EXTERMINATE ? - WHO INFLUENCES IT ALIGNMENT AND DIGITAL BUSINESS STRATEGY

Research paper

Wunderlich, Nico, Goethe University Frankfurt / E-Finance Lab, Frankfurt, Germany, nwunderlich@wiwi.uni-frankfurt.de

Abstract

Extant strategy concepts are challenged due to an increasing demand for agility in highly digitized markets. Concepts relying on separate constructs for IT and business, such as IT alignment, are well researched and applied in practice. The ongoing process of digitization developed digital infrastructures which fundamentally change conditions for all market participants, culminating in business models completely based on IT. This research gives first insights for a comparison of the concept of IT alignment with the recently introduced "digital business strategy" (DBS), which describes a cross-functional and agile fusion of business and IT strategy. Based on an online survey among 255 IT decision makers in IT-intensive industries in the U.S., this exploratory study measures DBS and IT alignment within one quantitative structural equation model. We especially focus on how organizational leaders from both the IT and business side influence the two different strategy concepts: The results reveal a total absence of an influence of the IT leader on DBS directly, whereas a high impact on IT alignment is still given. Business leaders in turn impact more on DBS than on IT alignment. We thus contribute to IT strategy literature and provide impulses for discussing future role definitions of CIOs.

Keywords: Digital Business Strategy, IT Alignment, IT Strategy, IT Leadership, CIO, Digitization

1 Introduction

The development of an increasingly digital economy has changed markets and the conditions for suppliers, customers, employees, and entrepreneurs (Tilson et al., 2010; Yoo, 2010). Digital business environments are characterized by higher interconnectiveness and expanding interdependencies, questioning static approaches to compete in these markets (Grover and Kohli, 2013; Porter, 2001). Uncertainty and dynamism in digitized market environments demand for an increased agility of business strategies (Teece et al., 2016). Existing strategy concepts and organizational configurations have to be revised due to the encompassing role of IT evolving from a mere business supporter towards an integral part of whole businesses (Bharadwaj et al., 2013; Coltman et al., 2015; King, 2011).

The last 25 years have been characterized by attempts to overcome the gap between IT as kind of "intruder" into a historically grown business environment (Davenport, 1993; Rai et al., 2006; Zhu et al., 2006), which gave rise to the emergence of what is known now as IT alignment (Henderson and Venkatraman, 1993; Luftman, 2000; Coltman et al., 2015; Gerow et al., 2014). IT alignment is characterized by a parallel existence of a business strategy and a separate IT strategy. Latest attempts underline the socially complex processes to achieve IT alignment through a shared understanding between business and IT leaders about the role of IT in an organization (Karpovsky and Galliers, 2015; Karahanna and Preston, 2013; Reich and Benbasat, 2000). Though, some researchers propose to examine concepts which prepare for an era after the digital revolution of transformation, where business models completely relying on IT demand for a rethinking of traditional structures, control, and strategic concepts of IT (Tilson et al., 2010; Henfridsson et al., 2014). In order to keep up with the aforementioned

challenges, the importance for organizations to develop a digital mind-set increases, consolidated and formulated in digital business strategies (DBS) (Bharadwaj et al., 2013), which suppose a fusion of IT and business strategy within one single program.

As the concept of DBS in contrast to extant strategy attempts is not clarified yet, the task of this research is to give first insights for a comparison with the established conception of IT alignment. Both mentioned concepts, IT alignment and DBS, aim at value creation through IT employment and increasing the firm's performance (Gerow et al., 2014; Queiroz, 2017; Bharadwaj et al., 2013). Still, the two concepts mainly differ in terms of being structured by either the coordination of two separate strategies for business and IT (IT alignment) or one fusioned overall strategy (DBS). Since research findings proved the socially based process as basis to achieve high degrees of IT alignment (Bassellier et al., 2003), the results of this study give first contribution to how an established digital mindset shouldered by both the IT and the business side (Lu and Ramamurthy, 2011; Bassellier et al., 2003; Boynton et al., 1994) in shape of DBS changes strategic IT decision making. To follow this idea, this investigation tests the concepts of IT alignment and DBS in one single quantitative research model. We therefore answer the call to assess how the digitization of business processes will change the role of IT strategy and IT alignment (Coltman et al., 2015). So far, the concept of DBS has not been quantitatively measured. Our first research question consequently is:

RQ 1: How can one conceptualize and measure DBS?

Strategy is key in digital markets as profitability alone is no longer sufficient to distinguish from competitors (Porter, 2001). Since organizational leaders are in charge of formulating strategy and redirecting strategic goals into the organizational structures and resources (Grant, 2010), this research gives a more detailed view on how organizational leaders influence both concepts, strategic IT alignment and DBS separately. By this, we answer requests for research to analyse organizational structures against the background of the changing role of strategy (King, 2011) and the call of Mithas et al. (2011) for further investigation particularly on organizational structures preceding DBS. Focussing on governance and power structures in detail, we especially distinguish between the influence of the IT side in terms of IT leaders in organizations, such as the CIO (Banker et al., 2011; Wunderlich and Beck, 2017a), in contrast to the business side, represented by the top management team (TMT, e.g. CEO, CFO, etc.). We state our second research question:

RQ 2: Who influences DBS in difference to or accordance with IT alignment?

The paper will continue as follows: first, the theoretical underpinnings of the investigated concepts of general business strategy, IT strategy, and IT alignment as well as DBS are presented. Hereafter, we examine a scale development process for DBS following the recommendations of MacKenzie et al. (2011) including two exploratory factor analyses. In order to test the extracted factor structure for nomological validity as well as gaining first insights on the predecessors of DBS, subsequently we investigate the concepts of DBS and IT alignment in one nomological net. The setting of this study was an online survey among 255 IT decision makers in the U.S., empirically focussed on knowledge and IT intensive industries in accordance with the official assignments of the OECD (OECD, 2013). In the conclusion we discuss how to understand the inventory concept of DBS concerning the two research questions and open avenues for future research.

2 Literature Background

2.1 Business strategy, IT strategy, and IT alignment

"Strategy […] is a unifying theme that gives coherence and direction to the actions and decisions of an individual or an organization" (Grant, 2010, p. 4). Basically, besides a corporate strategy – which industry and market to choose – a business strategy determines how to compete in the selected market (Grant, 2010). Generally, a business strategy defines how to organize, configure, and apply a firm's

resources to achieve a stated market oriented goal (Barney, 2001). In competitive environments, companies have to choose which activities to conduct in order to differentiate from rivals and gain a unique mix to obtain value: strategy involves being different, moreover, unique (Porter, 1996). In order to harmonize the sheer number of concepts for strategies by means of a single attributes catalogue, Mintzberg (1987) presented the „five Ps" applying to strategies: defining strategy as a plan (pursuing a determined aim), as a kind of a ploy (tackling or affect competitors), that contains a pattern (a portfolio of implementing activities), which facilitates a position (relates the organization with the external environment, typically the market), and provides a perspective (assembles the members of the organization beneath a shared view in the current situation as well as to future viewpoints).

For formulating a strategy, decision makers have to understand the competitive environment and define a consistent, durable goal (Grant, 2010). Strategy sets the goal, whereas in contrast planning allows to control and regulate the operational execution for reaching it and to configure a consequent application of the firm's resources (Barney, 2001). Organizational success can be achieved only through a combination of individual activities, operational effectiveness, competitive advantage, and sustainability (Porter, 1996). Strategy serves for supporting decisions, means to in-company coordination through general goal setting, a way to target future ambitions, and enabling subsequent benchmarking as well (Grant, 2010). Likewise, strategic management engages in how to implement the strategic goals and to transform those to employees on operational level (Mintzberg, 1987, 1989).

While the business strategy encompasses organizational activities to differentiate from rivals to achieve competitive advantage (Porter, 1996; Mintzberg and Waters, 1985), the IT strategy describes the "investment, deployment, use, and management of IS" (Chen et al., 2010a, p. 235). The implementation of information systems to support and enable business processes requires that the business strategy, process design, and the integrated technologies within an organization are tightly aligned (Snell and Dean, 1992). While IT itself often becomes over time a commodity without any strategic competitive advantage for companies, some IT resources and IT capabilities actually are and remain a source of competitive advantage (Grover et al., 1993) and a way to differentiate from competitors (Banker et al., 2011). In evaluating 48 articles on IT strategy in 2010, Chen et al. (2010a) found three widespread accepted definitions of IT strategy, namely supporting the business strategy, as master plan of the IT unit, as well as a shared view upon IT within the organization. As decision makers are in charge of strategy formulation (Grant, 2010), the CIO as the highest IT representative within an organization plays a crucial role for IT strategy (Banker et al., 2011). The CIO "acts as a bridge between the information technology group, the functional areas, and external entities" (Stephens et al., 1992, p. 449). With the growing importance of IT for the whole organization (Banker et al., 2011), advanced skills such as business knowledge turned out to be very important for fulfilling the CIO's function to fully understand the interconnection of business and IT demands (Chen et al., 2010b; Armstrong and Sambamurthy, 1999). Thus, providing a profound and effective IT strategy is key for integrating business demands in IT leadership (Lu and Ramamurthy, 2011).

With the emergence of the IT alignment concept, Henderson and Venkatraman (1993) highlighted the need to implement and enforce the organizational strategy in business processes and IS simultaneously. A congruence of IT and business strategy became a central element for competitive advantage, as above average returns on IT investments can be generated through an effective deployment of IT resources (Kearns and Lederer, 2000). The positive effect of IT alignment on firm performance was finally verified (Gerow et al., 2014; Queiroz, 2017). So far, achieving alignment between IT and business parties was regarded as an evolutionary and dynamic process (Luftman, 2000; Karpovsky and Galliers, 2015). Ultimately, IT alignment is seen as an enabler for developing a shared understanding between business and IT leaders about the role of IT (Reich and Benbasat, 2000; Peppard and Ward, 2004; Preston and Karahanna, 2009; Chen et al., 2010b). Implicitly, it was assumed that a "shared view" on IT among decision makers is the prerequisite for IT alignment (Chen et al., 2010a), which extended the IT alignment conceptualization (Henderson and Venkatraman, 1993) by a preceding process of cognitive and social alignment (Karahanna and Preston, 2013; Preston and Karahanna, 2009; Preston et al., 2008). The differentiation between IT and business strategy was reasonable in the be-

ginning, when formerly analogue business processes transformed into digital ones, thereby challenging historically grown business environments (Davenport, 1993; Rai et al., 2006; Zhu et al., 2006). Nowadays, new business processes are designed and planned from the beginning as digital, which asks more for a holistic digital business strategy (DBS) than for IT business alignment.

2.2 Digital business strategy

An enhanced concept of an encompassing business strategy that already comprises IT-related concerns by definition was first introduced by Mithas and Lucas (2010) and subsequently refined by Bharadwaj et al. (2013): the digital business strategy (DBS). The supplement „digital" adds the idea of „leveraging digital resources to create differential value" (Bharadwaj et al., 2013, p. 472) to the definition of a business strategy. Formulated as cross-functional, this concept integrates the strategic direction of several departments especially in fully digitized business models (Drnevich and Croson, 2013; Coltman et al., 2015). Since an increasing number of businesses completely rely on digital infrastructure, DBS gains more practical importance (Bharadwaj et al., 2013; Tilson et al., 2010; Yoo et al., 2010). Coincidently, it opens theoretical and practical opportunities to renew and overcome the perspective of IT as traditional business support and service deliverer (Peppard and Ward, 2004) towards an inseparable key component of business processes, business models, and business strategies. Thus, this extended concept of a fusion of the IT and the business strategy questions established considerations such as those on IT alignment (Coltman et al., 2015; Bharadwaj et al., 2013). The ambidexterity of static elements of strategy (how to compete currently) and dynamic aspects (what to become and achieve in future) seem to melt or even accelerate in more dynamic, digitized markets (Teece et al., 2016).

The DBS concept can be specified along four themes (Bharadwaj et al., 2013): scope, scale, speed, and source. Scope describes the portfolio of referring (digital) products and services, and corresponding challenges for the entire business ecosystem (Keen and Williams, 2013; Yoo et al., 2010). Scale encompasses network effects associated with DBS going along with increased connectivity by digital infrastructures (Tilson et al., 2010), accessible for the organization, its external partners, as well as for competitors. Consequentially, the speed of business activities accelerates since every market actor can easily access and imitate based on these infrastructural abilities (Coltman et al., 2015; Porter, 1996). Thus, the source theme of DBS focusses on business value creation and consequences in transforming business models as well as supply and value chains (Keen and Williams, 2013; Mithas et al., 2012).

Due to the overarching importance of IT infrastructure for companies and whole markets (Tilson et al., 2010; Porter, 2001), digital infrastructures have turned consumers into integrated and active prosumers (King, 2011; Tilson et al., 2010; Yoo et al., 2010). Those prosumers now have access to more channels and benefit from increased market transparency, as well as reduced switching costs (Porter, 2001). At the same time, the emergence of digital infrastructures lowered barriers to enter markets and forced threats of substitutional products (El Sawy et al., 2010; Porter, 2001). This is accompanied by a rapid decrease of operational advantages in digitized business environments, which causes a strong digital strategy as pivotal to generate a surplus (Porter, 1996; Keen and Williams, 2013; Teece, 2010). For the themes of scope, scale, speed, and source of DBS, leadership functions become even more evident (Bennis, 2013) for understanding the external competitive environment and transferring the resulting insights to internal application of non-imitable resources (Grant, 2010).

3 Digital Business Strategy: Exploratory Factor Analysis (EFA) and Item Reduction

3.1 Items development

In order to gain a measurable conceptualization for DBS, a factor analysis is executed in the first step of the analysis based on an online survey among 255 IT leaders. Due to the exploratory approach for quantifying DBS within this research, we build on prior theoretical conceptualization of the previously

presented DBS subcategorizations scope, scale, speed, and source (Bharadwaj et al., 2013, p. 479), which are listed in adopted manner in table 1. By means of an exploratory factor analysis, we ensure for item reduction and scale purification (Worthington and Whittaker, 2006). Guided by the extracted four item construct for DBS (RQ 1), in the next step we apply this item set within a nomological network to achieve first content-related results on DBS in comparison to IT alignment and related organizational structures (RQ 2).

Scope of Digital Business Strategy	
DBS 1	What is the extent of fusion and integration between IT strategy and business strategy?
DBS 2	How effectively does your company transcend traditional functional and process silos?
DBS 3	How well does your company exploit the digitization of products and services, and the information around them?
DBS 4	How well does your company exploit the extended business ecosystem?
Scale of Digital Business Strategy	
DBS 5	How rapidly and cost effectively can the IT infrastructure scale up and down to enable your company to bolster a strategic dynamic capability?
DBS 6	How well does your company leverage network effects and multisided platforms?
DBS 7	How well does your company take advantage of data, information, and knowledge abundance?
DBS 8	How effective is your company in scaling volume through alliances and partnerships?
Speed of Digital Business Strategy	
DBS 9	How effective is your company in accelerating new product launches?
DBS 10	How effective is your company in speeding up learning for improving strategic and operational decision making?
DBS 11	How effectively does your company bolster the speed of dynamic supply chain orchestration?
DBS 12	How quickly does your company enable the formation of new business networks that provide complementary capabilities?
DBS 13	How effectively does your company speed up the sense and respond cycle?
Sources of Value Creation and Capture	
DBS 14	How effective is your company in leveraging value from information?
DBS 15	How effective is your company in leveraging value from multisided business models?
DBS 16	How effective is your company in capturing value through coordinated business models in networks?
DBS 17	How effective is your company in appropriating value through the control of the firm's digital architecture?

Table 1. Item Set based on DBS Themes and Key Questions (Bharadwaj et al., 2013)

Based upon established scale development approaches (MacKenzie et al., 2011), the seventeen key questions of the DBS themes (Bharadwaj et al., 2013) are taken as a starting point for gaining a manageable measurement instrument. Within the questionnaire, the respondents faced the intial items of DBS in individually randomized order and without any assignments of the four DBS categorizations, which also motivated us to replace all terms of "digital business strategy" or "strategy" within the question set by the term "your company" (table 1). In doing so, we avoid informing the participants upfront about the theme of the questionnaire and secured for maximum inalterability of the respondents to avoid any content-related bias in the same step (Oppenheim, 2000). As further presumption, at first we take content validity as given due to the profound source the items are adopted from (Bharadwaj et al., 2013), and will reassess the content validity of the condensed item set within the structural equation model (SEM) in the following analysis. Content validity describes the intensity of the items corresponding to the conceptual definition (Hair, 2010).

3.2 Sample characteristics

In order to gain appropriate data for measuring DBS, a quantitative survey was conducted among senior IT decision makers in the U.S., resulting in N=255 complete questionnaires. In particular, we focused on knowledge-intensive organizations, as classified by the OECD (OECD, 2013) to concentrate

on firms who are most likely to have a DBS (table 2). We controlled for firm size and considered companies of at least 50 employees or more, having IT departments with more than two employees to assure for the IT decision maker's decisional power. During December 2016 and January 2017, 944 participants of a CIO panel operated by a large international market research institute were invited to participate in the online survey. To ensure for suitable data quality, we implemented plausibility checks and repeating track questions for several items. To guarantee for IT decision makers only, we filtered for the degree of participation in IT decision making at the beginning of the questionnaire. For double checking, we repeated questioning the job position in the end of the questionnaire by the well-developed scale of Sharma and Rai (2015). Presenting the job positions in table 2, the surveyed values verify this two-step checking procedure: 80% of our sample remain on the two highest job levels, namely CIOs and IT directors executing strategic or tactical functions. With regard to the surveyed constructs, we ensured for clear differentiation between respondents who act as CIO only and those who practice as CIO and CEO in personal union, since the latter respondents are considered as part of the business side (TMT) in a following step of this analysis.

Knowledge-intensive Industry Sector (n>8, OECD, 2013)					
Computer (Hardware, Software, Services)	53	20.78%	Healthcare, Medical	29	11.37%
Education, Training	44	17.25%	Aerospace, Automotive, Defense	13	5.10%
Banking, Financial Services, Insurance	39	15.29%	Advertising, Consulting, Market Research	13	5.10%
Industrial Manufacturing	30	11.76%	Other knowledge-intensive Industries	34	13.33%
Total				**N=255**	**100%**
IT Decision Maker Characteristics: Job Position Sharma and Rai, 2015)					
CEO, Sr V.P., V.P.	48	18.82%	director of systems development, director of IT/IS operations, internet technology strategist	77	30.20%
CIO / vice president of IT, chief technology officer, chief security officer	80	31.37%	other IT decision makers	50	19.61%

Table 2. Knowledge-intensive Industry Sectors and IT Decision Maker Characteristics

The average IT decision maker within the sample is 44.4 years old, is in 66% of the cases male, and has IT experience of 15 years. The average organizational tenure of the respondents of 12 years signals a mature IT decision maker sample and is in line with findings in other studies for the affiliation in the current organization in the field of information systems (e.g. Lu and Ramamurthy, 2011). Analysing the characteristics of the knowledge-intensive firms, the average organization in our sample was founded in 1974, has 26,991 employees, and an IT department supported by 4,527 IT employees. Summing up, the sample provides a well dispersed view on IT decision makers in knowledge-intensive industries in the U.S. in order to evaluate the presence and development of DBS.

3.3 Analysed exploratory factor results

In order to reassess the proposed factor structure of the DBS themes (Bharadwaj et al., 2013) and gain a comprehensive measurement instrument, we executed an EFA with IBM SPSS Statistics version 21. Factor extraction based on the principal component method and a varimax rotated component matrix allows to identify an as far as possible independent factor structure in statistical reasons (Hair, 2010). Proper sample size was assured by more than ten times the number of 17 items (n=255). The reliability of each factor remains confidently above the recommended threshold of 0.6 (Cronbach alpha; table 3) (Nunnally et al., 1967). Four factors were found, consisting of five, six, four, and two items (table 3). Due to the unequal factor size in respect to the number of items (Hair, 2010), several cross loadings could be identified, seven only higher than 0.4 (cross loadings higher than 0.3 shown in table 3). In order to gain a comprehensive factor structure, we decided for keeping the surrogate variables in our

analysis, meaning the highest loading item of each factor (Hair, 2010) as recommended for further application in subsequent statistical techniques. The resulting four items are presented in table 4.

Factor 1: Digital Architecture (Cronbach α = 0.833; ø= 3.922; σ = s.d. = 0.8677)				
DBS 17	**.691**		.315	
DBS 5	**.673**		.345	.364
DBS 3	**.627**			.411
DBS 2	**.611**	.531		
DBS 16	**.534**	.312	.531	
Factor 2: Digital Business Model (Cronbach α = 0.763; ø= 3.557; σ = s.d. = 1,0497)				
DBS 15		**.734**	.343	.331
DBS 4	.439	**.707**		
DBS 13		**.566**	.397	.383
DBS 9		**.547**	.311	.480
DBS 1	.499	**.543**		
DBS 12	.364	**.485**	.465	.310
Factor 3: Business Dynamism (Cronbach α = 0.765; ø= 3.958; σ = s.d. =0.8637)				
DBS 10		.330	**.704**	.342
DBS 11	.357		**.680**	.367
DBS 8	.317	.503	**.596**	
DBS 6	.464	.350	**.594**	
Factor 4: Information Management (Cronbach α = 0.755; ø= 3.974; σ = s.d. = 0.8584)				
DBS 7				**.794**
DBS 14	.452	.366		**.568**

Table 3. Results of the EFA: Rotated Component Matrix

Though, we take the computed factor structure for a brief discussion to verify the plausibility of the extracted factor allocations. Factor one combines items arising from several of the initial themes related to the digital architecture based on IT infrastructure. Beginning with DBS 17 describing the intensity of gaining business value from the organization's digital infrastructure, DBS 5 comprises the ability to scale infrastructure up and down. Further, two items describe the degree of the digitization of products and overcoming traditional process silos. The first item of factor 2 characterizes the whole factor: a description of the organization as an interwoven digital business model. DBS 15 defines the value of digital enabled multisided business models, consequently followed by steadying the exploitation of business ecosystems by the company (DBS 4). The items DBS 13 and DBS 9 measure the speed of the respond cycle and the degree of launching new products. The third factor encompasses the support of digital infrastructures for the organization's business dynamism: DBS 10 contains how DBS accelerates organizational learning resulting in improved strategic and operational decision making. Influences on an agile supply chain correspond to these business determinations (DBS 11). Likewise, the next two items (DBS 8, DBS 6) accordingly express foundations for exploiting network effects of digital platforms and business alliances. Factor 4 is closely related to the importance of information management for knowledge intensive organizations: two items describe the advantages and gaining business value of a large amount and accessibility of data, information, and knowledge (DBS 7, DBS 14). Summing up, the gained four factor structure underlines the fusional character of DBS for business and IT and provides a well structured and broad basis for future investigation.

DBS 17	How effective is your company in appropriating value through the control of the firm's digital architecture?
DBS 15	How effective is your company in leveraging value from multisided business models?
DBS 10	How effective is your company in speeding up learning for improving strategic and operational decision making?
DBS 7	How well does your company take advantage of data, information, and knowledge abundance?

Table 4. Digital Business Strategy: Resulting Surrogate 4 Items Construct

4 IT Alignment and Digital Business Strategy in one Shared Nomological Net

4.1 Hypotheses and research model

This research investigates the influence of organizational leaders on two distinct strategy concepts, strategic IT alignment and DBS. As both concepts share the formulation of the role of IT for a business, the research model (figure 1) assesses which concept is more influenced by either the business or the IT side in an organization. As approximization for these influences, we conceptualize the structural power of the CIO as the highest IT decision maker in an organization (Banker et al., 2011; Wunderlich and Beck, 2017a) as well as the specific strategic IT knowledge of the top management team in a company (Preston and Karahanna, 2009; Armstrong and Sambamurthy, 1999). According to Porter (1996), we capture internal (firm related) factors, in particular organizational attributes of the IT leader (Chen et al., 2010b) and of the TMT (Preston and Karahanna, 2009), in influencing both strategic concepts on managerial level.

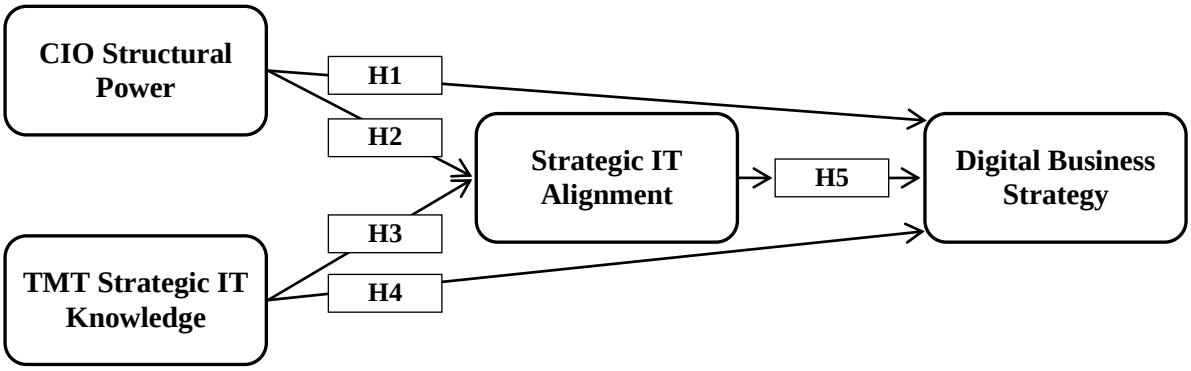

Figure 1. Research Model

The role of IT executives has gained more strategic importance over the years, from head of the tactical IT middle management (King and Teo, 1997; Kearns and Lederer, 2003) to C-level management and membership in the top management team (Banker et al., 2011). Especially for companies in high competitive and IT intensive industries, a strong CIO position increases the value of a company by signaling effective exploitation of IT to external stakeholders (Chatterjeem et al., 2001). The CIO reporting structure illustrates the allocation of power and control conferred to the IT executive (Banker et al., 2011). The higher the structural power of the CIO, the higher the perceived strategic decision-making authority of the IT leader in the organization (Preston et al., 2008). The progressively ongoing digitization of business processes and business models highlights the "digital" IT components in the concept of DBS (Bharadwaj et al., 2013), thus, we propose:
H1: CIO structural power has a positive impact on digital business strategy.

The main difference between CIOs and other C-level managers is the need for specialized, technical IT skills, combined with a profound understanding of operational as well as strategic facets of the organization (Karahanna and Watson, 2006). With the emergence of the IT alignment concept (Henderson and Venkatraman, 1993), the strategic relevance of IT for the whole company was manifested (Gerow et al., 2014; Queiroz, 2017; Chen et al., 2010b). From then up to the presence, IT alignment has gained increased importance (Peppard and Ward, 2004; Reynolds and Yetton, 2015; Coltman et al., 2015). As the CIO's authority in decision making has a significant impact on the ability of IT to contribute to strategic IT alignment (Preston et al., 2008), we hypothesize:
H2: CIO structural power has a positive impact on IT alignment.

Developing managerial IT skills is a particularly complex social task (Mata et al., 1995) and can be facilitated by social alignment on managerial level (Johnson and Lederer, 2005; Armstrong and Sam-

bamurthy, 1999). Business managers' IT knowledge positively influences their intentions to support IT initiatives (Bassellier et al., 2003). Shared IT knowledge between IT managers and business managers is proven to lead to an enhancement of strategic alignment (Kearns and Sabherwal, 2007; Chan et al., 2006). Further condensed, pronounced TMT IT knowledge fuels the influence on strategic alignment (Preston and Karahanna, 2009):
H3: TMT strategic IT knowledge has a positive impact on IT alignment.

For the themes of scope, scale, speed, and source of DBS, the leadership functions become even more evident, as power allocations and transparency will shift due to changing information flows (Bennis, 2013). Appropriate knowledge is a crucial condition for decision makers to understand the competitive environment and define a consistent strategy (Grant, 2010). Hence, to understand, formulate, and disseminate the digital facets of the fused concept of DBS (Bharadwaj et al., 2013; Drnevich and Croson, 2013), especially IT knowledge is supposed to be crucial for business leaders. Thus, we propose:
H4: TMT strategic IT knowledge has a positive impact on digital business strategy.

IT alignment and especially the process to achieve it are characterized by intensive organizational concertation such as social alignment (Luftman, 2000; Preston and Karahanna, 2009; Karpovsky and Galliers, 2015). Developed IT knowledge of the TMT led to shared understanding about IT between business and IT leaders (Reich and Benbasat, 2000; Karahanna and Preston, 2013). This process of achieving IT alignment within an organization may serve as prerequisite for a digital mindset established among all organizational leaders, expressed by an executed DBS (Bennis, 2013; Wunderlich and Beck, 2017b). Focussing on agile strategic concepts in highly digitized markets (Bharadwaj et al., 2013; Teece et al., 2016), we conceptualize IT alignment as predecessor for DBS and want to assess:
H5: IT alignment has a positive impact on digital business strategy.

CIO Structural Power (Chen et al., 2010; Preston and Karahanna, 2009; Preston et al., 2008)	
CIO Structural Power 1	I interact with TMT members on a formal basis (e.g., official meetings, work-related phone calls, etc.)
CIO Structural Power 2	Which of the following best describes your involvement with the top management team of your company (TMT)? (formal member / weekly / monthly / half a year / yearly or less often)
CIO Structural Power 3	How many reporting levels are between you and the CEO? (direct report / two levels / three levels / four levels / five or more levels)
TMT Strategic IT Knowledge (Preston and Karahanna, 2009)	
TMT IT Knowledge 1	How knowledgeable is the TMT about the potential and limitations of current IT?
TMT IT Knowledge 2	How knowledgeable is the TMT about the potential and the limitations of "next-generation" IT?
TMT IT Knowledge 3	How knowledgeable is the TMT about your competitors are applying IT?
Strategic IT Alignment (Preston and Karahanna, 2009; Karahanna and Preston, 2013)	
Strategic Alignment 1	The IT strategy is congruent with the corporate business strategy in your organization.
Strategic Alignment 2	Decisions in IT planning are tightly linked to the organization's strategic plan.
Strategic Alignment 3	Our business strategy and IT strategy are closely aligned.
Constructs measured by 5-point Likert scale, 1=completely applicable, 5=not applicable at all	

Table 5. Measurement Items

4.2 Operationalization of constructs

All relevant measures were adopted or based on constructs from recent AIS senior scholar basket journal publications (table 5) analysing the field of IT alignment without exception. We thereby guarantee for a well prepared test environment for content validity of DBS in this intensively investigated context (Straub et al., 2004; Straub, 1989). The measurement items for CIO structural power were adopted from several studies examining a CIO's influence on IT alignment, firm output, strategic deci-

sion making, and IT governance (Chen et al., 2010b; Preston et al., 2008; Bradley et al., 2012). This construct expresses the degree and frequency of formal communication between the CIO and the remaining top management team (TMT). A CIO's ability to transfer value-creating information and relevant insights to TMT colleagues increases with a higher formal and informal interplay between these IT and business side managers (Armstrong and Sambamurthy, 1999). For completion, we decided to add the third item consistent with Preston and Karahanna (2009) to measure the extent of formal communication and between the CIO and the CEO as well: A close reporting structure between the CIO and other C-level-managers are supposed to enhance the support of IT initiatives (Banker et al., 2011). The items of TMT strategic IT knowledge were lent from a study investigating social antecedents of strategic alignment (Preston and Karahanna, 2009). Originally formulated by Armstrong and Sambamurthy (1999), the construct expresses market oriented IT knowledge on current and future IT. IT alignment was conceptualized as unidimensional strategic alignment based on two well acknowledged studies in this field (Preston and Karahanna, 2009; Karahanna and Preston, 2013). Two items represent the traditional definition of the congruence of business and IT strategy (Sabherwal and Chan, 2001). One item expresses how decision making in IT is interrelated to the overall business strategy, reflecting the interweaving of business and IT strategy as a kind of process (Luftman, 2000).

4.3 Measurement model validation

In general, the measurement model consists of four reflective constructs, embracing the original sources of all adopted constructs (table 5). The four items for DBS (table 4) were conceptualized as reflective as well, relying on the well-accepted arguments of Jarvis et al. (2003): first, we assume the reflective indicators as caused by the latent construct as well as sharing a common theme; second, we measured a high covariance between the four items necessary for reflective indicator design (Jarvis et al., 2003; Bagozzi, 2011). We tested the four constructs included in the SEM by means of a further principal component EFA in IBM SPSS, which stated the gained four factor structure of DBS against the remaining variables (90% of explained variance by the factor structure, cronbach $\alpha > 0.6$ for all factors (Nunnally et al., 1967)). The four item DBS construct guarantees for the balance of the dependent variables in terms of a preferred similar number of indicators to avoid statistical imbalances and thus was preferred against a second order operationalization including all 17 DBS items (Ringle et al., 2012; e.g., IT alignment measured with three items). Prior to interpreting the path relations and their importance, we test the reflective measurement constructs for reliability and validity. For construct reliability, we evaluated the average variance extracted (AVE) exceeding the proposed threshold of 0.5 for AVE (Chin, 1998) and the composite reliability (CR) at 0.7 (table 6). Additionally, we scored Cronbach alpha and all coefficients above the desirable threshold of 0.6 (Nunnally et al., 1967). Discriminant validity was assessed by computing the inter-correlations between the latent variables: According to Fornell and Larcker criterion (1981; table 6), the square root of AVE of each construct performed as the maximum of every row and column (Gefen et al., 2000). Since self-reported data, measured at one time, and from a single source can be affected by common method bias, we applied the Harman single factor test to verify no more than 50% of the total variance as explained by one component (Podsakoff et al., 2003).

Construct	**AVE**	**CR**	**Alpha**	**R^2**	(1)	(2)	(3)	(4)	(5)
CIO Structural Power (1)	0.709	0.828	0.606	-	**0.842**				
TMT Strategic IT Knowledge (2)	0.835	0.938	0.901	-	0.348	**0.914**			
Strategic IT Alignment (3)	0.720	0.885	0.805	0.499	0.603	0.555	**0.848**		
Digital Business Strategy (4)	0.655	0.884	0.825	0.560	0.459	0.660	0.653	**0.809**	
AVE = Average Variance Extracted; CR = Composite Reliability; Alpha = Cronbach's alpha, Square root of AVE shown on diagonal; Bolded correlations significant at p<0.05 (two-tailed)									

Table 6. Reliabilitiy, Validity, and Correlations

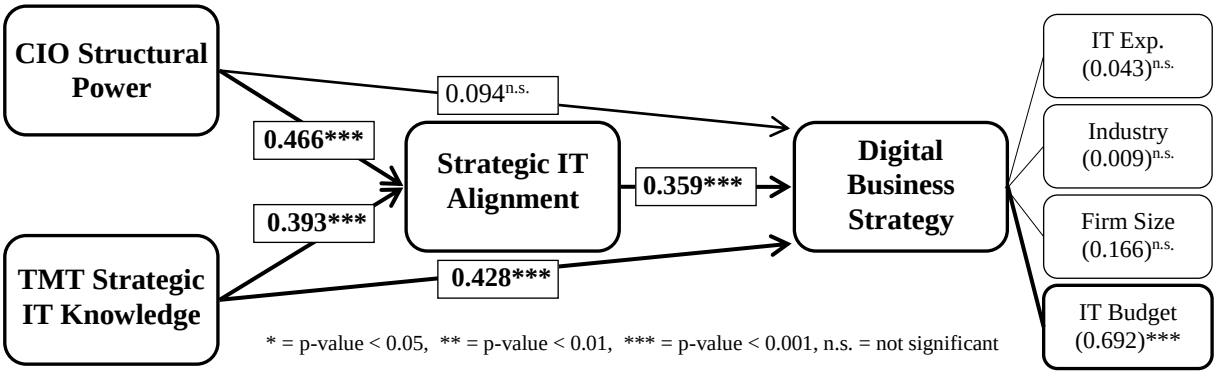

Figure 2. Resulting Structural Model

We conducted the data analysis as structural equation model (SEM) using the SmartPLS software tool (Version v.3.2.3; Ringle et al., 2016) with test results presented in figure 2. The research model was assessed employing a components based approach with a 500 sample bootstrapping technique (Chin, 1998). Based on a data set of 207 respondents, we favoured a partial least square based approach instead of a covariance-based procedure. In this step of analysis, we excluded the 48 CEOs acting in personal union as CIO from our sample of IT decision makers as belonging to the business side (table 2, job position). Leaving them in the analysis, e.g. the measurement for the items of CIO structural power (e.g. the hierarchical distance / reporting level) would have suffered a loss of interpretability; aditionally the measured relevant influence of TMT IT knowledge on both strategy constructs could have been biased by the personal qualification for the CEO/CIO. For the latter executed EFA, the CEOs remained in the sample since higher sample sizes serve to more precise results of this statistical procedure (Hair, 2010). The R^2 values (table 6) indicate a moderate amount of variance explained by the model (Chin, 1998). Reviewing relevant p-values, four of the five proposed hypotheses serve for derivation of statistically definite conclusions at highly significant level ($p<0.001$, figure 2). Hypothesis 1 was rejected as insignificant, delivering broad basis for the following results discussion.

5 Conclusion

5.1 Research results

The tested research model investigates the two strategic concepts of IT alignment and DBS in one single nomological network. Further, the influence of organizational leaders from the business side as well as from the IT side on both concepts was assessed. The first hypothesis H1 offers the main finding of our study: IT leaders in our sample do not experience any influence on DBS in their work routine. Conforming with statistical procedures (Hair, 2014), the lack of support for H 1 impressively highlights the full mediation of the CIO structural power on DBS via IT alignment (H1 = H2 + H5). In other words, our research model suggests that the only path for a CIO to influence DBS is by affecting the IT strategy within the IT alignment process. This finding is even more meaningful, since we enjoy merely the CIOs in the SEM analysis, while having excluded the 48 CEOs belonging to the business side in that step. Leaving out the direct connection between IT alignment and DBS in our model (H 5) would lead to a path coefficient of 0.260 from CIO structural power to DBS, whereas the influence of the strategic TMT IT knowledge would increase to 0.569. We thus have to revisit the strategic decision-making authority of CIOs on DBS, which was verified for IT alignment in this study.

The findings for H 2 and H 3 are in line with the structure of the concept of IT alignment: both leader groups (CIO and TMT) influence the formation of IT alignment (Henderson and Venkatraman, 1993; Luftman, 2000; Coltman et al., 2015). We find a slightly higher determination of IT alignment by the IT side than from the business side, stating the structural power of the CIO leading to higher strategic decision-making authority (Preston et al., 2008). The findings, especially concerning the strategic do-

main knowledge of the TMT, may be traced back to achieved social alignment and shared understanding about IT between business and IT leaders in the regarded organizations (Reich and Benbasat, 2000; Preston and Karahanna, 2009), hence expanding traditional concepts of analogue business strategies. We thereby state good conditions for establishing a digital mindset shouldered by both the IT and the business side (Lu and Ramamurthy, 2011; Bassellier et al., 2003; Boynton et al., 1994).

The changed importance of IT in knowledge-intensive industries demands strategic concepts that facilitate increased agility for organizations (Teece et al., 2016). We find a significant influence of the TMT IT knowledge on DBS in our model (H 4). Since the concept of DBS incorporates dynamic capabilities for firms to answer the demands for increasing market interconnectivity and interdependencies (Grover and Kohli, 2013; Bharadwaj et al., 2013), the direct influence of the IT domain knowledge of the TMT underlines the "digital" facet of DBS as perceived and responsibly executed by the business managers (Bennis, 2013; Keen and Williams, 2013). In conjunction with the rejection of the direct influence of the CIO on DBS (H 1), the question who mainly influences DBS can be answered clearly: the business side.

For H 5, we find a highly positive impact of IT alignment on DBS. Due to the structure of our research model, we confirm IT alignment as predecessing DBS. Since the definition of DBS encompasses the fusion of IT and business strategy (Mithas and Lucas, 2010; Bharadwaj et al., 2013), one can question if this might be a temporal snapshot until DBS will be fully implemented and may be replacing the isolated IT strategy in future. Nevertheless, the positive impact on DBS at least indicates a high theoretical mashup of both IT-related strategies. The moderator analysis with regard to the dependent construct of DBS (figure 2) shows only significant relations with IT budget (0.692), whereas other firm or CIO-related characteristics remain irrelevant. Summing up, since significant path coefficients are found evenly on equivalent level (all around 0.400; Ringle et al., 2012; Hair, 2014), the comparison of the analysed interconnection illustrate a profound basis for the following conclusion.

5.2 Contribution, limitations, and future research

To our knowledge, this research is the first which tests IT alignment and DBS in one nomological network. An EFA computed a first conceptualization of DBS, based on the responses of 255 IT decision makers in knowledge and IT intensive industries in the U.S. To give first proof how DBS differs from other strategies, we therefore answer the call to assess how the ongoing digitization changes the role of IT alignment (Coltman et al., 2015). Our research reveals that the two concepts are highly correlated, whereas we highlight that a profoundly implemented digital mindset on managerial level shifts the strategic IT decision making authority from the IT side to the business side. Following our considerations, we propose IT alignment as preceding DBS: DBS contains several aspects of scope, scale, speed, and source within its organizational implementation which bear great potential for firms to act agile and market oriented (Bharadwaj et al., 2013; Grover and Kohli, 2013). The concept of DBS highly corresponds to the demand for agile strategy concepts in highly digitized markets (Teece et al., 2016; Porter, 2001). IT alignment leads to effective deployment of IT resources and consequently competitive advantage (Kearns and Lederer, 2000; Croteau and Bergeron, 2001), dynamical strategic concepts such as DBS promise competitive advantage in digitized markets in particular (Bharadwaj et al., 2013; Teece et al., 2016).

The findings, especially concerning the strategic domain knowledge of the TMT, may be traced back to achieved social alignment and shared understanding about IT between business and IT leaders in the regarded organizations (Reich and Benbasat, 2000; Preston and Karahanna, 2009). Thus, the coordination process between the different concepts and stakeholders to achieve IT alignment is strongly inward oriented and time-consuming (Luftman, 2000; Queiroz, 2017). Highly digitized markets demand high interconnectivity, which is explicated by the agile and thereby more competition oriented aspects of DBS (scope, scale, speed, and source) (Grover and Kohli, 2013; Porter, 2001). Due to the demanded agility of business strategies in digitized market environments (Teece et al., 2016), we emphasize expressively the process to achieve IT alignment as predecessor for DBS, hence expanding

traditional concepts of analogue business strategies. Due to its intensively inward-oriented constellation, IT alignment can be stated as viable predecessor for DBS. Likewise, IT alignment may not become outdated by DBS, but fulfill an evolved function to dissolve the organization to achieve a digital mindset and subsequently a developed and fully implemented DBS (Coltman et al., 2015; Wunderlich and Beck, 2017b).

Our first research question concerns the measurement of DBS. Our extracted four item construct can be stated as first approach which offers a conceptualization of DBS for quantitative based research. Following recommended scale reduction procedures (Hair, 2010; Worthington and Whittaker, 2006), the gained items are highly applicable in structural equation modelling as condensed surrogate construct. Based on the theoretical considerations of Bharadwaj et al. (2013), the four items express the main purpose of DBS through the degree of gained value from a firm's digital architecture and from multisided business models, the effectiveness and flexibility in strategic decision making, and the realized advantage of analysing data, information, and knowledge. The items therefore cover three of the four DBS themes developed in the original publication (Bharadwaj et al., 2013).

Answering the second research question revealed a different view on which organizational leaders influence which strategy concept. Due to its conceptualization as coordinating the business and IT strategies, IT alignment is influenced by both the IT leader as well as the business managers (TMT) to a comparable extent. For DBS, we find a complete different picture: As main finding of our study, we especially emphasize that the CIO as highest IT leader in an organization does not share any direct influence on DBS. The TMT influences DBS on a comparative level as to strategic alignment. Following the calls of King (2011) and Mithas et al. (2011) on how organizational decision making changes under the progressively ongoing digitization, we have to question the future role of the CIO. After a decade of research to overcome the gap between business and IT via IT alignment (Henderson and Venkatraman, 1993; Coltman et al., 2015; Queiroz, 2017), our study suggests this concept as approved and assimilated due to the well-adjusted influence of both business and IT leaders. Which role will the CIO play, when IT gets more relevant for the entire business? How will CEOs take more responsibility for influencing IT decisions in DBS? Based on our conducted online study, our results can just indicate a decreasing influence of the CIO in strategy formulation since his or her mere influence on IT alignment only. Future roles for organizational IT leaders may lie in special areas, such as innovation (Gatian et al., 1995; Yoo et al., 2012; Yoo et al., 2010) or enhancing IT capabilities for the entire business, embracing the business employees in particular (Wunderlich and Beck, 2017b; Lu and Ramamurthy, 2011). As our model approximates the influence of CIO and TMT via structural power and IT domain knowledge, future research shall expand our findings and further develop assessing the changing influences and role models of CIOs and CEOs, e.g. based on an IT leadership construct which serves for increased direct comparison (Wunderlich and Beck, 2017a).

By this research, we highly contribute to the current discussion about how the digitization changes organizational structures and strategy concepts (Tilson et al., 2010; King, 2011; Coltman et al., 2015; Mithas and Lucas, 2010; Teece et al., 2016). We further give inspirations to practitioners for optimizing IT governance and power structures on managerial level (Mithas and Lucas, 2010; Wu et al., 2015; Bradley et al., 2012). As to any research results, there are limitations to this study. To avoid content related bias, we excluded CEOs acting in personal union as CIO from the SEM analysis. Subsequent investigations shall choose for a two sided approach, questioning leaders acting either as CIOs or CEOs within the survey setting. Therefore, common method bias may be reduced in the same step. Further, the focus on managerial level as to our study may be broadened by integrating an employee level perspective as well, referring to extant considerations (Wunderlich and Beck, 2017b). Future research shall also concentrate on possible outputs and consequences on DBS (Mithas and Lucas, 2010) and how to disseminate DBS related topics into the entire organization (Drnevich and Croson, 2013).

References

Armstrong, C. P. and V. Sambamurthy (1999). "Information Technology Assimilation in Firms: The Influence of Senior Leadership and IT Infrastructures." *Information Systems Research* 10 (4), 304–27.

Bagozzi, R. P. (2011). "Measurement and Meaning in Information Systems and Organizational Research: Methodological and Philsophical Foundations." *MIS Quarterly* 35 (2), 261–92.

Banker, R. D., Hu, N., Pavlou, P. A. and J. Luftman (2011). "CIO Reporting Structure, Strategic Positioning, and Firm Performance." *MIS Quarterly* 35 (2), 487–504.

Barney, J. B. (2001). "Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view." *Journal of Management* 27 (6), 643–50.

Bassellier, G., Benbasat, I. and B. H. Reich (2003). "The Influence of Business Managers' IT Competence on Championing IT." *Information Systems Research* 14 (4), 317–36.

Bennis, W. (2013). "Leadership In A Digital World: Embracing Transparency And Adaptive Capacity." *MIS Quarterly* 37 (2), 635–36.

Bharadwaj, A. S., El Sawy, O. A., Pavlou, P. A. and N. Venkat Venkatraman (2013). "Digital business strategy: toward a next generation of insights." *MIS Quarterly* 37 (2), 471–82.

Boynton, A. C., Zmud, R. W. and G. C. Jacobs (1994). "The Influence of IT Management Practice on IT Use in Large Organizations." *MIS Quarterly* 18 (3), 299–318.

Bradley, R. V., Byrd, T. A., Pridmore, J. L., Thrasher, E., Pratt, R. M. E. and V. W. A. Mbarika (2012). "An empirical examination of antecedents and consequences of IT governance in US hospitals." *Journal of Information Technology* 27 (2), 156–77.

Chan, Y. E., Sabherwal, R. and J. B. Thatcher (2006). "Antecedents and outcomes of strategic IS alignment: An empirical investigation." *IEEE Transactions on Engineering Management* 53 (1), 27–47.

Chatterjeem, D., Richardson, V. J. and R. W. Zmud (2001). "Examining the Shareholder Wealth Effects of Announcements of Newly Created CIO Positions." *MIS Quarterly* 25 (1), 43–70.

Chen, D. Q., Mocker, M., Preston, D. S. and A. Teubner (2010a). "Information systems strategy: reconceptualization, measurement, and implications." *MIS Quarterly* 34 (2), 233–59.

Chen, D. Q., Preston, D. S. and W. Xia (2010b). "Antecedents and Effects of CIO Supply-Side and Demand-Side Leadership: A Staged Maturity Model." *Journal of Management Information Systems* 27 (1), 231–72.

Chin, W. W. (1998). *The Partial Least Square Approach to Structural Equation Modeling.* G.A. Marcoulides. Mahwah, New Jersey, USA: Lawrence Erlbaum Associates.

Coltman, T., Tallon, P., Sharma, R. and M. Queiroz (2015). "Strategic IT alignment: Twenty-five years on." *Journal of Information Technology* 30 (2), 91–100.

Croteau, A.-M. and F. Bergeron (2001). "An information technology trilogy: business strategy, technological deployment and organizational performance." *The Journal of Strategic Information Systems* 10 (2), 77–99.

Davenport, T. H. (1993). *Process innovation: Reengineering work through information technology.* Boston, Mass. Harvard Business School Press.

Drnevich, P. L. and D. C. Croson (2013). "Information Technology And Business-Level Strategy: Toward An Integrated Theoretical Perspective." *MIS Quarterly* 37 (2), 483–509.

El Sawy, O. A., Malhotra, A., Park, Y. and P. A. Pavlou (2010). "Research Commentary: Seeking the Configurations of Digital Ecodynamics: It Takes Three to Tango." *Information Systems Research* 21 (4), 835–48.

Fornell, C. and D. F. Larcker (1981). "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error." *Journal of Marketing Research* 18 (1), 39–50.

Gatian, A. W., Brown, R. M. and J. O. Hicks, JR. (1995). "Organizational innovativeness, competitive strategy and investment success." *Journal of Strategic Information Systems* 4 (1), 43–59.

Gefen, D., Straub, D. and M.-C. Boudreau (2000). "Structural equation modeling and regression: Guidelines for research practice." *Communications of the Association for Information Systems* 4 (1), 1–77.

Gerow, J. E., Grover, V., Thatcher, J. and P. L. Roth (2014). "Looking Toward the Future of IT-Business Strategic Alignment through the Past: A Meta-Analysis." *MIS Quarterly* 38 (4), 1159–85.

Grant, R. M. (2010). *Contemporary Strategy Analysis.* 7.th ed. West Sussex, UK: Wiley.

Grover, V., Jeong, S.-R., Kettinger, W. J. and C. C. Lee (1993). "The Chief Information Officer: A Study of Managerial Roles." *Journal of Management Information Systems* 10 (2), 107–30.

Grover, V. and R. Kohli (2013). "Revealing Your Hand: Caveats In Implementing Digital Business Strategy." *MIS Quarterly* 37 (2), 655–62.

Hair, J. F. (2010). *Multivariate data analysis.* 7th ed. Upper Saddle River, New Jersey: Prentice Hall.

Hair, J. F. (2014). *A primer on partial least squares structural equations modeling (PLS-SEM).* Los Angeles, USA: SAGE.

Henderson, J. C. and H. Venkatraman (1993). "Strategic alignment: Leveraging information technology for transforming organizations." *IBM Systems Journal* 32 (1), 472–84.

Henfridsson, O., Mathiassen, L. and F. Svahn (2014). "Managing technological change in the digital age: The role of architectural frames." *Journal of Information Technology* 29 (1), 27–43.

Jarvis, C. B., MacKenzie, S. B. and P. M. Podsakoff (2003). "A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research." *Journal of Consumer Research* 30 (2), 199–218.

Johnson, A. M. and A. L. Lederer (2005). "The Effect of Communication Frequency and Channel Richness on the Convergence Between Chief Executive and Chief Information Officers." *Journal of Management Information Systems* 22 (2), 227–52.

Karahanna, E. and D. S. Preston (2013). "The Effect of Social Capital of the Relationship Between the CIO and Top Management Team on Firm Performance." *Journal of Management Information Systems* 30 (1), 15–56.

Karahanna, E. and R. T. Watson (2006). "Information systems leadership." *IEEE Transactions on Engineering Management* 53 (2), 171–76.

Karpovsky, A. and R. D. Galliers (2015). "Aligning in practice: From current cases to a new agenda." *Journal of Information Technology* 30 (2), 136–60.

Kearns, G. S. and A. Lederer (2000). "The effect of strategic alignment on the use of IS-based resources for competitive advantage." *The Journal of Strategic Information Systems* 9 (4), 265–93.

Kearns, G. S. and A. L. Lederer (2003). "A Resource-Based View of Strategic IT Alignment: How Knowledge Sharing Creates Competitive Advantage." *Decision Sciences* 34 (1), 1–29.

Kearns, G. S. and R. Sabherwal (2007). "Strategic Alignment Between Business and Information Technology: A Knowledge-Based View of Behaviors, Outcome, and Consequences." *Journal of Management Information Systems* 23 (3), 129–62.

Keen, P. and R. Williams (2013). "Value Architectures For Digital Business: Beyond The Business Model." *MIS Quarterly* 37 (2), 643–47.

King, J. L. (2011). "CIO: Concept is over." *Journal of Information Technology* 26 (2), 129–38.

King, W. R. and T. S.H. Teo (1997). "Integration Between Business Planning and Information Systems Planning: Validating a Stage Hypothesis." *Decision Sciences* 28 (2), 279–308.

Lu, Y. and K. Ramamurthy (2011). "Understanding the Link Between Information Technology Capability and Organizational Agility: An Empirical Examination." *MIS Quarterly* 35 (4), 931–54.

Luftman, J. (2000). "Assessing Business-IT Alignment Maturity." *Communications of the Association for Information Systems* 4 (14), 1–49.

MacKenzie, S. B., Podsakoff, P. M. and N. P. Podsakoff (2011). "Construct Measurement and Validation Procedures in MIS and Behavioral Research: Integrating New and Existing Techniques." *MIS Quarterly* 35 (2), 293–334.

Mata, F. J., Fuerst, W. L. and J. B. Barney (1995). "Information Technology and Sustained Competitive Advantage: A Resource-Based Analysis." *MIS Quarterly* 19 (4), 487–505.

Mintzberg, H. (1987). "The Strategy Concept I: Five Ps For Strategy." *California Management Review* 30 (1), 11–24.

Mintzberg, H. (1989). *Mintzberg on management: Inside our strange world of organizations.* New York, USA: Simon and Schuster.
Mintzberg, H. and J. A. Waters (1985). "Of Strategies, Deliberate and Emergent." *Strategic Management Journal* 6 (3), 257–72.
Mithas, S. and H. C. Lucas (2010). "What is Your Digital Business Strategy?" *IT Professional* 12 (6), 4–6.
Mithas, S., Ramasubbu, N. and V. Sambamurthy (2011). "How Information Management Capability Influences Firm Performance." *MIS Quarterly* 35 (1), 237–56.
Mithas, S., Tafti, A. R., Bardhan, I. and J. Mein Goh (2012). "Information technology and firm profitability: mechanisms and empirical evidence." *MIS Quarterly* 36 (1), 205–24.
Nunnally, J. C., Ira H. Bernstein, and Jos M. t. Berge (1967). *Psychometric theory.* New York, USA: McGraw-Hill.
OECD (2013). *OECD Science, Technology and Industry Scoreboard 2013.* OECD Science, Technology and Industry Scoreboard. Paris, France: Organization for Economic Cooperation & Development.
Oppenheim, A. N. (2000). *Questionnaire design, interviewing and attitude measurement.* London, UK: Bloomsbury Publishing.
Peppard, J. and J. Ward (2004). "Beyond strategic information systems: Towards an IS capability." *The Journal of Strategic Information Systems* 13 (2), 167–94.
Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y. and N. P. Podsakoff (2003). "Common method biases in behavioral research: A critical review of the literature and recommended remedies." *Journal of Applied Psychology* 88 (5), 879–903.
Porter, M. E. (1996). "What is Strategy?" *Harvard Business Review* 74 (6), 51–54.
Porter, M. E. (2001). "Strategy and the Internet." *Harvard Business Review* 79 (3), 62–78.
Preston, D. S., Chen, D. and D. E. Leidner (2008). "Examining the Antecedents and Consequences of CIO Strategic Decision-Making Authority: An Empirical Study." *Decision Sciences* 39 (4), 605–42.
Preston, D. S. and E. Karahanna (2009). "Antecedents of IS Strategic Alignment: A Nomological Network." *Information Systems Research* 20 (2), 159–79.
Queiroz, M. (2017). "Mixed results in strategic IT alignment research: A synthesis and empirical study." *European Journal of Information Systems* 26 (1), 21–36.
Rai, A., Patnayakuni and N. Seth (2006). "Firm Performance Impacts of digitally enabled Supply Chain Integration Capabilities." *MIS Quarterly* 30 (2), 225–46.
Reich, B. H. and I. Benbasat (2000). "Factors That Influence the Social Dimension of Alignment between Business and Information Technology Objectives." *MIS Quarterly* 24 (1), 81–113.
Reynolds, P. and P. Yetton (2015). "Aligning business and IT strategies in multi-business organizations." *Journal of Information Technology* 30 (2), 101–18.
Ringle, C. M., Sarstedt, M. and D. Straub (2012). "A critical look at the use of PLS-SEM in MIS Quarterly." *MIS Quarterly* 36 (1).
Ringle, C. M., Sven Wende, and J.-M. Becker (2016). *SmartPLS 3.2.6.* Boenningstedt, Germany: SmartPLS GmbH. http://www.smartpls.com.
Sabherwal, R. and Y. E. Chan (2001). "Alignment Between Business and IS Strategies: A Study of Prospectors, Analyzers, and Defenders." *Information Systems Research* 12 (1), 11–33.
Sharma, S. and A. Rai (2015). "Adopting IS process innovations in organizations: The role of IS leaders' individual factors and technology perceptions in decision making." *European Journal of Information Systems* 24 (1), 23–37.
Snell, S. A. and J. W. Dean (1992). "Integrated Manufacturing and Human Resource Management: A Human Capital Perspective." *Academy of Management Journal* 35 (3), 467–504.
Stephens, C. S., Ledbetter, W. N., Mitra, A. and F. Nelson Ford (1992). "Executive or Functional Manager? The Nature of the CIO's Job." *MIS Quarterly* 16 (4), 449.
Straub, D., Boudreau, M.-C. and D. Gefen (2004). "Validation Guidelines for IS Positivist Research." *Communications of the Association for Information Systems* 13 (1), 380–427.
Straub, D. W. (1989). "Validating Instruments in MIS Research." *MIS Quarterly* 13 (2), 147–69.

Teece, D., Peteraf, M. and L. Sohvi (2016). "Dynamic Capabilities and Organizational Agility Risk, Uncertainty, and Strategy in the Innovation Economy." *Sloan Management Review* 58 (4).

Teece, D. J. (2010). "Business Models, Business Strategy and Innovation." *Long Range Planning* 43 (2-3), 172–94.

Tilson, D., Lyytinen, K. and C. Sørensen (2010). "Research Commentary —Digital Infrastructures: The Missing IS Research Agenda." *Information Systems Research* 21 (4), 748–59.

Worthington, R. L. and T. A. Whittaker (2006). "Scale Development Research: A Content Analysis and Recommendations for Best Practices." *The Counseling Psychologist* 34 (6), 806–38.

Wu, S. P.-J., Straub, D. W. and T. Liang (2015). "How information technology governance mechanisms and strategic alignment influence organizational performance: Insights from a matched survey of business and IT managers." *MIS Quarterly* 39 (2), 497–518.

Wunderlich, N. and R. Beck (2017a). "25 Years of CIO and IT Leadership – Revisiting Managerial Roles in Information Systems Research." *Proceedings of the 21st Pacific Asia Conference on Information Systems (PACIS 2017); Langkawi, Malaysia*.

Wunderlich, N. and R. Beck (2017b). "We've Got the Power – The Relevance of IT Leadership and Organizational IT Capabilities in the Fully Digitized Business Era." *Proceedings of the 25th European Conference on Information Systems (ECIS 2017); Guimaraes, Portugal*.

Yoo, Y. (2010). "Computing in everyday Life: A Call for research on experiential Computing." *MIS Quarterly* 34 (2), 213–31.

Yoo, Y., Boland, R. J., Lyytinen, K. and A. Majchrzak (2012). "Organizing for Innovation in the Digitized World." *Organization Science* 23 (5), 1398–1408.

Yoo, Y., Henfridsson, O. and K. Lyytinen (2010). "Research Commentary —The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research." *Information Systems Research* 21 (4), 724–35.

Zhu, K., Kraemer, K. L. and S. Xu (2006). "The Process of Innovation Assimilation by Firms in Different Countries: A Technology Diffusion Perspective on E-Business." *Management Science* 52 (10), 1557–76.