exploration of potential value generation from digital investments and exploitation of existing assets. Scattered digital initiatives might be a sign of a less digitally mature

organization and an indication that leadership could benefit from taking ownership with a view to establishing an overall digital strategy that not only spans across departments but also considers strategic interorganizational collaboration. Further, digitally mature organizations typically possess cultural characteristics that we suggest might require leadership to foster. We suggest that holistic digital strategies should be implemented with a constant focus on business value creation, and that companies should be ready to adjust the course when needed.

We contribute to the body of research by establishing a platform of the current empirical knowledge of how digital strategies are scoped, structured, formed, and implemented, and of the extent of empirical proof of their effectiveness in leading to desired business outcomes. We suggest our findings have implications for research in a number of fields: from investigations of specific management practices such as digital strategy formulation and execution to software engineering disciplines (for example, how to accommodate dual architectures and other aspects of flexibility needed in the digital era). We encourage more quantitative research into how successful organizations strategize, as currently we observe several case studies but fewer quantitative studies (e.g., surveys) that can serve as a better basis for generalization. Given the increasingly central importance of digital strategies, both in shaping business and operating models, and in driving continued organizational competitiveness, there is a need to better understand the most important aspects of a digital strategy, as well as to provide empirical guidance on how to best go about the implementation of digital strategies, in particular taking into account change management aspects, which might reach far beyond organizational borders.

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APPENDIX A

Publication	Source[a]	Study type[b]	Themes					Aspects used during thematic synthesis
			A	B	C	D	E	
(Becker et al., 2018)	C	CS				X		CDO
(Berghaus and Back, 2017)	C	CS		X				Activities to create digital strategies
(Bughin and van Zeebroeck, 2017)	J	S					X	Digital disruption responses
(Carcary et al., 2017)	C	S			X			Drivers/barriers
(Chanias and Hess, 2016)	C	CS		X				Strategy formation
(Chanias, 2017)	C	CS		X				Strategy formation
(Duerr et al., 2018)	C	CS				X		Culture
(El Sawy et al., 2016)	J	CS			X			Bimodal IT
(Gimpel et al., 2018)	J	CS	X					Structuring transformations
(Haffke et al., 2017)	C	CS			X			Bimodal IT
(Hess et al., 2016)	J	CS		X				Guidelines for formation
(Holotiuk and Beimborn, 2017)	C	D			X	X		Success factors
(Horlach et al., 2017)	C	CS			X			Bimodal IT
(Horlacher and Hess, 2016)	C	CS				X		CDO
(Horlacher et al., 2016)	C	CS				X		CDO
(Islam et al., 2017)	C	CS	X					Value co-creation
(Kane et al., 2017)	J	S			X	X		Digital maturity
(Leischnig et al., 2016)	C	S					X	Effectiveness
(Leischnig et al., 2017)	J	CS					X	Effectiveness
(Luger et al., 2018)	J	CS	X			X		Exploration/exploitation
(Niemand et al., 2017)	C	CS					X	Entrepreneurial orientation
(Parviainen et al., 2017)	J	CS	X					Structuring transformations
(Planing and Pfoertsch, 2016)	C	CS	X					Strategic journeys
(Ross et al., 2016)	C	CS	X		X			Types of digital strategies
(Schreieck and Wiesche, 2017)	C	CS	X					Value co-creation
(Sebastian et al., 2017)	J	CS	X		X			Types of digital strategies
(Sia et al., 2016)	J	CS			X			Lessons learned
(Svahn et al., 2017)	J	CS			X			Digital innovation
(Tumbas et al., 2017)	J	CS				X		CDO
(Tumbas et al., 2018)	J	CS				X		CDO
(Weill and Woerner, 2018)	J	CS	X					Strategy journeys

[a]J=Journal; C=Conference, [b]CS=Case Study; S=Survey; D=Document Analysis; Theme A: Scoping and structuring digital strategies; Theme B: Forming digital strategies; Theme C: Implementation of digital strategies; Theme D: Supporting organizational culture and constructs; Theme E: Effectiveness of digital business strategies.

Table 6: Themes and coding of papers