Strategic IT management: how companies can benefit from an increasing IT influence

Christopher Reichstein
Hochschule Aalen, Aalen, Germany

Received 7 August 2018
Revised 26 November 2018
Accepted 5 December 2018

Abstract

Purpose – The purpose of this paper is to analyze the value of a strong decision-making information technology (IT) influence within organizations. Although research and managerial practice has repeatedly shown the importance of IT departments within firms and has commented on the influence of IT departments on business performance, prior research has still no evidence about the value of a strong decision-making IT influence yet.

Design/methodology/approach – To prove the influence of the IT department within the company, this study identifies and operationalizes a formative construct determined by four main specifics of the IT department: IT department size, IT department value assessment, IT experience of the top management and degree of digitization. A questionnaire was used to collect the data of 124 experts from companies that could be assigned mainly to the sectors manufacturing, trade as well as information and communication. The data were analyzed using exploratory and confirmatory factor analyses. Further, partial least squares structural equation model (PLS-SEM) was used to test the proposed model.

Findings – The results show that both investments in the size of the IT department as well as in top managers with IT experience, and a high degree of digitization in a company positively influence the role of the IT department. It also shows that a higher general appreciation of the IT department goes hand in hand with a higher influence of IT in the company. The measures are significant as companies, which do have an influential IT department, actually have higher monetary as well as non-monetary business performances.

Practical implications – The study is aimed equally at science and practice, as it provides information on the extent to which more importance should be attached to IT management in the future and what organizational adjustments need to be made.

Originality/value – Despite the ongoing discussions on the importance of IT management for business performance, no existing studies have delivered evidence that there is a significant direct link between the decision-making influence of IT and the extent of corporate performance. The present work therefore has two objectives. The theoretical goal is to clarify the impact of the IT department on business performance and to identify the factors that make up an influential IT department. The practical objective of the research is to provide recommendations on how firms could establish or expand the IT department.

Keywords Business performance, IT business value, Empirical results, Strategic IT management, IT department's influence

Paper type Research paper

1. Introduction

The value of information technology (IT) and its contribution to corporate performance has been one of the most discussed topics in the literature for years. Both scientists and practitioners agree that effective information provision and management can contribute competitive advantage to companies. While competition in the market is significantly increasing, the pressure on companies and their management also increases, and they, in turn, put enormous pressure on individual departments to perform better. Departments must not only justify their existence, but also their position within the company. From a strategic management perspective, this includes a continuous evaluation of the individual business units and an adequate cost-benefit analysis of each department, including IT, to ensure that there is "a source of value creation instead of a cost" (Tippins and Sohi, 2003). Caused by the rapid technological development, the IT department is increasingly moving into the focus of performance evaluation by delivering crucial intangible assets through knowledge and core competencies (Sampler, 1998).

Journal of Enterprise Information Management
Vol. 32 No. 2, 2019
pp. 251-273

1741-0398
DOI 10.1108/JEIM-08-2018-0172

A clearly defined area of responsibility and a strategically defined orientation of the IT department in the company seems indispensable, not only for the established "dot-com companies" of the new economy such as Amazon, Google and Facebook, but also for newly emerging digital business models that focus on web-based services.

The assumption that an IT department only focuses on IT issues including software and hardware maintenance within an organization is based on outdated task areas and corporate structures. In recent years, the IT competence area has undergone major changes, particularly as a result of digitization, from purely operational to strategic activities (Sambamurthy and Zmud, 2000). The competence of IT can be defined as "the set of IT-related knowledge and experience that a business manager possesses" (Bassellier *et al.*, 2003). Accordingly, the IT department of the company has developed into its own strategic business unit, which is supposed to represent a benefit in the company by simplifying and reducing the number of systems and platforms used (Köhler-Schute, 2015). Boynton et al. (1994) investigated the impact of IT management in companies and concluded that most managers have generally acknowledged the benefits and the necessity of using IT to support crucial organizational activities (Boynton *et al.*, 1994). Hence, the importance of the IT department in the company grows with increasing strategic IT decisions and makes it a management task. According to Moura *et al.* (2008), the expertise of the IT department reflects the performance of a company and is a responsibility of the entire company as "[…] there is an alignment of IT with the organization's mission, strategic goals, and expected results" (Moura *et al.*, 2008). While Peppard (2007) claimed that IT has been acknowledged, positioned and managed as an "island" in many organizations. Thus, IT functions are often physically located outside the main business sites.

The disagreement over the status quo of IT management prevails and is reflected in the diverse approaches by scholars dealing investigating IT. Several authors have examined critical success factors of IT management systems in a company (Sumner, 1999; Holland and Light, 1999), whereas emerging empirical findings show no correlation between IT and performance (Mahmood and Soon, 1991; Zahra and Covin, 1993; Hitt and Brynjolfsson, 1996; Powell and Dent-Micallef, 1997). Only a few authors have already critically examined the potentials of strategic IT management systems in companies. As emphasized in literature, outsourcing IT creates benefit for the company (Gorla and Somers, 2014). Han and Mithas (2013) found that firms that outsource IT manage it better and thereby create more value they can then capture. Knowing that IT is relevant for companies and that there are contradictory views on the anchoring of IT departments in firms, two fundamental questions arise, which this current research seeks to answer:

RQ1. What decision-making influence does the IT department have in a company?

RQ2. Is the existence of a supposedly influential IT department in a company justified in the age of digitization?

Despite the ongoing discussions on the importance of IT management for business performance, no existing studies have delivered evidence that there is a significant direct link between the decision-making influence of IT and the extent of corporate performance. The present work therefore has two objectives. The theoretical goal is to clarify the impact of the IT department on business performance and to identify the factors that make up an influential IT department. The practical objective of the research is to provide recommendations on how firms could establish or expand the IT department.

The paper is structured as follows. The next section provides the theoretical foundations and develops a conceptual model that links the specifics of the IT department and its decision-making impact as well as IT department's influence to business performance.

Thereafter, the method section provides information on the data collection process and the measurement validation of the model's constructs. The subsequent section presents the results of the study model. Finally, the paper concludes with a discussion of results and highlights implications for research and practice.

2. Conceptual model and hypotheses development

2.1 Conceptual model

The purpose of this study is to clarify the role of a company's IT department by investigating its decision-making influence on the company's performance. Derived from fundamental theories from psychology, sociology, economics and business informatics, Figure 1 presents the conceptual model of the IT decision influence as well as the connections and hypotheses postulated in the study framework. Overall, the model has 5 related components (i.e., business performance, IT department's influence, specifics of IT department, control variables and covariates) with 11 constructs, which will be discussed separately in the following.

The focus of the investigation model is on the decision-making influence of the IT department within the company. The second, central component of the model is the specifics of the IT department that determine the IT department's influence. The third component of the model is the impact of the IT department's influence on business performance (monetary as well as non-monetary). A fourth aspect in the model is the potential moderators (control variables) of the relationship between the impact of IT (independent variable) and business performance (dependent variable). Finally, the covariate variable (market turbulence) is the fifth part of the study model. These control and covariate variables are integrated to protect against internal (through firm characteristics) as well as external (through environmental characteristics) influences that could distort the relationship between the dependent and independent variable.

2.2 Hypotheses development

The IT department's influence. Sambamurthy and Zmud (1994) have examined the role of the IT management on the company's decision making and found that greater

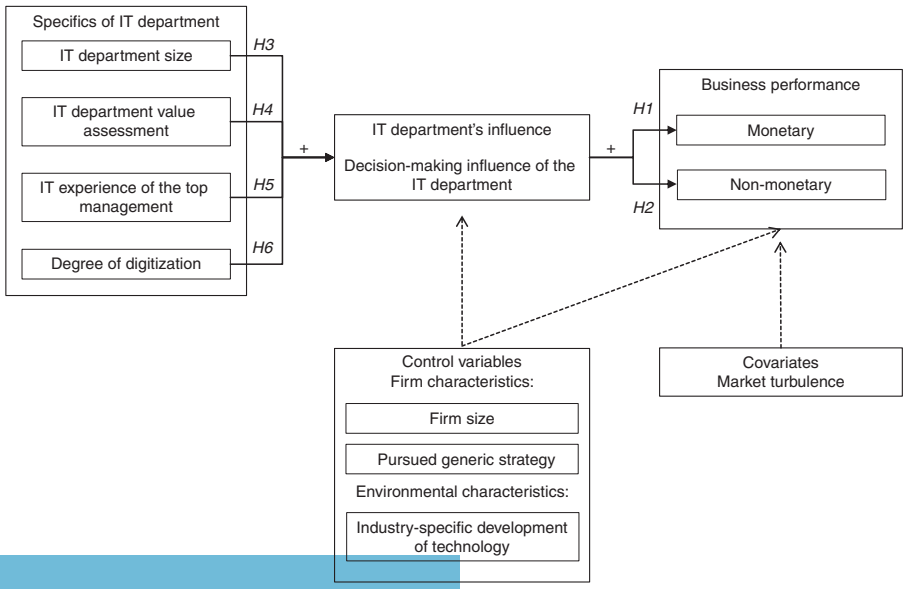

Figure 1.
Conceptual model of IT decision influence

IT management competencies exert a greater impact on the company. These results have been confirmed in other studies (e.g. Soh and Markus, 1995; Sambamurthy and Zmud, 2000; Tanriverdi, 2005). Choosing the IT department's influence as a central driver of business performance is based on Pfeffer and Pfeffer (1981), who showed that the power of individual departments in a company depends on their tasks and their qualifications or abilities (Pfeffer and Pfeffer, 1981). Similarly, Saaty and Khouja (1976) showed that a department holds an influential position in a company especially when it can exercise power through certain skills or resources (Saaty and Khouja, 1976). The IT department within a company is therefore highly influential when it exercises power over important decisions on strategic directions or major investments (Croteau and Bergeron, 2001; Homburg *et al.*, 1999; Soh and Markus, 1995; Sambamurthy and Zmud, 1994). Given that the IT department is able to influence significant strategic decisions in a company, it may also influence business development and, thus, corporate performance. Following the resource-based view (RBV), research – particularly in marketing and management sciences – has shown that individual strategically relevant departments can contribute to a competitive advantage of a company and thus to monetary business development (Chae *et al.*, 2014; Wade and Hulland, 2004). Consequently, an IT department that influences strategic decisions is likely to have an impact on a firm's monetary performance, which leads to the first hypothesis:

H1. An influential IT department positively affects monetary business performance.

A positive relationship between an influential IT and business performance underlines the importance of the IT department for a company. Hereby, business performance is based on monetary and non-monetary performance measures. In the past, companies have focused on performance metrics such as sales, profit and cash flows (Richard *et al.*, 2009). However, financial key figures only relate to past performances, which is why additional indicators are needed to forecast future performance to help companies to make strategic decision (Chakravarthy, 1986; Gerow *et al.*, 2014). In the past decades, non-monetary financial ratios like service quality, customer satisfaction and customer loyalty – especially in the business-to-business sector – have become increasingly important in companies (Moorman and Rust, 1999; Brynjolfsson and Hitt, 2000). The theory of dynamic capabilities (DCP) identifies such variables that affect the relationship between IT and business performance through organizational skills like digital opportunities and entrepreneurial vigilance (Chae *et al.*, 2014; Sambamurthy *et al.*, 2003). Such measures are part of the company's non-monetary performance indicators as they, for example, increase customer value through higher service quality based on new digitization approaches (Moorman and Rust, 1999; Gerow *et al.*, 2014). Hence, when measuring their performance, companies should not only consider the financial outcomes but also take into account the non-financial (customer-related) business development. The second hypothesis is as follows:

H2. An influential IT department positively affects non-monetary business performance.

To comprehend the exact mechanisms through which IT departments affect business performance, one have to critically look at the determinants of their influence.

IT department size. It has long been assumed that a company's IT infrastructure, including the size of its IT department, is an important business resource that can create long-term competitive advantages (Bharadwaj, 2000). As Bharadwaj (2000) described, human IT resources have an important and strong influence on a company, especially on the effectiveness and efficiency of various business areas and processes. Companies with strong IT resources have the advantage of integrating IT and business processes more effectively and can consequently implement them more efficiently in their business units. Powell and Dent-Micallef (1997) argued that human factors contribute more to a company's business

than strategic and economic factors (Powell and Dent-Micallef, 1997). According to the current state of science, the IT influence is strengthened less by the pure increase of the IT budgets than by the enlargement of the IT department in terms of employees (Soh and Markus, 1995). In this context, numerous studies concluded that the positive influence of employees can be explained by their behaviors toward and interactions with other business units and therefore shows significantly more positive performance deviations than other process factors (Byrd and Turner, 2000; Ginsberg and Venkatraman, 1992; Barthélemy and Geyer, 2005; Brynjolfsson and Hitt, 2000; Dedrick *et al.*, 2003; Melville *et al.*, 2004). Neo (1988) also pointed out that investments in human resources can positively influence the interaction between the IT department and other organizational units (Neo, 1988; Powell and Dent-Micallef, 1997). Consequently, an increasing size of the IT department in the company should positively affect the decision-making influence of IT in the company. Therefore, the following hypothesis is postulated:

H3. The size of the IT department increases the decision-making influence of the IT department within the company.

IT department value assessment. According to Tallon *et al.* (2000), respect and appreciation of a department's competences are the basic prerequisite for successful business processes. For more than two decades, the individual acceptance of IT has been a central and recurring topic in information system research (Tallon *et al.*, 2000; Armstrong and Sambamurthy, 1999; Melville *et al.*, 2004; Tanriverdi, 2005). IT acceptance is important because the expected benefits of IT use, such as an increase in efficiency, effectiveness or productivity, cannot be realized if individual users do not accept these systems to cope with their tasks (Bhattacherjee and Sanford, 2006). Lazic *et al.* (2011) argued that IT often does not receive the necessary attention, appreciation and respect. The results of the study prove that the IT department is explicitly crucial for the support, sustainability and growth of companies and that IT governance has become a key factor for corporate success (Lazic *et al.*, 2011). Above all, managers do not always adequately appreciate the benefits of cost-intensive IT infrastructures, which enable their companies to implement the right applications at the right time (Bharadwaj, 2000). Based on the RBV and DCP theories mentioned above, this paper suggests that a department is valued if it is regarded as an important component of a company because of its skills and resources (Moorman and Rust, 1999; Wade and Hulland, 2004). Research in marketing science has also shown that a department is particularly appreciated if it is regarded as strategically relevant and, hence, important for business success (Moorman and Rust, 1999). Therefore, the following hypothesis is postulated:

H4. The value assessment of the IT department increases the decision-making influence of the IT department within the company.

IT experience of the top management. Similar to the research about human capital in terms of the IT department size, there are also investigations about the knowledge and experience of IT personnel, in particular the top management (Tippins and Sohi, 2003; Li and Ye, 1999; Bhatt, 2001; Broadbent and Kitzis, 2005; Chuang *et al.*, 2013). According to Tanriverdi (2005), the experience of the IT department, also referred to as knowledge management, is an important organizational ability through which an IT department can indirectly influence corporate performance. The IT experience of the top management affects employees and managers within the IT department as well as the relationships with other company divisions (Tanriverdi, 2005; Li and Ye, 1999; Sambamurthy and Zmud, 1994). Equally relevant is the ability to effectively transfer and integrate this knowledge where it is needed. Dong *et al.* (2009) emphasized that leadership qualities allowing supply chain processes and business strategy to be adapted to the use of IT play the strongest role in IT

value creation. For a company to follow the suggestions of the IT department, decision makers must have strategic IT-related knowledge and extensive experience in the business area (Tanriverdi, 2005; Sambamurthy *et al.*, 2003; Iyengar *et al.*, 2015). This is, especially for larger IT departments, only possible through a "lobbyist," e.g. an IT executive. Prior research has already examined the relationship between a company's executive leadership with IT experience, for example, the chief information officer (CIO), and the impact of the IT department within the company and found that the more intensive the interaction of the CIO with the top management team (TMT), the sooner the IT visions will be implemented in the firm. (Armstrong and Sambamurthy, 1999; Davenport and Short, 1990; Li and Ye, 1999; Jarvenpaa and Ives, 1991; Hussin *et al.*, 2002). It is therefore assumed that the decision-making influence of the IT department in the company depends more on the IT experience of the top managers than on the experience of individual IT employees. The assumption is because the more members with IT experience sit in the TMT, the stronger the overall influence of IT. Given that there are more members with IT experience in the TMT, one can assume that the overall influence of IT, and consequently, the IT department will be on the company's decision making. Thus, the following hypothesis is set forth:

H5. The IT experience of the top management increases the decision-making influence of the IT department within the company.

Degree of digitization. It is undisputed that digital change has had a significant influence on the strategic orientation of companies (Barua *et al.*, 2004; Härting *et al.*, 2017; Sambamurthy *et al.*, 2003; Urbach and Ahlemann, 2017). Equivalently, the degree of digitization in the business environment also affects the position of the IT department in the company. In their study, Dong *et al.* (2009) argued that the degree of digitization of individual business areas has a strong influence on the efficient coordination along the entire supply chain. Accordingly, companies with a higher degree of digitization can adapt faster to new requirements to benefit therefrom (Dong *et al.*, 2009; Nambisan, 2013; Attaran, 2004). Digital integration, therefore, increases a company's legal capacity to receive real-time information about fluctuations in demand and supply, market information or competitive movements (Sambamurthy *et al.*, 2003; Dong *et al.*, 2009). This is especially critical to business areas with high competitive pressure. Barua *et al.* (2004) claimed that increasing digitization has a positive impact on financial performance. IT departments in modern business environments place a great emphasis on new digitization approaches and, accordingly, IT has a high influence in the company, especially in its ability to innovate (Gordon and Tarafdar, 2007). In their study on the effects of digitization, Sambamurthy *et al.* (2003) found that IT departments have a greater influence on the company through a higher degree of digitization. Generally, a higher degree of digitization has a positive influence on a company's organizational and strategic capabilities and makes it even more agile, dynamic and competitive (Sambamurthy *et al.*, 2003; Brynjolfsson and Hitt, 2000). This, in turn, increases both the competence of the IT department and the effectiveness as well as efficiency of IT processes, which ultimately strengthens the influence of IT in the company. Altogether, these assumptions lead to the final hypothesis:

H6. The degree of digitization increases the decision-making influence of the IT department within the company.

In addition, control variables and covariates were introduced which, although not the main component of the actual research, can exert a specific influence on the observed effects in the context of the questions and are therefore included in the survey. Due to the accompanying focus on the study model, no separate hypotheses were derived for the control variables and covariates. The results of the empirically confirmed effects will nevertheless be taken into account in this study. Based on the current literature, a structural equation model (SEM) has

been developed to examine the influence of the IT department on firm's performance. All journal articles have been checked with respect to their quality using internationally accepted rankings relevant to business information research (Hennig-Thurau *et al.*, 2004). Table I shows a summary of the literature review according to Cooper *et al.* (2006) as well as the assignment to the related topics and constructs.

3. Methodology

3.1 Measure development

By following the standard psychometric theory (Nunnally *et al.*, 1967), all scales and questions (except for the construct degree of digitization) used in the questionnaire are based on previous studies, while only a few items had to be adjusted (see Section 4.1) during the data analysis procedure. Thus, findings from recent research justify the current study design (Homburg *et al.*, 1999; Verhoef and Leeflang, 2009). Most constructs were assessed with multi-item measurements scales except for IT department size, IT experience of the top management, firm size and market turbulence, for which single items were used. All scales measured on a seven-point Likert scale are listed in detail in Table AI.

Construct	Literature
Specifics of IT department	
IT department size	Barthélemy and Geyer (2005), Bharadwaj (2000), Brynjolfsson and Hitt (2000), Byrd and Turner (2000), Dedrick *et al.* (2003), Ginsberg and Venkatraman (1992), Melville *et al.* (2004), Neo (1988), Powell and Dent-Micallef (1997), Verhoef and Leeflang (2009)
IT department value assessment	Armstrong and Sambamurthy (1999), Bharadwaj (2000), Bhattacherjee and Sanford (2006), Lazic *et al.* (2011), Melville *et al.* (2004), Moorman and Rust (1999), Tallon *et al.* (2000), Tanriverdi (2005)
IT experience of the top management	Armstrong and Sambamurthy (1999), Bhatt (2001), Broadbent and Kitzis (2005), Chuang *et al.* (2013), Dong *et al.* (2009), Hussin *et al.* (2002), Iyengar *et al.* (2015), Li and Ye (1999), Sambamurthy *et al.* (2003), Sambamurthy and Zmud (1994), Tanriverdi (2005), Tippins and Sohi (2003)
Degree of digitization	Attaran (2004), Barua *et al.* (2004), Brynjolfsson and Hitt (2000), Dong *et al.* (2009), Gordon and Tarafdar (2007), Härting *et al.* (2017), Nambisan (2013), Sambamurthy *et al.* (2003), Urbach and Ahlemann (2017)
IT department's influence	
Decision-making influence of IT department	Bhattacherjee and Sanford (2006), Croteau and Bergeron (2001), Homburg *et al.* (1999), Santhanam and Hartono (2003), Sambamurthy and Zmud (2000), Soh and Markus (1995)
Business performance	
Monetary Non-Monetary	Gerow *et al.* (2014), Moorman and Rust (1999), Richard *et al.* (2009)
Control variables	
Firm size	Bharadwaj (2000), Brynjolfsson and Hitt (2000), Huselid (1995), Neo (1988), Powell and Dent-Micallef (1997), Soh and Markus (1995)
Pursued generic strategy	Bergeron *et al.* (2004), Grabowski and Lee (1993), Henderson and Venkatraman (1993), Homburg *et al.* (1999), Kim and Lim (1988), Li and Ye (1999)
Industry-specific development of technology	Chen and Paulraj (2004), Jaworski and Kohli (1993), Sabherwal and Kirs (1994), Soh and Markus (1995), Li and Ye (1999)
Covariates	
Market turbulence	Sethi and Iqbal (2008), Jaworski and Kohli (1993), Li and Ye (1999)

Table I.
Summary of literature review

Main variables. The major objective of this study is to explain the IT department's decision-making influence at the level of a strategic business. To assess the IT department's influence on strategic decisions relevant to the company's success, three items were taken from Homburg *et al.* (1999). On a seven-point Likert scale ranging from 1 ("relatively low importance") to 7 ("relatively high importance"), respondents had to indicate the influence of the IT department on, e.g., methods for measuring customer satisfaction and the design of customer service and support. Four of the strategic areas included in Homburg *et al.* (1999) (i.e. pricing decisions, sales strategy, advertising content and selection of strategically important business partners) are primarily the responsibility of marketing management, and, hence, are excluded for the present work. For measuring business performance, ten items were taken and adapted from Moorman and Rust (1999). On a seven-point Likert scale with three anchor points (1 = very bad, 4 = practically equal and 7 = excellent), respondents were asked to assess how their company has performed in comparison to its competitors over the last three years. On five items each, they should indicate the company's non-monetary performance referring to customer-related corporate performance and the company's monetary performance referring its financial corporate performance. Following Powell and Dent-Micallef (1997), the size of the IT department is measured by the number of full-time IT employees relative to the number of full-time employees of the entire company. The IT department value assessment is based on Moorman and Rust (1999) and consists of four items measured on a seven-point Likert scale from 1 ("don't agree at all") to 7 ("agree completely"). Taken from Sambamurthy *et al.* (2003), the IT experience of the top management measures the number of people on the company's management/executive board that gained IT experience in the course of their career. Finally, the degree of digitization is based on Barua *et al.* (2004) and includes four items, such as the implementation of new digitization approaches (e.g. Big Data/Data Mining, Social Software, Mobile and Cloud Computing) and to what extent digital networking is an important success factor in the company. All items are also measured on a seven-Likert scale ranging from 1 ("relatively low importance") to 7 ("relatively high importance").

Control variables. Including control variables (firm as well as environmental characteristics) is important to avoid distortions of the research results and to control for their possible influence on the relationship between IT influence and business performance. Previous studies have shown that "structural factors" such as firm size of an industry can significantly influence the company's ability to convert IT assets into business value (Soh and Markus, 1995; Huselid, 1995). Taking into account the control variable generic strategies, the phenomenon, which describes different market and industry specifics, is to be addressed in equal measure. According to Porter (1980), companies can choose either differentiation or cost leadership as a generic strategy, focusing either on external factors (e.g. competitors, customers) or internal factors (e.g. costs, economies of scale) (Porter, 1980; Homburg *et al.*, 1999; Kim and Lim, 1988). Simultaneously, technological developments not only affect industries differently, but also determine the position of the IT department in the company (Jaworski and Kohli, 1993). Thus, the control variable industry-specific development of technology is implemented, as in technology-driven environments, people with IT experience are highly important for a company to quickly respond to new technological requirements. Finally, market turbulence is included as a covariate controlling for the general uncertainties in the market because unexpected market turbulences can have significant positive or negative impacts on the company's performance (Sethi and Iqbal, 2008).

3.2 Data collection

The data collection took place in the form of a survey in order to be able to carry out a causal-analytical evaluation of the data material later. All questions were designed equally

within the framework of general quantitative study guidelines (Hewson, 2003). The standardized questionnaire aimed at IT experts from all industries in German-speaking countries (i.e. Germany, Austria and Switzerland). For participants to be identified as such an expert, the survey included several criteria. The expert holds the position of a chief digital officer (CDO) and is responsible for planning and controlling IT in the company. If the CDO position is not available in a company, the head of IT or the executive board/managing director should answer the questionnaire. Otherwise, the questionnaire should be answered by manager being responsible for IT management (division/IT manager) or at least by employees of the IT department with managerial functions (team/project/group leader). The classification of enterprises by sector is based on the European Classification of Economic Activities (NACE Rev. 2) (Eurostat, 2018).

In order to achieve an appropriate sample size, a structured sampling procedure was carried out. The link to the survey was sent by e-mail to various executives with IT background through over 2,500 selected company addresses. To increase the response rate and to ensure that the questionnaire is completed by selected IT managers, the questionnaire was followed up by telephone, e-mail and social media (via Xing and LinkedIn), especially at the beginning of the data collection period. In addition, each respondent was offered both a monetary and a non-monetary incentive to motivate participation in this study. In return for their participation, all experts received an exclusive, descriptively evaluated results report and an e-book worth €16.90 as print edition. As additional incentive, €1was donated to a local aid organization for each completed questionnaire.

The online survey was conducted using the open source software LimeSurvey (www.limesurvey.org). Two pre-test runs were carried out in October and November 2017 to increase the validity of the questionnaire. Based on these results, the questionnaire was revised and included four major parts: the first part contains questions about the IT department in the company and measured its size, the IT experience of top management, the appreciation of the IT department and the degree of digitization. The second part is related to the basic orientation of the company and, hence, included questions on the company's generic strategies and decision fields. The third part contains questions about the technology development and market turbulences in the business area. Finally, respondents had to answer several general questions about sales, company performance/size and personal details (e.g. job position and professional experience). The main study started in December 2017 and ended in March 2018. Of the roughly 2,500 questionnaires sent out, 293 IT experts answered the survey, resulting in a response rate of approximately 12 percent. After eliminating incomplete questionnaires to avoid distortions in the following data analyses, the final sample consists of 124 experts. The final sample contained only completed questionnaires, since missing values can lead to considerable distortions and even useless data analysis (Weiber and Mühlhaus, 2014).

As outlined in Table II, the majority of experts work in the manufacturing industry/goods manufacturing (27.4 percent), followed by trade (16.1 percent) and the information/communication sector (13.7 percent). About 70 percent of the experts are employed in companies with more than 100 employees. Almost one-fourth of the companies (23.4 percent) the respondents work for have a managing director/executive board member for IT. The majority of the surveyed experts (58.1 percent) have more than five years of professional experience in the IT department and are currently in the "head of IT" position (33.9 percent). Further details with respect to the sample structure can be found in Table II.

3.3 Data analysis

To test the theoretical causal model, the obtained data were analyzed using partial least squares structural equation modeling. Partial least squares structural equation

Characteristics	Criteria	%
Industry	Manufacturing industry/production of goods	27.4
Which of the following industries does your business unit belong to?	Trade, transport and warehousing	16.1
	Information and communication	13.7
	Others (consulting, electrical industry, etc.)	12.1
	Public administration, health and social services	9.7
	Professional, scientific and technical services	6.5
	Miscellaneous services	6.5
	Construction/Construction	4.0
	Provision of financial and insurance services	3.2
	Real estate and housing	0.8
Sector	B2B	62.9
Please indicate whether the major share of your turnover was generated from B2B or B2C markets	B2C	29.0
	No indication	8.1
Sales volume (in €)	Up to 2m	13.7
How high was your company's turnover in the last financial year?	Up to 10m	11.3
	Up to 50m	19.4
	Over 50m	14.5
	No indication	41.1
Number of employees	< 10	6.0
How many full-time employees (expressed in full time positions) work in your company?	10–99	24.0
	100–999	43.0
	1,000–9,999	15.0
	$\geqslant$10,000	12.0
Stock exchange listed	Yes	10.5
Is your company listed on the stock exchange?	No	89.5
Size of the IT department	< 10	53.0
How many employees (expressed in full positions) are approximately in your IT department?	10–99	34.0
	100–999	10.0
	$\geqslant$1,000	3.0
IT Budget	0% up to $< 5\%$	0.8
What percentage of revenue is currently (approximately) flowing into the IT budget? (incl. personnel and material costs)	5% up to $< 10\%$	38.7
	10% up to $< 15\%$	8.9
	15% up to $< 20\%$	4.8
	20% up to $< 25\%$	2.4
	25% up to $< 30\%$	2.4
	$> 30\%$	25.0
	No indication	16.9
Managing director/board member IT	Yes	23.4
Does your company have a managing director/managing director for IT?	No	67.7
	No notification	8.9
Job title	CDO/Head of IT	33.9
What is your current position?	Team/Project/Group leader IT	30.6
	Executive board/managing director	20.2
	Others (division manager, IT manager, etc.)	15.3
Profession	No professional experience	6.5
If you summarize your professional experience (not only in your current company), how much time did you spend in the functional area/IT department?	Less than 1 year	10.5
	1 to 2 years	5.6
	More than 2 but less than 5 years	19.4
	More than 5 years	58.1

Note: Sum may not add up to 100 percent due to rounding

Table II.
Sample structure

model (PLS-SEM) belongs to the second generation of multivariate data analysis, which, unlike cluster analysis or linear regression, provides a deeper insight into the analysis of the data by focusing on individual relationships between existing variables (Hair *et al.*, 2016). Before testing the SEM and, thus, the hypothesized relationships between

the latent variables, one must first assess the measurement model, which can include formative or reflective latent variables and constructs (Hair *et al.*, 2016). For testing both, the measurement model and the structural model, SmartPLS 3 was used to calculate the path coefficients and to test for significance due to its robustness and data requirements (Ringle *et al.*, 2015; Chin, 1998; Hair *et al.*, 2016). Compared to other data analysis methods, this causal analysis allows investigating directed dependencies while accounting for measurement errors and correlations among the independent variables (Chin, 1998; Hair *et al.*, 2016). A major advantage of this method is the identification of causal chains and interdependencies without the requirement of large sample sizes (Hair *et al.*, 2016). In opposite to other tools for SEM calculation such as AMOS or LISREL, SmartPLS calculates the structural path coefficients and its significance via bootstrapping that allows testing the statistical significance of various PLS-SEM results including path coefficients, indirect effects, R^2, item reliabilities (IR), average variance extracted (AVE), composite reliability (CR), Cronbach's α (CA) and Heterotrait–Monotrait (HTMT) ratio of correlations (Hair *et al.*, 2016).

4. Measurement model and research results

4.1 Measurement model

Before analyzing the structural model including the moderating effects of the control variables, the measurement scales of the latent variables, all being reflectively measured, were checked for reliability (internal consistency) and validity (both convergent and discriminant validity). To check every single construct for internal consistency, i.e. for reliability, the key figures of CA and CR were used as quality criteria. In addition, the convergence validity of each construct was calculated in order to be able to make statements about the outer loadings of the individual indicators, also known as IR, as well as the AVE. As a result, the measurement model shows good psychometric properties (see Table AI) regarding the common quality criteria CA, AVE, IR and CR. All SEM paths exceed the thresholds defined by literature of 0.70 for CA, 0.60 for CR and 0.50 for AVE (Hair *et al.*, 2016). The outer loadings of the indicators (IR) show to what extent the constructs capture what the indicators have in common (Hair *et al.*, 2016). According to Hair *et al.* (2016), outer loadings should exceed values above 0.708, since squaring this ratio describes how much variance of the item is explained by the respective construct. Consequently, values of the AVE of over 0.5 are desirable.

Another quality criterion measured is the discriminant validity of the underlying constructs. The discriminant validity of a construct assesses both the distinctiveness of other constructs and cross-loadings of indicators with the individual constructs (Hair *et al.*, 2016). If indicators do not meet these criteria, they can be removed iteratively. In the IT department's influence construct of the designed model, four items (i.e. pricing decisions, sales strategy, advertising content and selection of strategically important business partners) fell below the requirement level of 0.50, which is why they were removed because of their insufficient outer loadings. After the elimination of these items, it became clear that the measurement model meets all requirements. Likewise, one item (efforts to achieve cost advantages in material procurement) of the pursued generic strategy (cost leadership strategy) construct had to be eliminated due to a too low outer loading. If the individual indicator loadings for measuring a construct fluctuate relatively strongly (i.e. if the outer loadings move between 0.60 and 0.80), as in the case for the focus construct IT department's influence, it makes sense to use the quality criterion HTMT ratio (Hair *et al.*, 2016). The HTMT assesses "the ratio of the between-trait correlations to the within-trait correlations" (Hair *et al.*, 2016). Following Hair *et al.* (2016), the HTMT criterion practically estimates the correlation between two constructs assuming that they were perfectly measured, i.e. reliable, and should not exceed a value of 0.90. Since all HTMT values in the model are below the

limit of 0.90, there is no lack of discriminant validity. However, it has to be noted that there is no need to fulfill all quality criteria, if the overall measurement model exhibits high-quality standards. Individual quality measures can be neglected, if only slightly undercut or exceeded (Homburg, 2000). Thus, the coefficient of determination (R^2) for the overall measurement model within this study is in a moderate range ($0.36 > 0.19$) according to Chin (1998). According to this, more than a third of the variance of the IT influence is represented by the IT department specifics. With respect to monetary (30.7 percent) and non-monetary (27.3 percent) business performance, both constructs show that a large part of the variance is reflected by the decision-making influence of the IT department.

Finally, the determinants of the IT departments influence were also tested for independence to ensure that there is no multicollinearity (Chin, 1998). The variance inflation factor (VIF) of the individual constructs was measured to check the quality of the model also with regard to possible method distortions due to possible collinearities and a common method bias. Considering, for example, *H4* ("IT department value assessment"), it must be stated that a subjective self-assessment by IT experts could take place. This possible lack of objectivity could possibly lead to distortions of results. After all, a complete collinearity test has shown that all constructs in the measurement model have a VIF less than 3.3, so that the model can be considered free of common method distortions (Kock, 2015).

4.2 Research result

Figure 2 illustrates a summary of the overall research model results related to the IT department's influence providing support for *H1–H6*.

H1 examines whether the decision-making influence of the IT department increases the financial business performance in the company. The empirical analysis shows a significant impact of an influential IT department on the monetary business performance. Due to a positive and significant path coefficient ($\beta = 0.16$; $p \leqslant 0.05$), *H1* can be confirmed. *H2* assumes that the influence of the IT department also increases the non-monetary business development in the company. Consequently, the results show that an influential IT department significantly influences a company's non-monetary business development by having both a positive and a significant path coefficient ($\beta = 0.19$; $p \leqslant 0.1$). Thus, *H2* can

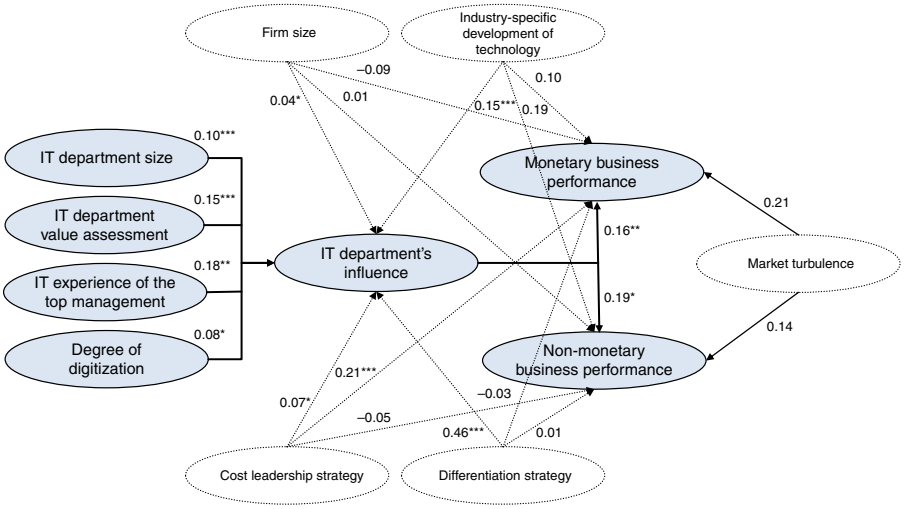

Figure 2.
Results of the SEM

Notes: *$p \leqslant 0.1$; **$p \leqslant 0.05$; ***$p \leqslant 0.01$

be confirmed, too. *H3* investigates whether the size of an IT department (measured by the number of employees) increases the decision-making influence of the IT department in the company. As *H3* can be confirmed due to a positive and highly significant path coefficient ($\beta = 0.1$; $p \leqslant 0.01$), the IT department size increases the decision-making influence of the IT within the company. *H4* expects that the appreciation of the IT department increases the decision-making influence of the IT department. As there is also a positive and highly significant impact ($\beta = 0.15$; $p \leqslant 0.01$), the hypothesis cannot be rejected. Consequently, appreciation including respect and perceived contribution to the company increases the influence of the IT department. *H5* examines whether the IT experience of top management increases the decision-making influence of IT in the company. The results of the SEM support the hypothesis based on a positively significant path coefficient ($\beta = 0.18$; $p \leqslant 0.05$). *H6* finally demonstrates to what extent an increased decision-making influence of the IT department depends on the degree of digitization of the company. According to that, the causal analysis shows a positive and significant influence ($\beta = 0.08$; $p \leqslant 0.1$) of the degree of digitization on the decision-making influence of the IT department within the company. Thus, *H6* can be confirmed, too.

With regard to the control variables introduced, it can be seen that both pursued generic strategies (cost leadership and differentiation strategy) show significant effects in the model. The results of the causal model point out that companies that pursue a corporate strategy, whether cost leadership or differentiation strategy, have a positive and significant impact on the influence of the IT department. While the choice of the differentiation strategy has an over six times higher effect on the influence of the IT department ($\kappa = 0.46$ vs $\kappa = 0.07$; both $p \leqslant 0.01$), the cost leadership strategy also has a strongly significant and positive influence on the monetary business performance ($\kappa = 0.21$; $p \leqslant 0.01$). Furthermore, it should be mentioned that both the company size ($\kappa = 0.04$; $p \leqslant 0.1$) and the industry-specific development of technology ($\kappa = 0.15$; $p \leqslant 0.01$) have a positive effect on the influence of the IT department. As the size of the company and the technology development of the sector in which the company is located increases, so does the influence of IT. Only the covariable "market turbulence" shows no significance, which is why it is not taken into account in further analysis. The results of the SEM paths and coefficients are summarized in Table III.

5. Discussion

After systematic consideration of previous findings from the literature, scientists do not agree on the role and influence of the IT department as well as the resulting importance of the IT for the company. The study therefore provides information on the extent to which the IT management has a right to exist in the company. The results of the PLS-SEM analysis to what degree an influence in the company can be attributed to the IT department today. It turns out that the IT department has a direct influence on the performance of the company. Thus, it has been empirically proven that the decision-making influence of the IT department has a positive impact on both monetary and non-monetary business performance. The study therefore has interesting implications for research and practice that are discussed below, together with the limitations of the study. Finally, an outlook for future research and a conclusion follows.

5.1 Research implications

The paper offers essential theoretical and methodological contributions regarding the strategic role of IT. The value of IT, especially the monetary contribution of IT to business success, can now be measured directly by operationalizing the decision-making influence of the IT department. The study not only shows that a high decision-making influence of the IT department has a positive influence on the monetary and non-monetary business development of the company, but also on which factors the decision-making influence of the

Hypothesis	SEM path	Path coefficient (β)	p-Value
Impacts			
H1	IT influence → business performance (monetary)	0.16	0.03**
H2	IT influence → business performance (non-monetary)	0.19	0.07*
Determinants			
H3	Size of IT department → IT influence	0.10	0.01***
H4	IT department value assessment → IT influence	0.15	0.00***
H5	IT experience of top management → IT influence	0.18	0.04**
H6	Degree of digitization → IT influence	0.08	0.06*
Control variables			
No hypotheses generated	Differentiation strategy → IT influence	0.46	0.00***
	Differentiation strategy → business performance (monetary)	−0.03	0.78
	Differentiation strategy → business performance (non-monetary)	0.01	0.89
	Cost leadership strategy → IT influence	0.07	0.10*
	Cost leadership strategy → business performance (monetary)	0.21	0.01***
	Cost leadership strategy → business performance (non-monetary)	−0.05	0.66
	Market turbulence → business performance (monetary)	0.21	0.39
	Market turbulence → business performance (non-monetary)	0.14	0.49
	Technical development → IT influence	0.15	0.01***
	Technical development → business performance (monetary)	0.10	0.41
	Technical development → business performance (non-monetary)	0.19	0.33
	Firm size → IT influence	0.04	0.09*
	Firm size → business performance (monetary)	−0.09	0.31
	Firm size → business performance (non-monetary)	0.01	0.93

Notes: *$p \leq 0.1$; **$p \leq 0.05$; ***$p \leq 0.01$

Table III.
SEM coefficients

IT department depends. Interestingly, the size of the IT department, its value assessment, the IT experience of the top management and the degree of digitization increase the standing of IT in the company. While the effect of the degree of digitization – based on the survey results – only plays a minor role for an increased influence of IT within the company, the other determinants show significant impacts. In particular, an investment in the TMT with IT background pays off, since this constitutes the largest part of the decision-making influence in the company. The higher the IT experience of the top management, the higher the decision-making influence of the IT department and the stronger its influence on business performance. The results confirm Jarvenpaa and Ives' (1991) findings that the functional background and expertise of a manager positively influences the perception of a department. As a result, the perception of the importance of the IT department increases with the accumulated IT experience of the managing directors and board chairmen. Similarly, it becomes apparent that the greater the value assessment of IT in the company, the greater its influence. Iyengar *et al.* (2015, p. 634) emphasized that a "conceptualization of IT use as a learning mechanism paves the way to a profound understanding and richer appreciation of its role within organizations." A higher appreciation of the IT department in the company therefore requires a higher acceptance of the employees in the company on general IT-related topics. Thus, the organization benefits from the technological possibilities, especially when employees outside the IT department take on IT topics and combine them with their own experience and knowledge. Here, openness to technology and the will to develop the personal skills of each individual employee are essential. The same applies to the degree of digitization within the company because a high degree of digitization not only increases the strategic capabilities of the IT department, but also the financial as well as customer-related company performance. With the independently

developed construct degree of digitization, new scales are also available to science and practice for further work, which have shown outstanding quality values within the investigated measurement model. The degree of digitization includes new digitization approaches as well as increasing digital networking within the company, which ultimately has the effect of increasing the efficiency and effectiveness of business processes (Härting *et al.*, 2017; Sambamurthy *et al.*, 2003). Looking finally at the size of the IT department in relation to the entire company, it becomes clear that the larger the IT department, the stronger the influence on decision making. However, it should be noted that "the bigger, the better" or "as bigger, as stronger" only applies to a limited extent, since the larger the department, the more likely it is that IT will become slower and thus less flexible. Because the size of the IT department is limited for organizational reasons, the influence of the IT department and the resulting positive effects on business performance cannot be unlimited. There is even a positive correlation between the size of the IT department and firm's willingness to outsource (Barthélemy and Geyer, 2005). According to Barthélemy and Geyer (2005), the decision for or against outsourcing depends on a variety of internal (i.e. asset-specificity, size and internal organization of IT) and external (i.e. institutional framework conditions) factors and must be examined for each individual case due to the complexity of the underlying decision criteria. Surprisingly, the choice of differentiation strategy over cost leadership strategy has an over six times greater impact on the IT department's decision-making influence. Companies pursuing a differentiation strategy are therefore likely to have a more influential IT department. One reason for this could be the fact that IT departments today have to focus more and more on external aspects, such as meeting customer needs through appropriate web services (Li and Ye, 1999). Li and Ye (1999) could prove nearly two decades ago that an external orientation of IT through participation in strategic decisions such as market expansion or product development has a stronger effect on the company performance than a purely internal focus.

5.2 Managerial implications

The results imply that companies should strengthen the IT department by increasing its influence. Increased support for top management, e.g. in the form of investments in IT managers, increases the possibility of an influential IT in the company. But it is not only important that the IT department gains influence, it is also important that IT supports the company's goals and strategies. Thus, implementing IT governance is a critical success factor for business development to ensure that corporate goals and strategies are followed (Lazic *et al.*, 2011). For a long-term competitive advantage, IT experts are considered one of the most important resources in the company (Bharadwaj, 2000; Brynjolfsson and Hitt, 2000). As the influence of the IT department and the associated contribution to corporate performance grows through acceptance and appreciation of IT, companies and their managers can be recommended to train their employees so that they are open to relevant IT topics and thus actively participate in the digitization process themselves. With the growing size of a company and the increasing technological development of an industry, the influence of IT increases, too. Consequently, the more dynamic the technological developments in an industry are, the stronger the external orientation of a company should be and the more IT investments pay off. Accordingly, it also pays to increase the degree of digitization in order to increase the influence of IT in the company. The most important digital technologies that are currently relevant for companies to increase the degree of digitization include Business Analytics/Intelligence, Mobile/Cloud Computing, Big Data, ERP/CRM applications and IT security (Härting *et al.*, 2017; Luftmann and Kempaiah, 2008). On the one hand, a strong digital network is a critical and decisive success factor within the company. On the other hand, the success of a digitization process depends largely on the investments in IT and the available IT budget as the implementation of digitization

processes is key cost factors in fiscal year planning and in most cases, the necessary resources are not fully available to maximize the high level of digitization (Sambamurthy *et al.*, 2003; Brynjolfsson and Hitt, 2000). Since the influence of the IT department increases with the size of the company, the expansion of an influential IT department is particularly necessary for small- and medium-sized enterprises (SMEs) in order to increase business performance. In particular, IT outsourcing could be an option for SMEs if they operate in less technology-driven industries, because, conversely, the smaller the company and the lower the industry-specific technological development is, the smaller the influence of IT in the company will be. Finally, outsourcing and the associated isolation of IT can lead to a certain IT blindness due to a lack of understanding for the technological interests of the company (Ciborra and Lanzara, 1994).

5.3 Limitations

Nevertheless, the study is limited by a few factors that show possible improvements for future research. First, it can be said that the sample of $n = 124$ experts is sufficient for empirical studies, but relatively small for a representative cross-industry study with companies of all sizes (Chin, 1998). In order to avoid possible distortions in the future and to take account of the different conditions in the individual industries, a stronger focus should be placed on the particularities of different company sizes as well as on industry specifics. In Germany, for example, there are not only major differences in terms of the degree of digitization when differentiating according to company size, but also when looking at different sectors (Bundesministerium für Wirtschaft und Energie, 2017). Second, the survey aims at experts from German-speaking countries (Germany, Austria and Switzerland). From an international point of view, however, a study in other countries would make sense, especially in order to be able to make country comparisons. Third, the study carried out considers IT in absolute figures and thus not in relation to other departments in the company.

5.4 Future research

An intra-organizational investigation would be desirable measuring the influence of decision making and the respective scope on the company performance for all departments. In addition, it would certainly be of great importance for business practice to know to what extent the department-specific influence develops over a longer period of time. This would require a long-term study or a replication study with structurally identical data sets. Furthermore, it should be examined to what degree the focus construct, which measures the effects on the decision-making influence of the IT department, should be extended by further determinants. For example, the degree of innovation in the company could have a positive effect on the influence of IT, since IT competencies already influence the success of implementing innovations in companies in various phases of the innovation process (Tarafdar and Gordon, 2007). The results of the investigation also show that the influence of the IT department can be represented in particular by customer-related strategy decisions, e.g. through methods for measuring and programs for increasing customer satisfaction as well as the design of customer service and support. Accordingly, IT has an increased influence on strategic decisions that directly affect customer relations. For example, IT uses the technological possibilities to collect and analyze data on customer patterns, interpret customer behavior and develop predictive models for CRM (Chen and Popovich, 2003). Consequently, it can be assumed that with the increasing importance of CRM in the company, the influence of the IT department will also grow. In order to take account of these potential influencing variables, which were not taken into account in the study model, it is advisable to consider extended method approaches. For example, qualitative comparative analysis (QCA) could be used as an extended investigation method, which is mainly used in

management and strategy research. QCA is also a causal analysis with the advantage that it combines qualitative and quantitative research approaches, which can result in new revealing combinations of the already established causal relationships (Ragin, 2014).

6. Conclusion

An increasing competition and the associated cost pressure require an increase in efficiency and are one of the main motives for companies to equip IT for the age of digital change (Singh and Hess, 2017). Important findings of the study are the knowledge of significant influencing determinants of the IT department that offer enormous potential for a sustainable success of a company. In a growing digital market environment, investments in the IT department, specifically in its management and relative size, the degree of digitization and the value assessment of IT, create advantages over competitors and have positive effects on business performance. Hence, the tasks of an IT department have changed considerably over the last few years, not least due to digitization and Industry 4.0. Through social networking and the Internet of Things, the IT department has established itself as an elementary business area that no modern company can do without in order to survive on the market in the long term. Especially new requirements due to the progressive digitization have led to an organizational change in the IT department. The competencies of pure system support have receded into the background; the focus is on the integration of new services and technologies. The involvement of the IT department in strategic decisions and corporate planning is a critical success factor in terms of monetary as well as non-monetary performance and more than ever one of the key issues for IT executives (Luftmann and Kempaiah, 2008). It is already clear today that the IT department, as part of a growing complexity of the company, must be given the necessary decision-making leeway to be able to contribute to increasing business performance. As the majority of companies still have some catching up to do in anchoring IT knowledge in the TMT and increasing the degree of digitization, the topic of the organizational and strategic orientation of IT will continue to be relevant for both research and practice.

References

Armstrong, C.P. and Sambamurthy, V. (1999), "Information technology assimilation in firms: the influence of senior leadership and IT infrastructures", *Information Systems Research*, Vol. 10 No. 4, pp. 304-327.

Attaran, M. (2004), "Exploring the relationship between information technology and business process reengineering", *Information & Management*, Vol. 41 No. 5, pp. 585-596.

Barthélemy, J. and Geyer, D. (2005), "An empirical investigation of IT outsourcing versus quasi-outsourcing in France and Germany", *Information & Management*, Vol. 42 No. 4, pp. 533-542.

Barua, A., Konana, P., Whinston, A.B. and Yin, F. (2004), "An empirical investigation of net-enabled business value", *MIS Quarterly*, Vol. 28 No. 4, pp. 585-620.

Bassellier, G., Benbasat, I. and Reich, B.H. (2003), "The influence of business managers' IT competence on championing IT", *Information Systems Research*, Vol. 14 No. 4, pp. 317-336.

Bergeron, F., Raymond, L. and Rivard, S. (2004), "Ideal patterns of strategic alignment and business performance", *Information & Management*, Vol. 41 No. 8, pp. 1003-1020.

Bharadwaj, A.S. (2000), "A resource-based perspective on information technology capability and firm performance: an empirical investigation", *MIS Quarterly*, Vol. 24 No. 1, pp. 169-196.

Bhatt, G.D. (2001), "Knowledge management in organizations: examining the interaction between technologies, techniques, and people", *Journal of Knowledge Management*, Vol. 5 No. 1, pp. 68-75.

Bhattacherjee, A. and Sanford, C. (2006), "Influence processes for information technology acceptance: an elaboration likelihood model", *MIS Quarterly*, Vol. 30 No. 4, pp. 805-825.

Boynton, A.C., Zmud, R.W. and Jacobs, G.C. (1994), "The influence of IT management practice on IT use in large organizations", *MIS Quarterly*, Vol. 18 No. 3, pp. 299-318.

Broadbent, M. and Kitzis, E. (2005), "Interweaving business-driven IT strategy and execution: four foundation factors", *Ivey Business Journal*, Vol. 69 No. 3, pp. 1-6.

Brynjolfsson, E. and Hitt, L.M. (2000), "Beyond computation: information technology, organizational transformation and business performance", *The Journal of Economic Perspectives*, Vol. 14 No. 4, pp. 23-48.

Bundesministerium für Wirtschaft und Energie (2017), "Monitoring-Report Wirtschaft DIGITAL 2017", available at: www.bmwi.de/Redaktion/DE/Publikationen/Digitale-Welt/monitoring-report-wirtschaft-digital-2017.pdf?__blob=publicationFile&v=18 (accessed May 11, 2018).

Byrd, T.A. and Turner, D.E. (2000), "Measuring the flexibility of information technology infrastructure: exploratory analysis of a construct", *Journal of Management Information Systems*, Vol. 17 No. 1, pp. 167-208.

Chae, H.C., Koh, C.E. and Prybutok, V.R. (2014), "Information technology capability and firm performance: contradictory findings and their possible causes", *MIS Quarterly*, Vol. 38 No. 1, pp. 305-326.

Chakravarthy, B.S. (1986), "Measuring strategic performance", *Strategic Management Journal*, Vol. 6 No. 5, pp. 437-458.

Chen, I.J. and Paulraj, A. (2004), "Towards a theory of supply chain management: the constructs and measurements", *Journal of Operations Management*, Vol. 22 No. 2, pp. 119-150.

Chen, I.J. and Popovich, K. (2003), "Understanding customer relationship management (CRM) people, process and technology", *Business Process Management Journal*, Vol. 9 No. 5, pp. 672-688.

Chin, W.W. (1998), "The partial least squares approach to structural equation modeling", *Modern Methods for Business Research*, Vol. 295 No. 2, pp. 295-336.

Chuang, S.H., Liao, C. and Lin, S. (2013), "Determinants of knowledge management with information technology support impact on firm performance", *Information Technology and Management*, Vol. 14 No. 3, pp. 217-230.

Ciborra, C.U. and Lanzara, G.F. (1994), "Formative contexts and information technology: understanding the dynamics of innovation in organizations", *Accounting, Management and Information Technologies*, Vol. 4 No. 2, pp. 61-86.

Cooper, D.R., Schindler, P.S. and Sun, J. (2006), *Business Research Methods*, Vol. 9, McGraw-Hill/Irwin, New York, NY.

Croteau, A.M. and Bergeron, F. (2001), "An information technology trilogy: business strategy, technological deployment and organizational performance", *The Journal of Strategic Information Systems*, Vol. 10 No. 2, pp. 77-99.

Davenport, T.H. and Short, J.E. (1990), "The new industrial engineering: information technology and business process redesign", *MIT Sloan Management Review*, Vol. 31 No. 1, pp. 11-27.

Dedrick, J., Gurbaxani, V. and Kraemer, K.L. (2003), "Information technology and economic performance: a critical review of the empirical evidence", *ACM Computing Surveys (CSUR)*, Vol. 35 No. 1, pp. 1-28.

Dong, S., Xu, S.X. and Zhu, K.X. (2009), "Research note – information technology in supply chains: the value of it-enabled resources under competition", *Information Systems Research*, Vol. 20 No. 1, pp. 18-32.

Eurostat (2018), "Die Statistische Systematik der Wirtschaftszweige – NACE Revision 2", available at: http://ec.europa.eu/eurostat/de/web/nace-rev2 (accessed April 11, 2018).

Gerow, J.E., Grover, V., Thatcher, J.B. and Roth, P.L. (2014), "Looking toward the future of IT-business strategic alignment through the past: a meta-analysis", *MIS Quarterly*, Vol. 38 No. 4, pp. 1059-1085.

Ginsberg, A. and Venkatraman, N. (1992), "Investing in new information technology: the role of competitive posture and issue diagnosis", *Strategic Management Journal*, Vol. 13 No. S1, pp. 37-53.

Gordon, S.R. and Tarafdar, M. (2007), "How do a company's information technology competences influence its ability to innovate?", *Journal of Enterprise Information Management*, Vol. 20 No. 3, pp. 271-290.

Gorla, N. and Somers, T.M. (2014), "The impact of IT outsourcing on information systems success", *Information & Management*, Vol. 51 No. 3, pp. 320-335.

Grabowski, M. and Lee, S. (1993), "Linking information systems application portfolios and organizational strategy", in Banker, R.D., Kauffman, R.J. and Mahmood, M. (Eds), *Strategic Information Technology Management: Perspectives on Organizational Growth and Competitive Advantage*, IGI Publishing, Hershey, PA, pp. 33-54.

Hair, J.F. Jr, Hult, G.T.M., Ringle, C. and Sarstedt, M. (2016), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage Publications, Thousand Oaks.

Han, K. and Mithas, S. (2013), "Information technology outsourcing and non-IT operating costs: an empirical investigation", *MIS Quarterly*, Vol. 37 No. 1, pp. 315-331.

Härting, R.C., Reichstein, C. and Jozinovic, P. (2017), "The potential value of digitization for business – insights from German-speaking experts, INFORMATIK", in Eibl, M. and Gaedke, M. (Eds), *Lecture Notes in Informatics (LNI)*, Gesellschaft für Informatik, Bonn.

Henderson, J.C. and Venkatraman, H. (1993), "Strategic alignment: leveraging information technology for transforming organizations", *IBM Systems Journal*, Vol. 32 No. 1, pp. 472-484.

Hennig-Thurau, T., Walsh, G. and Schrader, U. (2004), "VHB-JOURQUAL: Ein Ranking von betriebswirtschaftlich-relevanten Zeitschriften auf der Grundlage von Expertenurteilen", *Zeitschrift für betriebswirtschaftliche Forschung*, Vol. 56 No. 9, pp. 520-545.

Hewson, C. (2003), *Internet Research Methods: A Practical Guide for the Social and Behavioural Sciences*, Sage, London.

Hitt, L.M. and Brynjolfsson, E. (1996), "Productivity, business profitability, and consumer surplus: three different measures of information technology value", *MIS Quarterly*, Vol. 20 No. 2, pp. 121-142.

Holland, C.R. and Light, B. (1999), "A critical success factors model for ERP implementation", *IEEE Software*, Vol. 16 No. 3, pp. 30-36.

Homburg, C. (2000), *Kundennähe von Industrieunternehmen: Konzeption, Erfolgsauswirkungen, Determinanten*, Gabler, Wiesbaden.

Homburg, C., Workman, J.P. Jr and Krohmer, H. (1999), "Marketing's influence within the firm", *The Journal of Marketing*, Vol. 62 No. 2, pp. 1-17.

Huselid, M.A. (1995), "The impact of human resource management practices on turnover, productivity, and corporate financial performance", *Academy of Management Journal*, Vol. 38 No. 3, pp. 635-672.

Hussin, H., King, M. and Cragg, P. (2002), "IT alignment in small firms", *European Journal of Information Systems*, Vol. 11 No. 2, pp. 108-127.

Iyengar, K., Sweeney, J.R. and Montealegre, R. (2015), "Information technology use as a learning mechanism: the impact of IT use on knowledge transfer effectiveness, absorptive capacity, and franchisee performance", *MIS Quarterly*, Vol. 39 No. 3, pp. 615-641.

Jarvenpaa, S.L. and Ives, B. (1991), "Executive involvement and participation in the management of information technology", *MIS Quarterly*, Vol. 15 No. 2, pp. 205-227.

Jaworski, B.J. and Kohli, A.K. (1993), "Market orientation: antecedents and consequences", *The Journal of Marketing*, Vol. 57 No. 3, pp. 53-70.

Kim, L. and Lim, Y. (1988), "Environment, generic strategies, and performance in a rapidly developing country: a taxonomic approach", *Academy of Management Journal*, Vol. 31 No. 4, pp. 802-827.

Kock, N. (2015), "Common method bias in PLS-SEM: a full collinearity assessment approach", *International Journal of e-Collaboration*, Vol. 11 No. 4, pp. 1-10.

Köhler-Schute, C. (Ed.) (2015), *Industry 4.0 – A Practice Oriented Beginning*, KS Energy Verlag, Berlin.

Lazic, M., Groth, M., Schillinger, C. and Heinzl, A. (2011), "The impact of IT governance on business performance", *Americas Conference on Information Systems, Detroit, MI, August 4-7*.

Li, M. and Ye, L.R. (1999), "Information technology and firm performance: linking with environmental, strategic and managerial contexts", *Information & Management*, Vol. 35 No. 1, pp. 43-51.

Luftmann, J. and Kempaiah, R. (2008), "Key issues for IT executives 2007", *MIS Quarterly Executive*, Vol. 7 No. 2, pp. 99-112.

Mahmood, M.A. and Soon, S.K. (1991), "A comprehensive model for measuring the potential impact of information technology on organizational strategic variables", *Decision Sciences*, Vol. 22 No. 4, pp. 869-897.

Melville, N., Kraemer, K. and Gurbaxni, V. (2004), "Review: information technology and organizational performance: an integrative model of IT business value", *MIS Quarterly*, Vol. 28 No. 2, pp. 283-322.

Moorman, C. and Rust, R.T. (1999), "The role of marketing", *Journal of Marketing*, Vol. 63, pp. 180-197.

Moura, A., Sauvé, J. and Bartolini, C. (2008), "Business-driven IT management-upping the ante of IT: exploring the linkage between it and business to improve both IT and business results", *IEEE Communications Magazine*, Vol. 46 No. 10, pp. 148-153.

Nambisan, S. (2013), "Information technology and product/service innovation: a brief assessment and some suggestions for future research", *Journal of the Association for Information Systems*, Vol. 14 No. 4, pp. 215-226.

Neo, B.S. (1988), "Factors facilitating the use of information technology for competitive advantage: an exploratory study", *Information & Management*, Vol. 15 No. 4, pp. 191-201.

Nunnally, J.C., Bernstein, I.H. and Berge, J.M.T. (1967), *Psychometric Theory*, Vol. 226, McGraw-Hill, New York, NY.

Peppard, J. (2007), "The conundrum of IT management", *European Journal of Information Systems*, Vol. 16 No. 4, pp. 336-345.

Pfeffer, J. and Pfeffer, J. (1981), *Power in Organizations*, Vol. 33, Pitman, Marshfield, MA.

Porter, M.E. (1980), *Competitive Strategy: Techniques for Analyzing Industries and Competition*, Free Press, New York, NY.

Powell, T.C. and Dent-Micallef, A. (1997), "Information technology as competitive advantage: the role of human, business, and technology resources", *Strategic Management Journal*, Vol. 18 No. 5, pp. 375-405.

Ragin, C.C. (2014), *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies*, University of California Press, Berkeley and Los Angeles.

Richard, P.J., Devinney, T.M., Yip, G.S. and Johnson, G. (2009), "Measuring organizational performance: towards methodological best practice", *Journal of Management*, Vol. 35 No. 3, pp. 718-804.

Ringle, C.M., Wende, S. and Becker, J.M. (2015), "SmartPLS 3. Boenningstedt: SmartPLS GmbH", available at: www.smartpls.com/ (accessed April 10, 2018).

Saaty, T.L. and Khouja, M.W. (1976), "A measure of world influence", *Journal of Peace Science*, Vol. 2 No. 1, pp. 31-48.

Sabherwal, R. and Kirs, P. (1994), "The alignment between organizational critical success factors and information technology capability in academic institutions", *Decision Sciences*, Vol. 25 No. 2, pp. 301-330.

Sambamurthy, V. and Zmud, R.W. (1994), *IT Management Competency Assessment: A Tool for Creating Business Value through IT*, Financial Executives Research Foundation, Morristown, NJ.

Sambamurthy, V. and Zmud, R.W. (2000), "Research commentary: the organizing logic for an enterprise's IT activities in the digital era – a prognosis of practice and a call for research", *Information Systems Research*, Vol. 11 No. 2, pp. 105-114.

Sambamurthy, V., Bharadwaj, A. and Grover, V. (2003), "Shaping agility through digital options: reconceptualizing the role of information technology in contemporary firms", *MIS Quarterly*, Vol. 27 No. 2, pp. 237-263.

Sampler, J.L. (1998), "Redefining industry structure for the information age", *Strategic Management Journal*, Vol. 19, pp. 343-355.

Santhanam, R. and Hartono, E. (2003), "Issues in linking information technology capability to firm performance", *MIS Quarterly*, Vol. 27 No. 1, pp. 125-153.

Sethi, R. and Iqbal, Z. (2008), "Stage-gate controls, learning failure, and adverse effect on novel new products", *Journal of Marketing*, Vol. 72 No. 1, pp. 118-134.

Singh, A. and Hess, T. (2017), "How chief digital officers promote the digital transformation of their companies", *MIS Quarterly Executive*, Vol. 16 No. 1, pp. 1-17.

Soh, C. and Markus, M.L. (1995), "How IT creates business value: a process theory synthesis", *Proceedings of the 6th International Conference on Ion Sources (ICIS 1995), Whistler, September 10-16*, pp. 29-41.

Sumner, M. (1999), "Critical success factors in enterprise wide information management systems projects", *Proceedings of the 1999 ACM SIGCPR Conference on Computer Personnel Research*, pp. 297-303.

Tallon, P.P., Kraemer, K.L. and Gurbaxani, V. (2000), "Executives' perceptions of the business value of information technology: a process-oriented approach", *Journal of Management Information Systems*, Vol. 16 No. 4, pp. 145-173.

Tanriverdi, H. (2005), "Information technology relatedness, knowledge management capability, and performance of multibusiness firms", *MIS Quarterly*, Vol. 29 No. 2, pp. 311-334.

Tarafdar, M. and Gordon, S.R. (2007), "Understanding the influence of information systems competencies on process innovation: a resource-based view", *The Journal of Strategic Information Systems*, Vol. 16 No. 4, pp. 353-392.

Tippins, M.J. and Sohi, R.S. (2003), "IT competency and firm performance: is organizational learning a missing link?", *Strategic Management Journal*, Vol. 24 No. 8, pp. 745-761.

Urbach, N. and Ahlemann, F. (2017), "Die IT-Organisation im Wandel: Implikationen der Digitalisierung für das IT-Management", *HMD -Praxis der Wirtschaftsinformatik*, Vol. 54 No. 3, pp. 300-312.

Verhoef, P.C. and Leeflang, P.S.H. (2009), "Understanding the marketing department's influence within the firm", *Journal of Marketing*, Vol. 73 No. 2, pp. 14-37.

Wade, M. and Hulland, J. (2004), "Review: the resource-based view and information systems research: review, extension, and suggestions for future research", *MIS Quarterly*, Vol. 28 No. 1, pp. 107-142.

Weiber, R. and Mühlhaus, D. (2014), *Strukturgleichungsmodellierung: Eine anwendungsorientierte Einführung in die Kausalanalyse mit Hilfe von AMOS, SmartPLS und SPSS*, Springer-Verlag, Berlin, Heidelberg.

Zahra, S.A. and Covin, J.G. (1993), "Business strategy, technology policy and firm performance", *Strategic Management Journal*, Vol. 14 No. 6, pp. 451-478.

Further reading

Schryen, G. (2013), "Revisiting IS business value research: what we already know, what we still need to know, and how we can get there", *European Journal of Information Systems*, Vol. 22 No. 2, pp. 139-169.

Sevin, C.H. (1965), *Marketing Productivity Analysis*, McGraw-Hill, St Louis, MO.

Appendix

Measures	MS	MN	SD	IR	CR	AVE	CA
Monetary business performance (i.a. Moorman and Rust, 1999)	Reflective				0.92	0.69	0.89
How has your company outperformed your competitors in the following areas over the past three years?							
increase in turnover		4.86	1.17	0.85			
making of profits		4.70	1.13	0.87			
achievement/maintenance of the targeted market share		4.90	1.22	0.70			
achieving the desired return on sales (= operating profit before taxes/sales)		4.63	1.21	0.85			
return on investment (ROI = profit/total capital)		4.58	1.12	0.87			
Non-monetary business performance (i.a. Moorman and Rust, 1999)	Reflective				0.84	0.51	0.78
How has your company outperformed your competitors in the following areas over the past three years?							
achieving customer acquisition		4.90	1.16	0.75			
retaining current customers		5.09	1.23	0.68			
customer acquisition		4.78	1.30	0.58			
strategy (e.g. superior market cultivation strategy)		4.51	1.08	0.70			
quality of the products and services (e.g. higher customer benefit)		4.92	1.07	0.82			
IT department's influence (i.a. Homburg *et al.*, 1999)	Reflective				0.91	0.77	0.85
How important are the following decision fields for the success of your business unit?							
Decisions on…							
methods for measuring customer satisfaction		4.48	1.57				
programs to increase customer satisfaction		4.99	1.47				
the design of customer service and support		4.77	1.60				
IT department size (i.a. Powell and Dent-Micallef, 1997)	Single item (ratio scale)	0.12	0.29	1.0	1.00	1.00	1.00
Number of full-time employees in the IT department in relation to the number of full-time employees in the company							
IT department value assessment (i.a. Moorman and Rust, 1999)	Reflective				0.91	0.72	0.87
To what extent do the following statements apply?							
Compared to other departments the IT department is…							
valued		5.07	1.47	0.84			
important for business success		5.69	1.31	0.76			
respected		4.82	1.48	0.90			
seen as an important component.		5.23	1.33	0.90			
IT experience of the top management (i.a. Armstrong and Sambamurthy, 1999)	Single item (ratio scale)	0.48	0.69	1.0	1.00	1.00	1.00
How many people on your company's management/ executive board have gained IT experience in the course of their career?							
Degree of digitization (i.a. Barua *et al.*, 2004)	Reflective				0.87	0.62	0.80
To what extent do the following statements apply?							
Our company established new digitization approaches such as Big Data/Data Mining, Social Software, Mobile and Cloud Computing		4.63	1.60	0.77			

Table AI.
Measures

(*continued*)

Measures	MS	MN	SD	IR	CR	AVE	CA
Digitization makes the company more agile, dynamic and competitive in the modern business environment		5.48	1.23	0.84			
With an increasing degree of digitization, the effectiveness and efficiency of processes increase		5.68	1.13	0.81			
A high level of digitization has a positive impact on the organizational and strategic capabilities of the company		5.40	1.28	0.73			
Firm size (i.a. Huselid, 1995)	Single item	19.061	71.752	1.0	1.00	1.00	1.00
How many full-time employees (expressed in full time positions) work in your business unit/company?							
Pursued generic strategies (differentiation strategy) (i.a. Kim and Lim, 1988)	Reflective				0.87	0.64	0.81
To what extent does your company emphasize the following activities?							
achieving competitive advantages through high-quality products		5.69	1.49	0.82			
new product development		4.65	1.93	0.79			
establishment of a leading product and brand images		5.25	1.71	0.88			
achievement of high prices on the market		4.59	1.58	0.69			
Pursued generic strategies (cost leadership strategy) (i.a. Kim and Lim, 1988)	Reflective				0.81	0.60	0.66
To what extent does your company emphasize the following activities?							
efforts to achieve cost efficiency and cost advantages		5.34	1.29	0.67			
striving for economies of scale (size advantages)		4.27	1.67	0.82			
market share increase through aggressive pricing policy of the products		3.22	1.73	0.82			
Industry-specific development of technology (i.a. Jaworski and Kohli, 1993)	Reflective				0.91	0.71	0.86
To what extent do you estimate that the following statements apply to the situation in your industry?							
Technology is changing rapidly in this industry		4.98	1.68	0.88			
In this sector, it is very difficult to estimate the state of technological development in 2–3 years		4.23	1.56	0.70			
In this sector, technological breakthroughs made a large number of new product ideas possible		4.28	1.82	0.86			
Technological developments are very important in this sector		4.89	1.77	0.90			
Market turbulence (i.a. Sethi and Iqbal, 2008)	Single item	3.39	1.65	1.0	1.0	1.0	1.0
To what extent do the following statement apply to your market?							
There is a great deal of uncertainty in our markets							

Notes: MS, measurement; MN, mean; IR, item reliabilities; AVE, average variance extracted; CR, composite reliability; CA, Cronbach's α

Table AI.

Corresponding author
Christopher Reichstein can be contacted at: christopher.reichstein@hs-aalen.de