IT orientation

what it comprises and how it directly influences firm performance

Radboud University

By Mark Diesveld

Radboud University

Nijmegen School of Management

Master's thesis Strategic Management

Supervisor: Dr. ir. G.W. Ziggers

Co-reader: Dr. P. Vaessen

Word count: 21.491

Abstract

Current technological changes and opportunities require firms to adapt their businesses. Information technology (IT) is increasingly seen as a means to do so. However, how and when using IT enables this is not clear. By investigating how IT can lead to a competitive advantage from a strategic orientation perspective, this study clarifies this. A survey is composed based on literature review and interviews with IT experts and professionals. Based on a cross-industry sample among 114 respondents, the findings show that IT orientation positively influences firm performance. IT orientation comprises six IT capabilities: (1) business intelligence, (2) IT system configuration, (3) IT management, (4) digital marketing and sales, (5) social and mobile platform management, and (6) online customer service. Only IT management has a significant positive effect on firm performance. These findings provide new insights in the effect of IT on firm performance.

Keywords: IT orientation, strategic orientation, firm performance, competitive advantage, capabilities, dynamic capabilities

Table of contents

1. Introduction

1.1 Background

In the late 90s a digital revolution was taking place. The internet became increasingly important for individuals and businesses and created a huge amount of opportunities for them. Things as e-mail, e-commerce, and online sales became part of the majority of businesses (Gerlich, 2001). In those years, roughly 50% of homes in America possessed a personal computer (Gates, 1999). Currently, this percentage is still increasing. Gates (1999) argued that businesses that do not embrace technological changes will fall behind. By that time, the late 90s, it became apparent that the entry of the internet forced incumbents to adapt or else they would risk losing market share (Gerlich, 2001). This means that organizations that don't react or anticipate to changing digital technologies and opportunities will not survive. Nowadays, firms operate in dynamic business environments in which digital technologies are continuously and rapidly evolving. This era is repeatedly referred to as the 'information age', characterized by the explosion of data and information (Castells, 2003).

In this information age, the digital environment is changing at fast pace. This digitalization, also referred to as digital transformation, creates opportunities and challenges for businesses. On the one hand the digitalization could for instance lead to a higher efficiency for organizations, but on the other hand the digitalization comes with higher customer demands. Organizations need to deal with the digital transformation, otherwise processes will be outdated and eventually customers will defect to competitors. The importance of information technology (IT) in doing this becomes apparent in the literature. Scholars from both the strategy and management information systems (MIS) literature have examined the effects of IT in dealing with the changing environment. Both literature streams found a significant role of IT in improving firm performance, since information technology affects the mechanisms through which an organization creates and captures value (Bharadwaj et al., 2013a; Makadok, 2010; 2011). This indicates that IT is more than a function, it should be considered on business-level strategy (Drnevich & Croson, 2013; Pagani, 2013). More precisely, IT is a crucial part of organizations in making a profit and therefore in their competitive advantage. To go even further, IT is crucial for firms' competitive survival (Arora & Rahman, 2016).

In this thesis, IT is studied from the perspective of strategic orientations. Those orientations can provide sources for competitive advantage for firms. The internal postures and strategic directions of a firm are aligned with their environment to achieve superior performance (Sarkar et al., 2016). They consist of a set of capabilities (Foley & Fahy, 2009; Ziggers &

Henseler, 2016), which in turn consist of a set of activities. Strategic orientations in itself do not provide better firm performance (Hult et al., 2005), it depends on how the capabilities are deployed. These capabilities can lead to a competitive advantage, since they contribute positively to performance and are the deeply embedded values and beliefs through which an organization operates. This makes it difficult for competitors to imitate these capabilities, since the capabilities are firm-specific (Theodosiou et al., 2012). Firms can pursue different strategic orientations. The orientation on which a firm focuses determines the scope and nature of plans and activities of the firm (Miles & Arnold, 1991). This implies that firms can deliberately focus on certain components within their firm in achieving a competitive advantage. A firm can for instance focus on market orientation, production orientation, or entrepreneurial orientation. Firms can also focus on multiple strategic orientations simultaneously. This can potentially result in even better firm performance than focusing on a single strategic orientation (Ziggers & Henseler, 2016). This paper proposes IT as a strategic orientation, IT orientation, and identifies its IT capabilities. Further, this study researches if these capabilities, and therefore IT orientation, have a positive effect on firm performance.

1.2 Problem formulation

Strategic management literature and MIS literature streams are converging, since both streams see the importance of IT in business-level strategy to stay ahead of the competition. Currently, environments are rapidly changing due to fast improving technologies and changing customer demands. Organizations need to deal with this in an effective and efficient way, otherwise it can negatively affect the firm's performance (Audia et al., 2000). IT can be a means for firms to adapt to new technological changes and transformations. By strategically focusing on IT, firms are able to deal with the changing environment and eventually achieve a competitive advantage over competitors. However, despite the fact that scholars see the increasing importance of IT for firms' business strategies, previous research report mixed findings about the effects of IT on firm performance (e.g., Kala Kamdjoug et al., 2018; Liu et al., 2013; Ray et al., 2005; Wu et al., 2006). It is not clear if and how IT influences the performance of organizations. This is problematic for firms, especially since it is expected that the technological changes and opportunities will increase in the coming years. By examining the link between IT and firm performance from the strategic orientation perspective, this thesis tries to create clarity regarding this topic. The strategic orientation perspective assumes that firms achieve a competitive advantage by their capabilities because these are positively related to firm performance and are difficult to imitate. This paper therefore conceptualizes IT as a strategic

orientation by firstly identifying the capabilities and activities defining the IT orientation, and secondly by measuring the effects of the IT orientation capabilities on firm performance.

In summary, the twofold objective of this study is (1) to identify what IT orientation is and (2) what its effect on firm performance is. The corresponding research question based on this objective is: What comprises an IT orientation and does it affect firm performance? By achieving the research objective it is intended that it becomes clear how the use of IT relates to firm performance. More specifically, this study aims to develop an instrument that makes it possible to measure the degree to which firms use IT in order to increase firm performance. It helps firms in identifying the aspects of IT they should focus on in order to increase their performance. This measuring instrument is not developed yet and is the main focus of this study. The study also helps future research in going more in-depth on the effect between IT and firm performance.

1.3 Relevance

After introducing the objective of this research, the following sections explain how the newly generated knowledge of this research is expected to complement existing research and how this knowledge gives insights to managers and organizations in the field of strategy and IT. The academic relevance will first be discussed followed by an explanation of the relevance for managers and firms.

1.3.1 Academic relevance

This research is relevant for the scientific community in the field of strategic orientations. Although a big body of research has focused on this broad topic, viewing the use of IT as a strategic focus for firms is new. This brings together two streams, strategic management literature and MIS literature. These literature streams are converging towards a fusion of IT and business strategy. Scholars advocate for bridging the gap between the strategy and MIS area in order to find results for the effect of IT on firm performance (e.g., Bharadwaj et al., 2013a; Drnevich & Croson, 2013). Despite the agreement in both literature streams in seeing the importance of IT in firms' strategies, research on IT in business-level strategy is still in its beginning years (Bharadwaj et al., 2013a; Woodard et al., 2013). More qualitative and quantitative research on IT needs to be done to find results for the effectiveness of being IT oriented and in which situations it is most effective. IT can be seen as a strategic orientation, because it can be a strategic direction that firms use to align their internal postures with their environment (Sarkar et al., 2016). In this way, IT orientation may provide sources for competitive advantage and can increase firm performance (Noble et al., 2002).

To contribute to the academic field, this study first identifies IT capabilities and activities. This validates the construct of IT orientation and makes it usable for further research. Secondly, the effect of different IT capabilities on firm performance will be examined. In this way it is researched whether IT can lead to a competitive advantage and superior performance. This complements current studies about the effect of strategic orientations on firm performance. By looking at the effects of IT capabilities on firm performance measures, scientific knowledge on this relationship will be enlarged.

1.3.2 Managerial relevance

Currently, we are experiencing a digital transformation in which a lot is changing in business environments. Due to an explosion of data that is generated on a continuous basis, together with an increase in connectivity, social media and other new digital technologies and opportunities, organizations need to adapt their businesses (Kumar et al., 2013). The combination of increasing digital intensity, connectivity and big data, all amplified by the growth of the Internet of Things (Stankovic, 2014), created the 'information age' or the 'digital era' we now live in (Bharadwaj et al., 2013a; 2013b). New digital technologies make it possible that work processes can be carried out across the barriers of distance, time and function (Rai et al., 2012). Products and services are increasingly enclosed with digital technologies and new forms of business strategies are generated. When firms fail to address these environmental changes, it can negatively affect the firm's performance (Audia et al., 2000). Some firms deal with this better than others, with some even creating totally new business models (firms like Airbnb and Uber). Neglecting technological changes could lead to firms falling behind and even to their extinction (Raphan & Friedman, 2014).

By validating the construct IT orientation, this research helps managers in understanding that IT is more than a supportive functional department. IT becomes more important on business-level strategy. The increasing role of IT in business strategies indicates that it is essential for managers and organizations to enlarge their knowledge about IT. Managers should know why and how IT can influence their firm performance. By explicitly identifying IT capabilities and activities and examining their effect on firm performance, insights on the importance of those capabilities are gained. The result is a measuring instrument for IT orientation. This gives managers the knowledge on which facets of IT are essential in order to increase firm performance. This understanding is critical for managers since strategic value can be generated from using IT. Managers then potentially could change their opinion on the use of IT by strategically integrating IT in firms' philosophies. Firms with a higher degree of IT

orientation see IT as more than a supporting tool, IT is a means for achieving strategic goals. This research aims to give recommendations in this field to managers and organizations.

1.4 Outline of the thesis

This chapter has introduced the topic of this study, discussed its importance, defined the research objective and corresponding research question, and has explained how this study is expected to contribute to both the academic and managerial community. The next chapter discusses the theoretical framework, which serves as theoretical support for this study. This is done by discussing what strategic orientations are, explaining how they influence firm performance, and conceptualizing IT orientation. Chapter 3 describes the methodology of the research and describes the context. After that, the results of the study are shown in chapter 4 and interpreted and discussed in chapter 5 together with the research implications for managers and scholars. Also, limitations of the research and future research directions are described in chapter 5.

2. Theoretical framework

2.1 Strategic orientations

The concept strategic orientations has received a lot of attention in the literature over the last two decades. Strategic orientations can be defined as "principles that direct and influence the activities of a firm and generate the behaviours intended to ensure its viability and performance" (Hakala, 2011, p. 199). Strategic orientations can provide sources for competitive advantage for organizations and guide firms in achieving superior performance (Gatignon & Xuereb, 1997; Zhou et al., 2005). The concept means that firms develop a systematic method in which the firms' internal postures and strategic directions are aligned with their environment in order to have continuous superior performance (Narver & Slater, 1990; Sarkar et al., 2016). Strategic decisions evolve from a set of organizational processes (Hart, 1992; Rajagopalan et al., 1993). These processes lead to patterns and behavior in organizations. The processes for making strategic decisions encompass the total range of activities in the organization, from planning to strategic management. Culture, shared values and a corporate vision are also part of those processes and lead to strategic directions (Lumpkin & Dess, 1996; Pascale, 1985). Orientations thus reflect a firm's philosophy on how to operate through deeply embedded values and beliefs (Miles & Arnold, 1991).

Despite no general agreement is found on which strategic orientation leads to the highest performance and when, there is consensus on this performance increasing effect of strategic orientations in general: "a large consensus has emerged in the literature that firms possessing strategic orientations along one or different dimensions tend to have superior performance" (Sarkar et al., 2016, p. 1004). Firms can for instance focus on market orientation, customer orientation, production orientation, selling orientation, learning orientation, innovation orientation, entrepreneurial orientation, or supply-base orientation (e.g., Deutscher et al., 2016; Noble et al., 2002; Ziggers & Henseler, 2009). It appears that there are different strategic orientations that can lead to increased firm performance. This means that different organizations can focus on different strategic orientations, but both still performing well. It is an organization's choice to have a certain orientation in order to operate in its environment (Barreto, 2010). Firms often pursue different orientations simultaneously to become successful (Cadogan, 2012). More orientations can complement and mutually support each other, which could lead to an increasing firm performance (Zhou et al., 2005).

2.2 Firm performance

Firms operate according to their strategy and this affects their firm performance. Strategic orientations are assumed to positively influence firm performance. In validating the IT orientation concept, it is important to know what firm performance is and to examine whether IT orientation positively affects firm performance. Firm performance may be one of the most researched variables in organization and strategy literature. It is essential for firms to achieve a certain level of firm performance in order to maintain viable and to survive (Richard et al., 2009). Poor firm performance leads to negative results and can eventually lead to bankruptcy. Typical research regarding firm performance focuses on the link between some independent variable(s) and firm performance as the dependent variable. It is important to notice that firm performance is not always defined in the same way (Santos & Brito, 2012). Traditionally, firm performance was seen as a financial outcome. However, over the last few decades managers and scholars began to integrate new, non-financial, performance measures like customer satisfaction, employee satisfaction, environmental satisfaction, and social performance (Barney & Clark, 2007; Harter et al., 2002). These non-financial measures come from the stakeholder perspective for looking at firm performance (Dess et al., 2003; Freeman, 1984; Harrison & Wicks, 2013). This perspective states that the needs of multiple stakeholders should be met in order to achieve good firm performance. Stakeholder perspective provides the most comprehensive view on firm performance. Identifying different stakeholders and focusing on their satisfaction is increasingly adopted by managers and scholars (e.g., Richard et al., 2009). In short, firm performance should be seen as a multidimensional construct, instead of an unidimensional financial construct (Glick et al., 2005). The main argument for this is that not all stakeholders have similar demands and needs. An unidimensional financial measure would be a very simplistic representation of the construct (Combs et al., 2005; Murphy et al., 1996; Santos & Brito, 2012). The relevance of measures may vary across firms, depending on the relevant stakeholders for those firms. However, there are measures that are relevant and applicable for all firms. These general measures are also used in this research and comprise both financial and non-financial aspects of firm performance.

2.3 Four profit mechanism perspectives on increasing firm performance

In order to get understanding in how firms differentiate in the field of firm performance, different theories in strategic management literature on increasing firm performance are briefly explained and categorized by their causal profit mechanism. These different profit mechanisms describe different causes for variations in firm performance.

Makadok (2010; 2011) made a categorization of the major theories in strategy literature. In this categorization, Makadok views the literature through four perspectives. In these perspectives, the focus is on the causal profit mechanisms, which are means that transfer money from the customer to the organization. The four perspectives are (1) collusion-based theories, (2) governance-based theories, (3) competence-based theories, and (4) flexibility-based theories.

Collusion-based theories are about market power. Firms need market power in order to get returns on their investments. By tacit collusion with competitors, rivalry and price wars are reduced. Coordinating with the value chain and positioning the firm in the industry are important aspects of collusion-based theories (Porter, 2008). In this perspective, (intense) competition can only be countered by tacit or explicit collusion, otherwise firms cannot capture the value they create. They then won't be profitable, as costs will exceed revenues. Firms need market power to create long-term returns that exceed the fixed costs. Industrial concentration and barriers to entry are important in this view, since they support collusion among firms which reduces price wars and it increases revenues (Brandenburger & Stuart, 1996). Profit mechanisms in this perspective include operational efficiency rents due to power over suppliers (Ricardo, 1891) and monopoly-power rents (Bain, 1956; 1959).

Governance-based theories are focused on the degree of efficiency in organizing the transactions of the firm. A governance structure separates activities that should be done inside the firm from those that should be performed outside. Two well-known governance-based theories are the transaction cost theory (Williamson, 1979) and the agency costs theory (Eisenhardt, 1989). Minimizing costs in creating value is central in both theories. Both theories emphasize the importance of increasing producer surplus by efficiency-based cost minimization in order to reduce costs of creating value (Jacobides & Croson, 2001; Williamson, 1975). Profit mechanisms in this perspective include operational efficiency rents due to efficient governance (Ricardo, 1891) and transactional efficiency rents due to avoiding unnecessary costs of coordination in economic activities (Coase, 1937).

Competence-based theories underline the resources and capabilities of a firm and how they create and capture value. Profitability of the organization is the result of effectively utilizing the resources and capabilities. One of the first competence-based theories that became popular, and still is popular in the literature, is the one by Barney (1991). He discusses the resource-based view (RBV) in which a firm's resources are central in getting a sustainable competitive advantage. This RBV is also extended to the knowledge-based view (KBV) in which knowledge is the crucial resource of companies which could lead to a sustainable

competitive advantage (Grant, 1996; Kogut & Zander, 1992). RBV has become the most popular perspective for firm profitability in the strategy and MIS literature. The theory has an inside-out view on gaining a sustainable competitive advantage by the application of resources and capabilities that a firm possesses (Barney, 1991; Penrose & Penrose, 2009; Rumelt & Lamb 1984; Wernerfelt, 1984).

Flexibility-based theories focus on the ability of an organization to quickly respond to change. Organizations should do this by either improving efficiency, price minus cost, and/or by improving effectiveness, value minus price. In the flexibility-based literature, the main theory is dynamic capability theory (DC). Dynamic capabilities are defined as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments." (Teece, 1997, p. 516). This implies that dynamic capabilities represent an organization's ability to obtain new forms of competitive advantage given their firm-specific resources and other assets, such as capabilities for example. This is due to a firm's path dependency, the path they have taken to come up to their current state (Leonard-Barton, 1992). In flexibility-based theories, the profit mechanism for organizations is in getting flexibility rents (Schumpeter, 1954). This means that organizations earn profits from responding to a change in the environment until the point that others imitate it.

Given the fact that strategic orientations comprise a set of capabilities (Foley & Fahy, 2009; Ziggers & Henseler, 2016), RBV and DC explain how they can lead to competitive advantage. Dynamic capabilities theory is seen as the extension of the RBV. The resource-based view is an inside-out theory on gaining a sustainable competitive advantage by the application of a bundle of valuable resources and capabilities that a firm possesses (Barney, 1991; Penrose & Penrose, 2009; Rumelt & Lamb 1984; Wernerfelt, 1984; Zhu, 2004). RBV suggests that competitive advantages of firms stem from their unique resources and distinctive capabilities (Barney, 1991; (Mahoney & Pandian, 1992; Wernerfelt, 1984; Zhou et al., 2005). DC complements this by stating that in order to achieve a competitive advantage not only resources are needed that are valuable, rare, inimitable, and non-substitutable, but also capabilities that are used to adjust and deploy those resources. In this way, firms can match their use of resources to continuously changing market environments. These dynamic capabilities are deeply embedded in organizational processes and routines and therefore difficult to imitate (Grant, 1996). They are therefore seen as sources for competitive advantage and lead to better firm performance (Barney, 1991; Day, 1994; Hunt & Morgan, 1995). Strategic orientations consist of a set of those capabilities and are thus assumed to have a

positive influence on firm performance. Therefore, RBV and DC are helpful in understanding the effect of IT orientation on firm performance.

2.4 IT as strategic orientation

From the time IT made its entry, roughly 50 years ago, it was only used for planning and controlling and did not have a direct relation with a firm's strategy (Gibson & Nolan, 1974; Ives & Learmonth, 1984; Martin, 1990; Rockart, 1978; Teubner, 2013). Through the years, scholars and managers began to see the potential for IT in being more than a supporting function in firms (Ward et al., 2002; Wiseman, 1985). Businesses were linking IT to more aspects of the firm (Henderson & Venkatraman, 1993; Teubner, 2006). However, IT became a commodity and IT solutions based on the internet were visible to others, which made them easy to imitate (Carr, 2003). Companies therefore didn't sustain a competitive advantage for long (McAfee & Brynjolfsson, 2008). Nowadays, business environments are changing and causing major changes. Business infrastructures have become digital with increased interconnections among processes, services and products. New technologies are transforming business strategies, processes, products and services, and relationships in networks (Bharadwaj et al., 2013b). As a result, a debate has risen in academic circles about new challenges and approaches to looking into IT (Buhl et al., 2012; Merali et al., 2012; Ward, 2012). From this point on, scholars began to think of IT from the RBV and DC perspective. This perspective states that a sustainable competitive advantage does not come from a particular technology or a particular system, it comes from unique capabilities of an organization (Piccoli & Ives, 2005). IT is now seen as a means to reach strategic goals.

It may be logical to think in terms of a strategic orientation. IT orientation can be operationalized by identifying the corresponding IT capabilities and IT activities that cluster on these capabilities. It first is important to make clear what IT is. Onn and Sorooshian (2013) in their research reviewed the literature on definitions of information technology. Aspects of information technology that were repeatedly found in definitions are software (Attaran, 2003; Sarosa & Zowghi, 2003; Thong & Yap, 1995), hardware (Sarosa & Zowghi, 2003; Tan et al., 2009; Thong & Yap, 1995), computer-based systems (Carr & Smeltzer, 2002; Hollander et al., 1999), telecommunications (Attaran, 2003) and the use of internet (Tan et al., 2009). Moreover, many scholars state that information technology comprises all the technology that is used in dealing with information. In general, IT is used to collect, transport, retrieve, store, transform, present, and process information in all its forms (Boar, 1997; Sarosa & Zowghi, 2003). Based on the literature review by Onn and Sorooshian (2013), in this study IT is seen as "all the

technology used by an organization in order to collect, secure, store, retrieve, distribute, create, process, and present information in all its forms." By examining how firms can differ in applying and exploiting information technology, the effect of IT orientation on firm performance can be researched. The capabilities and activities of IT orientation can clarify this. By extensively studying the literature, information is gathered on the capabilities and activities that should be attributed to IT orientation. These capabilities characterize IT orientation and are expected to explain how organizations can get a competitive advantage by using all kinds of technology in order to collect, secure, store, retrieve, distribute, create, process, and present information.

The literature review gives insight in the IT activities that are characteristic for IT orientation. Some activities are expected to be closely related to one another and are expected to be part of the same IT capability. However, quantitative analyses are needed to validate this. It will then become clear which IT activities correlate and they can then be interpreted as IT capabilities. This will lead to the conceptualization of IT orientation in terms of activities and capabilities. In the following paragraphs all IT activities that are found in the literature are discussed. Activities that are expected to be related to each other are grouped and described in the same paragraph. This is only done to create an overview, but is not based on evidence. Also, there might be some overlap between activities of different paragraphs. This can be explained by the fact that IT activities and capabilities are expected to be related to each other. The quantitative analyses in this research reveal the final categorization of IT capabilities and underlying IT activities.

2.4.1 Business intelligence

Organizations increasingly have the possibility to create and collect vast quantities of data. Creating value from this is considered key in competitive success (McAfee & Brynjolfsson, 2012; Moharana et al., 2011). Further, this valuable information has to be distributed in order to have high quality information available in each department (Drnevich & Croson, 2013). IT can be used to access, analyze and understand information. This gives firms the knowledge in order to make better business decisions. In this paragraph, activities related to using IT in collecting, analyzing, and distributing are discussed. These activities are expected to be part of the same IT capability, which is here called business intelligence.

The first activity of business intelligence is **collecting data**. This data can then further on be used to find for instance customer demands and trends. Examples of data that may be interesting to firms are customer transaction records, search and user logs, user-generated

content, navigation paths and clicks on the website, user experience data, purchase decision data, contact information, and so on. Also demographic data like income, age, gender, geography, preferences can be useful to create meaningful segments. Al these types of data can be collected in many different ways by the use of IT. Data can be collected from various sources, like customers, suppliers, end-users, and institutions.

The next activity is analyzing the collected data. Analyzing data is an essential step in finding out what you should do as a firm. It gives insight in customer needs, future trends can be predicted, but also production processes can be optimized and automated due to better knowledge about those processes. Fast changing demands require business intelligence, since "organizations that can recognize the changes and react quickly and intelligently will have the upper hand." (Davenport et al., 2012, p. 24). The information explosion is due to the emergence of big data. This is one of the key external digital trends at the moment and is the result of pervasive connectivity. It leads to information abundance (Bharadwaj et al., 2013a). By the use of **data analytics**, firms can create intelligence and work out how demands could be met. Data analytics involves the analysis of data to discover relationships and describe events. It is the process by which large and varied data sets, big data, are examined to uncover patterns, correlations, trends, customer preferences and other useful information in order to improve the business decisions of a firm. "Big data is the information asset characterized by such a high volume, velocity and variety to require specific technology and analytical methods for its transformation into value". (De Mauro et al., 2016). Collected data from the web usually contains rich customer opinion and behavioral information (Chen et al., 2012). By analyzing data and transforming it into useful information, firms can create value. Examples of analytics are database segmentation and clustering, social network analysis, text and web analytics, and sentiment and affect analysis. Firms like Google, Facebook, and eBay are perfect examples of organizations that use data analytics to create value and eventually respond to future trends.

The creation of useful information is not the only thing that is essential in having business intelligence. This information also has to be available throughout the organization. By **information distribution**, firms gain benefits like availability of high quality information in each department and faster response times. IT has an essential role in distributing information throughout the organization (Drnevich & Croson, 2013). By using certain applications and software which make it easy to distribute information, the whole firm can use the adequate information at the required time (Galliers & Leidner, 2014). Such applications and software make it possible that information can be used in multiple departments for varying purposes by making it accessible across departmental boundaries and therefore eliminating isolated data

islands.

Business intelligence is not only used for finding out how to respond to market demands, it is also used for optimizing processes and systems within the firm. In this way business intelligence can even help in optimizing business processes. Business intelligence is more than a focus on a firm's market, it is intelligence on all the processes within firms.

2.4.2 IT system management

Together with new technological opportunities comes the need to manage it. IT can be used to do this. Information should be stored and secured and should be possible to be transferred to other departments in the firm (Korfhage, 2008; Von Solms & Van Niekerk, 2013). Also, firms should use IT to streamline and integrate information systems (Chaffey, 2009; Garbani & Cecere, 2011). This paragraph contains activities related to managing IT systems. These activities are expected to be closely related and are expected to be part of the same capability, IT system management. The activities together lead to efficiency benefits like faster response time (Drnevich & Croson, 2013), cost reduction (Arora & Rahman, 2016; Zandi & Tavana, 2011) and productivity enhancement (Vaidyanathan et al., 2012).

Storing information is essential for businesses. This is the first activity of IT system management. Collecting, analyzing and distributing information is very important, but this information should also be stored. Information is of no use when it can't be stored and retrieved (Korfhage, 2008). IT provides systems to organize information so that it can be a valuable resource. Those systems make it possible to store the information that the firm has created out of data and past experiences. This enables firms to use this information later on by retrieving it from the memory of the firm (Ackerman, 1998; Walsh & Ungson, 1991). Using storage technologies leads to accurate, comprehensive, timely, and available organizational intelligence (Galliers & Leidner, 2014).

With storing information comes the task of **securing information**. This is of prime importance to ensure privacy and validity of the information the organization possesses. "Information security is the protection of information, which is an asset, from possible harm resulting from various threats and vulnerabilities." (Von Solms & Van Niekerk, 2013, p. 101). Security technologies help to protect the valuable information and knowledge from external actors, for instance competitors. When a firm's information is available for others outside the firm, actions based on the information can be imitated.

The third activity of IT system management is **integrating information systems**. Different information systems within the firm need to be configured and integrated to make it

possible to transfer data from one application to another. This is done by linking together different software applications and computing systems physically or functionally in order for it to work as a coordinated system. With technological opportunities increasing system integration is getting more important, because new systems are designed and should be connected to existing systems. Integrating information systems decreases the number of interfaces and costs for a firm and it increases the flexibility and speed of business processes (Gold-Bernstein & Ruh, 2004).

Next to integrating information systems within the firm, the systems from different firms in a supply chain can be integrated. Businesses are increasingly using global supply chains, which requires the need of good connection between actors in the supply chain (Bharadwaj et al., 2013a). By **supply chain database integration** this connection between different actors can be achieved. Creating supply chain visibility helps in increasing efficiency and avoiding communication problems between actors in the supply chain. Integrating the databases of different stakeholders into one shared database can create this visibility (Chaffey, 2009). One of the advantages of such a shared database is that a supplier can check when a client will place the next order. A popular and often used system for this is electronic data interchange (EDI). This is a computer-to-computer exchange of documents in a standard electronic format between business partners (Musawa & Wahab, 2012). Firms can place an order that automatically gets processed. This saves both time and costs for both actors.

Another activity of this capability is **streamlining communication**. This is one of the main predictors for productivity (Cardona et al., 2013). IT enables different devices to be connected so that employees on different platforms can work together. Even while the world is globalizing, which causes firms to have a dispersed workforce with employees working from different places, streamlining communication creates the opportunity for firms' employees to work together efficiently.

The last activity of IT system management is **IT process automation**. In this activity firms use IT in order to facilitate the adjustment of processes through automated workflows. Processes that occur in a repeatable pattern can be automated by the installation of software applications. In this way, tasks that would normally be handled manually by employees can be done automatically (Garbani & Cecere, 2011). Specific procedures and conditions are set to which the system then reacts.

2.4.3 Digital marketing

Marketing is a main point of interest for firms. By the increasing possibilities due to innovating

digital technologies, new ways of marketing have evolved. “The growth in the prominence of digital, social media, and mobile marketing has paralleled technological innovations” (Lamberton & Stephen, 2016, p. 146). IT and marketing have become interrelated in these new marketing practices (Edelman, 2010). Since digital marketing is seen as such an important issue for firms, it is here seen as an independent capability. The most discussed marketing activities in literature that are expected to together represent the capability digital marketing are described in this section.

IT is valuable in marketing activities in many ways. Possibly the most important way in which IT adds value to marketing is in **data-driven marketing**. This is also referred to as one-to-one marketing and personalized marketing. This type of marketing depends on IT for data collection, transfer and analysis. Due to the proliferation of technologies, consumer data is generated. Based on these collected data, firms can personalize their marketing efforts. This is specified to individual consumers’ preferences and wants (Fowler et al., 2013).

The second marketing activity is **social media marketing**. In this type of marketing social media platforms are used to promote products and services (Felix et al., 2017). Social media marketing is becoming more popular for practitioners and researchers, mostly since social media usage is increasing. Both current and prospective customers can be triggered by interacting through social media marketing (Hudson & Hudson, 2013). Firms can choose which platforms they use in their social media marketing. Important in social media marketing is the concept of electronic word of mouth. This has a positive effect on organizational outcomes such as sales (Babić Rosario et al., 2016).

A third activity of the digital marketing capability is **mobile marketing**. This refers to marketing focused on smart phones, tablets and other mobile devices and networks. It has the advantage that firms can provide consumers with relevant information and information sensitive to timing or location (Fritz et al., 2017). Furthermore, mobile devices are used by the vast majority and are used on daily basis. This means that mobile marketing can be essential in influencing potential customers (Shankar et al., 2016; Ström et al., 2014). Good use of IT makes it possible to reach customers on mobile devices.

The fourth marketing activity is **email marketing**. Marketing by using emails can be a very effective means to reach a big group of current customers and potential customers. Email marketing can lead to building customer loyalty, trust and brand awareness. It can be very valuable, since it is a straightforward and cost-effective way for acquiring and retaining customers (Castronovo & Huang, 2012). This leads to increased customer involvement and therefore also to higher purchase intention and positive word of mouth (Müller et al., 2008). IT

provides firms with a database from which customers can be contacted.

The next two activities of digital marketing together form search engine marketing (SEM). This type of marketing is the promotion of the website of a firm by increasing the visibility in search engine pages (Rangaswamy et al., 2009). It is a way of inbound marketing, which refers to marketing that is focused on being found by customers. The role of IT in search engine marketing lays in collecting and analyzing the most searched keywords. Based on this information the most optimal keywords and phrases for search engine result pages can be formulated. This is known as **search engine optimization (SEO)**. Further, firms use the information of the most searched keywords to optimize the placement of ads or links of a firm (Skiera et al., 2010). This is known as **search engine advertising (SEA)**. Search engine marketing may be essential for acquiring customers since "search engines have become the main tool consumers use to locate information" (Skiera et al., 2010, p. 489).

Additionally to using marketing to be found by customers, products (or services) need to be sold. **Sales management** therefore is very important for firms. It involves the selling systems to make the purchase process easy for customers and the firm (Jones et al., 2005). Especially the online selling systems are important. A good working selling environment on a firm's website makes it much more attractive to buy a product than when the purchase process is unclear and does not work very well. This activity is placed under digital marketing since creating a good selling environment complements attracting customers by using digital marketing activities.

2.4.4 Electronic customer relationship management (e-CRM)

Retaining existing customers is easier and cheaper for firms than acquiring new customers. Therefore, companies use customer relationship management to increase the satisfaction and loyalty of their customers (Azila & Noor, 2011). IT provides firms with the opportunity to track customers and their (trans)actions. This information gives firms the input to create and maintain customer relations and gives the opportunity to understand customers' needs and wants. IT oriented firms are thus expected to have strong CRM programs that help them in creating value for their firm. Some scholars refer to the increasing importance of IT in CRM by naming it electronic customer relationship management (e-CRM). Chaffey (2009) emphasizes that the purpose of e-CRM is to maximize sales of existing customers by the use of digital communications technologies. By electronic use of CRM, firms can improve the effectiveness of the interactions with customers while also making it intimate through individualization (Mahdavi et al., 2008).

Customer database building is the first activity of e-CRM. E-CRM is facilitated by the use of IT and is based on data from customers (Bahrami et al., 2012). This makes IT essential in implementing e-CRM (Minami & Dawson, 2008). This may be due to the statement that "IT is considered an enabler that allows organizations to foster closer relationships with customers, analyze customer information and provide a coherent view of the customer" (Bahrami et al., 2012, p. 61). This customer information needs to be stored in a customer database. Building a customer database is fundamental for e-CRM. From this database relations with customers can be controlled and managed.

Direct customer service is the second activity of e-CRM. Researchers have recognized the role of IT in the customer service process (Ray et al., 2005). IT collects and stores information about complaints, needs and ideas provided by customers (Braojos et al., 2015). Direct customer service means that a firm responds to customer requests or questions. This can for instance be done by accessing the customer database in which customer information can be found or by providing product information. An often used type of a direct customer service tool is a chat feature on the website (Chaffey, 2009). Direct customer service helps in retaining customers by increasing satisfaction.

Firms nowadays should pay attention to their online communities and social media. In these online communities and on social media customers socialize and share experiences. These experiences are very important influencers on the customers' perception of the firm or products of the firm (Chaffey, 2009). **Interaction with the online community** refers to the interaction that firms have with their customers on online platforms, like social media platforms and the firm's website. This interaction is aimed at maximizing the favorable mentions and minimizing the unfavorable mentions the firm gets. Also, by interacting with customers on online platforms, firms can stimulate customers to visit the website. Interaction with a firm's online community is communication in a two-way direction, from the customer to the firm and vice versa. This activity therefore differs from social media marketing, since that activity has communication in a one-way direction from the firm to the customer.

Another activity of e-CRM is **after-sales support**. It encompasses a wide array of services that help in retaining customers by providing them with support after they make a purchase. These services can be product updates, answers on frequently asked questions and maintenance (Zhu, 2004). After-sales support helps customers in using products and could lead to customer satisfaction and the development of brand loyalty.

E-CRM is aimed at retaining customers. Customer satisfaction leads to customer loyalty and thus to retaining customers (Homburg et al., 2009). **Customer satisfaction measurement**

therefore is essential. This can be done by using the customer database. Experiences of customers with the firm in general can be measured, but also specific aspects or services of the firm can be measured.

2.4.5 IT orientation and firm performance

IT has not been conceptualized as a strategic orientation in previous literature. Additionally, research lacks on the link between IT and firm performance from a strategic perspective. This study examines this link by researching the effects of IT capabilities on firm performance.

Business intelligence activities are necessary for firms in the information age. The information overload creates the need to react in an appropriate way. Firms that collect and analyze data are expected to better understand and predict customer demands (Davenport et al., 2012). Firms then are better able to effectively and efficiently react to those customer demands. Additionally, firms create understanding in the needs of other stakeholders as well. Further, distribution of the information is essential in achieving significant organizational improvements (Alavi & Leidner, 1999). Each department has the availability of high quality information. IT is essential in executing this (Drnevich & Croson, 2013). Business intelligence capability is thus expected to have a positive effect on firm performance by knowing what customers want and having high quality information available in each department throughout the firm.

IT system management creates efficiency for firms. Collected and analysed data should not only be transferred to the right department, but should also be stored and secured. By storing information, firms build a knowledge base from which they can make decisions later on (Galliers & Leidner, 2014). Securing information then is important for sustaining a competitive advantage. This helps firms in keeping information from for instance competitors. Further, integrating information systems and supply chain database integration decrease the number of interfaces and costs. It leads to flexibility and the speed of business processes increases, which has positive effects on firm performance (Gold-Bernstein & Ruh, 2004). Also, it leads to faster response times (Drnevich & Croson, 2013) and cost reduction (Arora & Rahman, 2016; Zandi & Tavana, 2011). IT further is important in increasing the productivity by streamlining communication within the firm (Cardona et al., 2013). Lastly, IT process automation leads to both cost savings and greater productivity by automating workflows that occur in a repeatable pattern (Garbani & Cecere, 2011). IT system management is therefore expected to positively affect firm performance.

Attracting new customers is important for firms to increase sales and market share. Marketing is used for this. Digital marketing is a relatively new way of conducting marketing

and comprises several marketing activities. In digital marketing, by the use of IT, firms can personalize their marketing efforts. This data-driven marketing is specified to individual customers' preferences and thus more relevant for those customers. Further, social media marketing could lead to electronic word of mouth, which has a positive effect on organizational outcomes such as sales (Babić Rosario et al., 2016). Mobile and email marketing both reach a big group of customers and potential customers. They are cost-effective ways for acquiring and retaining customers (Castronovo & Huang, 2012). Email marketing even leads to increased customer involvement and higher purchase intention (Müller et al., 2008). Search engine marketing, which can be subdivided into search engine optimization and search engine advertising, is an increasingly popular and effective way for firms to attract customers. Taken together, digital marketing consists of marketing activities that are expected to attract potential customers, which increases the sales of a firm.

Retaining customers may even be more important to firms, since retaining existing customers is easier and cheaper than acquiring new customers. IT is used in e-CRM to build relations with customers. This begins with building a customer database (Bahrami et al., 2012). Additionally, direct customer service means that firms respond to customer requests or questions. This helps customers in their selection and purchase processes and increases satisfaction and customer loyalty. Both have a positive effect on firm performance. Further, interacting with a firm's online community helps firms in maximizing the favorable mentions and minimizing the unfavorable mentions for the firm. This shapes a better image of the firm and has positive effects for their performance. Retaining customers is also done by providing after-sales support and measuring customer satisfaction. E-CRM is expected to positively affect firm performance by increasing the satisfaction and loyalty of their customers (Azila & Noor, 2011).

What the final operationalization of IT orientation is in terms of activities and capabilities cannot be stated yet, quantitative analyses are needed to clarify this. However, taken altogether, the total list of IT activities is expected to increase firm performance. The following hypothesis is therefore suggested.

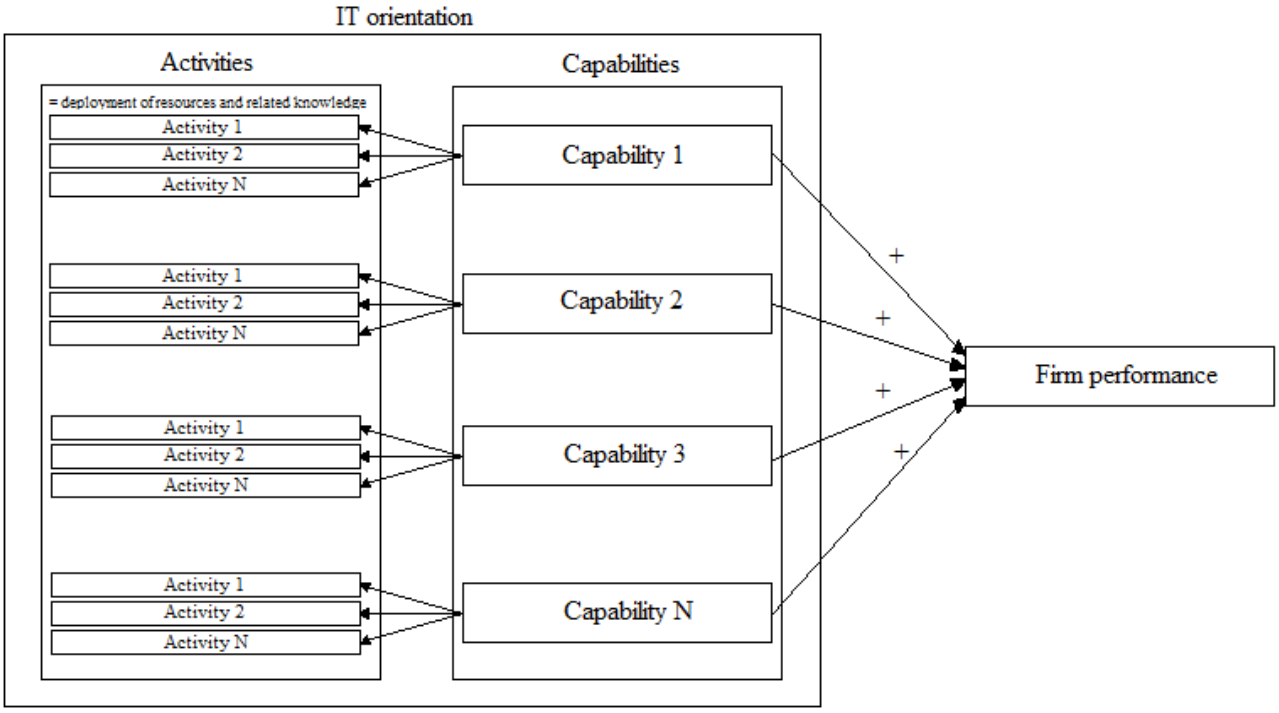
Hypothesis 1: IT orientation has a positive effect on firm performance.

2.5 Conceptual model

In the previous sections, the activities that are expected to make up IT orientation and the direct effect of IT orientation on firm performance are discussed. In figure 1, the conceptual model for IT orientation is shown. The actual activities and capabilities that make up IT orientation

will be found after conducting quantitative analyses and are therefore not displayed in the conceptual model. The model shows how IT orientation is build up and shows the expected positive relationships between the capabilities and firm performance. The model gives an overview of the theoretical framework and is the starting point for this research.

Figure 1: Conceptual model



3. Methodology

In this chapter the research design and method will be described. After that, the context and sample will be explained. Additionally, the measurement of the central concepts and the operationalization of these concepts will be described. To conclude this chapter, the data analysis procedure is discussed and research ethics are addressed.

3.1 Research design and method

In general, research can either be exploratory or conclusive (Malhotra et al., 2013). Exploratory research focuses on providing insights about a phenomenon and conclusive research is conducted to test certain hypotheses and/or examine relationships. This research has both components in it, but is mainly explorative. First, the study is exploratory in the way that the goal is to find out what IT orientation consists of. The validation of the IT orientation concept is central in this study and leads to a measuring instrument. This part of the study is exploratory in nature because IT has not been studied from the strategic orientations perspective yet. The research is conducted to provide insights on the importance of IT for firm performance, a topic that needs more clarity. This is typical for exploratory research (Shields & Rangajaran, 2013). Second, a hypothesis is tested on the effect of IT orientation on firm performance. This is the conclusive part of the research. A categorization of conclusive research types distinguishes between a descriptive research design and a causal (also called explanatory) research design. Descriptive research focuses on describing characteristics of a phenomenon or concept, whereas causal research focuses on finding evidence for causal relationships between concepts (Malhotra et al., 2013). By testing the hypothesis, this study aims to find evidence for the causal relationship between IT orientation and firm performance. The conclusive part of the study therefore has a causal design.

To test both aspects of this study, qualitative and quantitative research is done. A literature research on IT activities is done, which is complemented by insights from five expert interviews. The insights from the literature research and expert interviews are input for the survey. A survey is sent to respondents and the results of the survey are the data for the quantitative analyses. With an exploratory factor analysis, it can be validated which capabilities and activities IT orientation consists of. Consequently, the effect of these IT capabilities on firm performance can be measured by using multiple regression analyses.

3.2 Context and sample

This study was conducted in the Netherlands, with the objective to generate new knowledge

about IT by viewing it as a strategic orientation. The study did not focus on a particular industry or a particular type of company, since it is expected that IT is becoming increasingly important for all types of firms. The researcher did not have access to a usable set of data for this research, which indicates that collecting data was limited. All the respondents were Dutch professionals, with knowledge about IT and the information provision within their firms. The respondents differ in types of job and the hierarchical position they have in the firm. Owners of companies for instance have participated in the research, but also employees or supervisors from particular departments have participated. However, all the respondents have the required knowledge about IT and information provision processes. In the mail with the link to the survey it is explicitly stated which knowledge respondents require in order to be able to fill in the survey. It can be checked whether respondents actually have that knowledge, because two questions regarding the respondents' department in which they work and the function they have in the firm are included in the survey. Other control variables are included in the survey to control for effects other than the hypothesized ones, for instance performance differences between product companies and service companies.

The survey can be filled in by all firms except for non-profit firms. Performance measures may not be representative for those firms since achieving superior performance is not their goal. Therefore, firms focusing on making a profit and pursuing superior performance are approached. This is a broad array of firms, which made it possible to contact a big group of firms and people. The survey is distributed mainly in two ways: cold acquisition and personal connections. The Orbis database is used for cold acquisition, which is available for students at the Radboud University. In this database, firms can be categorized by filtering on geography, status, industry, ownership, and so on. The filtering options made it possible to contact the appropriate firms for this research. An e-mail is sent to the companies in which a short introduction on the topic and the incentive to fill in the survey are described. When filling in the survey, respondents can indicate that they want to receive a summary with the results of the research. This increases the chance respondents actually are willing to participate. With regard to personal connections, potential participants with required knowledge to fill in the survey themselves, or with connection to someone who can, are approached. A similar message as with the cold acquisition is sent to those connections. This is either also by email, or by channels like LinkedIn, Facebook and WhatsApp. In the message a link to the survey is included.

3.3 Measurement and common method variance

A minor qualitative research has been conducted in order to obtain face validity for the findings

about IT capabilities and activities derived from the literature. Face validity ensures that the selection of capabilities and activities is not only based on theoretical findings, but also on practical considerations (Hair et al., 2010). This minor qualitative research comprises five interviews. These interviews are semi-structured and have been set up in the form of open-ended questions, since the main incentive of the interviews is to validate the findings from the literature and to obtain additional information about IT activities and capabilities. Semi-structured interviews provide the opportunity to go in-depth into certain interesting topics and questions. The concept IT orientation is new and has different facets. Due to this, different type of respondents have been interviewed to get more knowledge on the various facets. IT experts/professionals, MSc students in information and data sciences, a business intelligence and market intelligence expert, and someone that links IT processes to business processes have been interviewed. The outline of the interview can be found in appendix A. This minor qualitative part of the study is subordinate to the quantitative part of the study and is therefore only briefly mentioned.

A survey has been made based on the findings from both the literature and the interviews. This survey is presented to respondents and can be found in appendix B. Providing a survey after conducting interviews is a two-stage process that is essential in determining the construct validity (Lynn, 1986). Construct validity refers to the content representativeness of a certain construct. By distributing the survey among respondents after conducting interviews, a judgment stage complements a development stage. The items in the survey can be ranked with a Likert-scale. The scale has seven choice options. The ends of the scale are specified as strongly disagree / never (1) and strongly agree / always (7). Too little or too many choice options could lead to a distorting image of the actual answers of respondents. The accuracy of data from Likert items becomes significantly lower when the number of scale points is below five or above seven (Johns, 2010). However, studies provide no evidence for preferring a five-point or a seven-point scale. In this research the choice for seven choice options instead of five is made because most items in the survey are presented in the following form: “indicate to what extent your company…”. A scale with seven choice options is expected to give respondents the possibility to more adequately state to what extent their company executes certain activities than a scale with only five choice options.

Studies can be subject to measurement error, which can either be random error or systematic error (Schwab, 1999). Systematic error is mainly the result of the chosen method for measurement and can have negative consequences for the validity of the research (Podsakoff et al., 2003). Many scholars believe that common method biases are important and need to be

controlled for (e.g., Campbell & Fiske, 1959; Doty & Glick, 1998; Sharma et al., 2009). Common method biases can have certain causes, such as a common measurement context, a common rater, a common item context, or it arises from the characteristics of items themselves (Podsakoff et al., 2003). "Method biases are likely to be particularly powerful in studies in which the data for both the predictor and criterion variable are obtained from the same person in the same measurement context using the same item context and similar item characteristics." (Podsakoff et al., 2003, p. 885). This indicates that in this study, common method variance (CMV) may be present. The method for measurement of all variables in this study is by the use of a survey. This could lead to systematic error (Craighead et al., 2011). To reduce method biases, respondent anonymity is assured and evaluation apprehension is reduced. Respondents fill in the survey anonymously and it is explicitly stated that there are no wrong or right answers. This is expected to provide more honest and less socially desirable answers. Furthermore, Harman's single factor test is executed to check for common method bias. In this test, all relevant variables are entered into a factor analysis and the number of factors is set on one. Thereafter, the results of the unrotated factor solution are examined. The assumption is that when (a) there emerges a single factor from the analysis or (b) one factor accounts for the majority of the covariance among the measures a substantial amount of common method variance is present (Podsakoff et al., 2003). The rule of thumb is that "if the newly introduced common latent factor explains more than 50% of the variance, then common method bias may be present." (Eichhorn, 2014, p. 4). The results of Harman's single-factor analysis show that the common latent factor explains only 24%, which gives reason to think that common method variance is not problematic in this research.

3.4 Operationalization

In chapter 2, the central concepts are defined and the hypothesis is discussed. In order to research the hypothesis, the concepts have to be converted into measurable variables. IT orientation, firm performance and the control variables have to be operationalized. The operationalization is crucial for executing the research because the indicators are incorporated in the survey. The IT capabilities are the independent variables and are measured by the corresponding IT activities. Firm performance is the dependent variable and consists of seven performance indicators. Several control variables are added to control for differences in firm performance caused by other aspects than IT orientation. A comprehensive operationalization of all variables is given in table 15 in appendix C1 (and table 16 in appendix C2 for the Dutch version). Below, table 1 shows the concise operationalization table. The variables business

intelligence, IT system configuration, IT management, digital marketing, and e-CRM refer to the IT capabilities that are based on the findings from the literature and expert interviews. However, these are not validated yet. Quantitative analyses will provide statistical evidence for what the capabilities and activities of IT orientation really are. In other words, the operationalization of IT orientation, consisting of several IT capabilities, may differ from table 1 when quantitative analyses have been conducted. Nevertheless, there is chosen to include these capabilities in the operationalization table to show that the IT activities are metric with a ratio scale.

Table 1: Operationalization table

Variable name	Construct	Unit	Numeric coding
Business intelligence	Business intelligence	Metric	Ratio scale
IT system configuration	IT system configuration	Metric	Ratio scale
IT management	IT management	Metric	Ratio scale
Digital marketing	Digital marketing	Metric	Ratio scale
E-CRM	Electronic customer relationship management	Metric	Ratio scale
Performance	Firm performance	Metric	Ratio scale
Firm size	Number of employees	Metric	Ratio scale
Firm age	Year of foundation	Non-Metric	Nominal scale
Respondent qualification	Department	Non-metric	Nominal scale
	Position title	Non-metric	Open-ended
Industry	Industry type	Non-metric	Open-ended
Production/services	Production or services	Non-metric	Nominal scale
Self-conducting or	Self-conducting or outsourcing business intelligence	Non-metric	Nominal scale
outsourcing	Self-conducting or outsourcing IT system configuration	Non-metric	Nominal scale
	Self-conducting or outsourcing IT management	Non-metric	Nominal scale
	Self-conducting or outsourcing digital marketing	Non-metric	Nominal scale
	Self-conducting or outsourcing E-CRM	Non-metric	Nominal scale

3.4.1 Operationalization: IT orientation

As stated at the end of section 3.4, IT orientation can only by operationalized when quantitative analyses create statistical evidence for the concept. This indicates that it is not possible to

operationalize IT orientation in this section. It is of no value to operationalize the concept in terms of capabilities yet, since this might be changed after analyzing the data from the survey. Quantitative analyses indicate, out of this list of activities, which activities correlate and together represent a capability. This will be discussed in chapter 5.

It, however, is useful to provide the set of IT activities that is found up to this point. Findings from the literature and expert interviews indicate that the IT activities given in table 2 potentially have a positive effect on firm performance and therefore might be part of IT orientation.

Table 2: IT activities based on literature and expert interviews

Activity	Sources (most important ones)
(1) data collection	Matsuno et al. (2000) and expert interviews
(2) data analysis	Davenport et al. (2012)
(3) distributing information	Matsuno et al. (2000) and Drnevich & Croson (2013)
(4) storing information	Korfhage (2008) and Galliers & Leidner (2014)
(5) securing information	Von Solms & Van Niekerk (2013)
(6) configuring and integrating information systems	Gold-Bernstein & Ruh (2004)
(7) supply chain database integration	Bharadwaj et al. (2013a) and Chaffey (2009)
(8) streamlining communication	Cardona et al. (2013)
(9) automating processes	Garbani & Cecere (2011)
(10) scanning future IT establishment	Expert interviews
(11) managing IT alignment	Expert interviews
(12) managing IT capacity	Expert interviews
(13) analyzing IT resources value	Expert interviews
(14) data-driven marketing	Fowler et al. (2013)
(15) social media marketing	Felix et al. (2017) and Hudson & Hudson (2013)
(16) mobile marketing	Shankar et al. (2016) and Ström et al. (2014)
(17) email marketing	Castronovo & Huang (2012) and Müller et al. (2008)
(18) search engine optimization (SEO)	Rangaswamy et al. (2009) and Skiera et al. (2010)
(19) search engine advertising (SEA)	Rangaswamy et al. (2009) and Skiera et al. (2010)
(20) sales management	Jones et al. (2005)
(21) customer database building	Bahrami et al. (2012) and Minami & Dawson (2008)
(22) direct customer service	Ray et al. (2005) and Chaffey (2009)

(23) interaction with the online community	Chaffey (2009)
(24) after-sales support	Zhu (2004)
(25) customer satisfaction measurement	Homburg et al. (2009)

Regarding the measurement of those activities it holds that almost all activities are included in the survey as single items. However, the activities data collection and information distribution need more explanation in their measurement. Data can be collected from a big range of sources. Therefore, the activity data collection is a very broad activity and is calculated by the average of nine sub activities. Eight of these are based on work by Matsuno et al. (2000) and the last is based on the expert interviews. That sub activity refers to data collection from a firm's own employees. Distributing information is also calculated by the average of sub activities based on work by Matsuno et al. (2000). All other activities are single items in the survey. The complete version of the operationalization table is shown in appendix C1.

3.4.2 Operationalization: firm performance

In this research a subjective measure for firm performance is used, simply because objective performance data, like financial performance indicators, are extremely hard to collect (Sarkar et al., 2016). By using self-reported measures for measuring firm performance, it may be easier to get data (Dess & Robinson, 1984; Slater & Narver, 1994). Previous studies found significant correlations between objective measures of performance and the corresponding subjective measures which indicate that those subjective measures can be considered as reliable for measuring firm performance (e.g., Robinson & Pearce, 1988; Venkatraman & Ramanujam, 1987). For this study, there is relied on a scale used by Zhou et al. (2005), next to many others (e.g., Matsuno et al., 2000; Sarkar et al., 2016; Wiklund & Shepherd, 2003), who used a 7-point rating scale ranging from 'much worse' (1) to 'much better' (7). Respondents are asked whether during the last 3 years, their firm performed worse, better, or equal to other firms in their industry. This way of measuring firm performance immediately reflects their relative advantage compared to competitors, since all items are measured comparing their firm to rival firms (Wiklund & Shepherd, 2003). Financial performance measures that respondents are asked to assess are: sales growth, profit level, return on investment, and market share (Zhou et al., 2005). Next to these financial indicators, two non-financial performance measures that are associated with firm performance are added. These come from considerations regarding the stakeholder perspective on firm performance (Dess et al., 2003; Freeman, 1984; Harrison & Wicks, 2013). This perspective states that satisfying all stakeholders is essential for firm performance. Since

this study does not focus on a particular industry, there is a big variety in the stakeholders of firms participating in the research. Some stakeholder performance measures might be essential to a few firms, but do not apply to others. Therefore, two non-financial firm performance measures that can be applied to all firms are included in the measurement of firm performance. These items are customer value and corporate social responsibility. To conclude the measurement of firm performance, a seventh item is added by which respondents are asked to assess the overall performance of their firm relative to competitors. This item is added to check whether the other six measures represent firm performance adequately. When 'overall firm performance' significantly differs from the other six measures, critical performance measures might be missing which would indicate that the measures in this study are not representative for the respondent. It is expected that 'overall firm performance' scores somehow the same as the average of the other six firm performance measures. The average of the 7 items is a firm's performance measure and this can be seen in the complete version of the operationalization table in appendix C1.

3.4.3 Operationalization: control variables

Some control variables are incorporated in the survey to control for alternative explanations in variance in the dependent variable. By introducing the control variables it is intended that the unique contributions of the explanatory, or independent, variables will be found (Atinc et al., 2012). The control variables in this research are: firm size, firm age, industry of the firm, self-conducting or outsourcing IT capabilities, and whether the firm produces products or services. *Firm size* is incorporated in the research since it can be expected that larger firms can have advantages like economies of scale, scope, or network benefits that small firms may not have (Bhatt & Grover, 2005). This can have an influence on the dependent variable, firm performance. *Firm age* is taken into account in the study because it can be expected that firm age can be influential for firm performance. It may be expected that older firms have better firm performance due to learning effects they experienced in the past. However, Loderer and Waelchli (2010) found that firm age has a negative effect on firm performance, due to organizational rigidities and rent seeking. To control for potential effects of firm age, this is incorporated as a control variable. Including *industry* of the firm is important, since different industries could potentially indicate other performance outcomes in general. Also, different industries may require firms to have different (levels of) strategic orientations. This study does not examine a certain industry, it therefore is good to include firm industry as a control variable in order to justify using data from respondents of different industries (Dess et al., 1990). *Self-*

conducting or outsourcing certain IT capabilities may be an important distinction to make, according to expert interviews. Differences on this matter may lead to differences in firm performance. Further, a distinction between *products or services* may be important to control for since this distinction influences the processes of organizations in producing, selling, analyzing the market and so on. Also, a control question on *respondent qualification* is asked in the survey. Asking respondents about their function in their firm is important to control for eventual differences in knowledge or estimations about levels of strategic orientations and firm performance. This is not used in further analysis, but serves as check to see if respondents have the required knowledge to participate.

3.5 Data analysis

Information found in the literature was tested and complemented by conducting five expert interviews. Data analysis of these interviews is restricted to using information that is additional to the already found information in the literature study. This is done to find as many capabilities and activities of IT orientation as possible so that a factor analysis later on can reduce and summarize the concept IT orientation. Therefore, the interviews are not coded but only additional information is used. The insights from the literature study and interviews are combined and converted into a survey. This survey will be used to conduct quantitative analyses.

The quantitative analyses start with a factor analysis. This type of analysis makes it possible to reduce and summarize the data. The goal is to explain the maximum amount of common variance in a correlation matrix by the fewest explanatory constructs, also called factors or latent variables (Field, 2013). Items of the survey load on certain factors. In this study this gives insight in what IT activities load on which IT capabilities. Factor analysis also tests how well the IT activities represent the IT capabilities. Two types of factor analysis can be distinguished: confirmatory factor analysis (CFA) and exploratory factor analysis (EFA). In CFA, the factors are derived from literature and variables are assigned to those factors before this is statistically tested. In EFA, the factors are derived from statistical research and variables are related to every factor (Hair et al., 2010). In this study, a list of 25 activities has been identified by the researcher. These are expected to lead to a number of IT capabilities. Exploratory factor analysis should be used to validate the IT orientation construct, because in EFA the factors are found based on statistical results. Results from the EFA help in seeing IT as a strategic orientation.

After conducting the factor analysis, a reliability analysis is conducted. This analysis

gives a certain Cronbach's Alpha value, which tests whether or not there is enough internal consistency between items that load on the same underlying factor. This assesses how reliably the IT capabilities are measured by the IT activities. Activities that do not contribute to the internal consistency for an IT capability are deleted from the dataset. By conducting reliability analyses for each factor, the reliability of each distinct factor and eventually IT orientation in total is determined (Field, 2013). Next to reliability analyses, it is essential to test for construct validity, in this case the validity of IT orientation. Statistical tests are used to find the extent to which a set of measured variables, IT activities, represent the latent construct, the separate IT capabilities. It consists of convergent and discriminant validity (Hair et al., 2010). Construct validity is good when there is high correlation between variables loading on the same factor and low correlation between different factors. This is measured by respectively convergent validity and discriminant validity. Construct validity will be discussed in the results of the factor analysis.

After conducting a factor analysis, a multiple regression analysis is conducted to examine the effect of IT capabilities on firm performance. It will then be clear if and how IT orientation predicts firm performance. The multiple regression analysis shows whether the capabilities have a significant effect on firm performance and what the strength of the effect is, which provides understanding in the relationship between the constructs.

3.6 Research ethics

When conducting academic research, research ethics must be taken into consideration (Symon & Cassell, 2012). These are stated by the American Psychological Association and make sure research is conducted according to ethically desired guidelines. It is a code of behavior that is not very strict in terms of rules or duties. However, guaranteeing anonymity, transparency, honesty, and discreetness in handling data and participant relationships are the standards (Symon & Cassell, 2012). All the collected data in this study is handled with the highest care and was not shared with other parties. A short introduction for each question was given to provide respondents clarity on what is meant by the constructs. Further, respondents were informed about the duration of the survey and anonymity was protected and assured. No personal information questions were asked in the survey. This was all communicated in the e-mail with the invitation to participate. Additionally, respondents had the opportunity to receive a summary of the research with a benchmark of their firm. Concluding, this research complied with the research ethics standards since anonymity, transparency and discreetness are guaranteed.

4. Results

This chapter contains the results of the data analyses. First of all, insights from the interviews will briefly be discussed. After that, the research population characteristics are described to provide a starting point for the quantitative analyses. This is followed by the EFA to find out what IT orientation comprises in terms of capabilities and activities. In this section the construct validity will also be discussed. Further, reliability analyses have been conducted for each of the factors identified in the EFA. Finally, a multiple regression analysis is executed to examine the effect of IT capabilities on firm performance. When IT capabilities have an effect on firm performance, statements can be made on viewing IT as a strategic orientation.

4.1 Interview insights

The interviews have led to the adjustment of the activity *data collection* by adding a new source from which data can be collected. Further, the interviews have led to a control variable that makes a distinction between *self-conducting or outsourcing the capabilities* and to four IT management activities that together are expected to represent a capability named *IT management*. The initial expected capability *IT system management* is renamed to *IT system configuration*. The interview findings can be found in appendix D1 and appendix D2. These show the brief and extensive interview findings.

4.2 Research population characteristics

This section describes the characteristics of the research population. After distributing the survey, 114 responses have been gathered. None of these responses had to be deleted since no missing values or remarkable data have been found. The research population is the basis from which analyses are done. Table 3 gives an overview of the characteristics. In this table the departments where respondents are currently working are shown first. As can be seen, respondents of the survey are working in different departments. It varies across approximately 10 to 12 departments. Next to the 8 option categories, some respondents stated that they work in a department other than those named in the choice options. Those respondents mainly work in customer operations, logistics, or consultancy within their firm. Having respondents from varying departments is good for the validity of the research, since the bias of only having respondents from a specific department is avoided. This control variable is mainly added to check this, and to check whether respondents have the required knowledge to participate. This control variable is not included in the regression analysis, in contradiction to the other control variables.

Firm size is measured by number of employees. It is an open-ended question in the

survey. After the survey, the results regarding this question are grouped into three different categories. The groups refer to firms with 1 to 50 employees, firms with 51 to 250 employees, and 251 and more employees. This categorization has been made to distinguish between small firms, medium firms, and large firms (Roza et al., 2011). Grouping firms gives better insight in analyzing the effect of firm size than by using the absolute numbers of employees. The latter would lead to distorted results since an increase in employees from 10 to 20 would be interpreted the same as an increase in employees from for instance 1000 to 1020. This should not be interpreted the same. Therefore, three categories are made which can be taken into account in the regression analysis. All groups for firm size have at least 30 respondents. The distinction between firms that sell (tangible) products and firms that sell (intangible) services shows that this is almost equally divided in the research population. There are 59 firms that sell products and 55 firms that sell services. Regarding self-conducting or outsourcing IT capabilities, it should be noticed that market intelligence / business intelligence, marketing, and customer relationship management is mostly done by firms themselves. On the other hand, IT system configuration often is outsourced (44,7%). IT management is also outsourced relatively often, but to a lesser extent (23,7%). Firm age is the last control variable in this research. A question is incorporated in the survey about the founding year of the organization. This is translated to the firm age by taking the year 2018 and subtracting it with the founding year. This method can be used since no firms where founded in 2018, so no values of 0 are found. Otherwise, all values would have been increased with 1. As can be seen, the sample contains a broad array of firm ages, from 2 to 201 years old. The mean is 60.61 years, with a standard deviation of 47.15. This indicates a very big dispersion of the firm age values across the respondents.

Table 3: Respondent and firm characteristics (n=114)

Respondent working in department	**N**	**% of total**
Production	7	6.1
IT	22	19.3
Marketing	10	8.8
Finance	22	19.3
MI / BI	2	1.8
Sales	13	11.4

Human resources	2	1.8		
CEO or owner	13	11.4		
Other	23	20.2		
Number of employees	**N**	**% of total**		
1-50	31	27.2		
51-250	39	34.2		
251+	44	38.6		
Production	**N**	**% of total**		
Products	59	51.8		
Services	55	48.2		
Self-conducting or outsourcing	**N**	**% of total**		
Market intelligence / business intelligence				
- Self	99	86.8		
- Outsourcing	15	13.2		
IT system configuration				
- Self	63	55.3		
- Outsourcing	51	44.7		
IT management				
- Self	87	76.3		
- Outsourcing	27	23.7		
Marketing				
- Self	104	91.2		
- Outsourcing	10	8.8		
E-CRM				
- Self	107	93.9		
- Outsourcing	7	6.1		
Firm age	**Mean**	**SD**	**Min**	**Max**
Firm age	60.61	47.15	2	201

4.3 Exploratory factor analysis

An exploratory factor analysis is conducted to define the underlying structure among variables in this study. This analysis tracks if items used to measure a factor actually relate to that factor

and not to others (Hair et al., 2010). The guidelines described by Field (2013) are mainly used in conducting the factor analysis. The main objective of this factor analysis is to identify the IT capabilities that represent the concept IT orientation better than the total set of IT activities. Another objective is to reduce the amount of IT activities into a set of activities that adequately represents IT orientation. The total set of activities that are expected to be essential for IT orientation are included in the factor analysis. This means that 25 items are included, which are all metric variables. In this study, common factor analysis is preferred over component analysis as the method of extraction, because the main objective of the factor analysis is to identify underlying factors (Hair et al., 2010). The assumption thus is that the data in this study contains latent constructs, or underlying dimensions. Principal axis factoring (PAF) therefore is the method for extraction. This is an adequate technique for finding latent constructs in the data.

4.3.1 Assumptions

Statistical assumptions need to be tested before conducting the analysis. Those assumptions are required of the dataset in order to be able to conduct the analysis and to indicate whether or not factor analysis is an appropriate technique. Field (2013) first states that data should be at least at interval level to be useful in factor analysis. Also, there should be no outliers in the dataset. Both assumptions are met since all items incorporated in the factor analysis are metric and no outliers are present in the data. Further, there must be some degree of collinearity among variables in the dataset. However, since factor analysis is an interdependency technique, no perfect multicollinearity between the variables must be present. To determine this assumption, the correlation matrix can be used to check the pattern of relationships (Field, 2013). Variables that do not correlate enough with any others should be eliminated. The matrix should be scanned on correlations greater than .3 and variables with only a few correlations greater than .3 can cause problematic multicollinearity. Additionally, variables that have correlation coefficients greater than .9 could indicate problematic multicollinearity. In the correlation matrix in this study, no variables have been found that do not correlate enough with other variables and no correlation coefficient is greater than .9. Multicollinearity thus is not expected to be problematic in this analysis. The last two assumptions for factor analysis are the Kaiser-Meyer-Olkon (KMO) measure and Bartlett's test of sphericity (Field, 2013). KMO indicates the (in)adequacy of the sample that is used by measuring the proportion of variance among variables that might be caused by underlying factors (Cerny & Kaiser, 1977). Bartlett's test of sphericity examines whether there is enough correlation between items included in the analysis. With a significance level of $< .05$ for Bartlett's test of sphericity and a KMO value higher than .50, factor analysis

is considered an adequate technique (Field, 2013). By running the analysis, the KMO measure verified the sampling adequacy, KMO = .834. This is meritorious, according to guidelines of Hutcheson and Sofroniou (1999). Bartlett's test of sphericity χ^2 (300) = 1465.13, $p < .001$, which indicates that correlations between items in the data are sufficiently large. Table 4 shows both assumptions.

Table 4: KMO and Bartlett's test of sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.834
Bartlett's Test of Sphericity	Approx. Chi-Square	1465.13
	df	300
	Sig.	.000

4.3.2 Factor extraction, rotation and eliminating items

The initial factor analysis is conducted in order to obtain eigenvalues in the data. This helps in extracting factors from the dataset. The rule of thumb for deciding how many factors should be extracted is that a factor should have an eigenvalue greater than one. This is also referred to as Kaiser's criterion (Field, 2013). As can be seen in table 18 in appendix E1, the initial factor analysis indicates that six factors have an eigenvalue greater than one. These six factors together have a total explained variance of 65.65%, which is quite high. Therefore six factors are extracted and taken into account in further analysis.

Again, the analysis is run. Now the number of factors is set on the fixed amount of six. Also, factor rotation is applied. Factor rotation is applied in order to simplify the structure among factors and to better interpret the results of the analysis. A choice should be made between orthogonal rotation and oblique rotation. Orthogonal rotation refers to the context in which factors remain uncorrelated after rotation. Oblique rotation on the other hand allows the factors to correlate (Field, 2013). The choice for either one of the rotation methods can be substantiated, since for both methods there are many scholars preferring them over the other method. For instance, Costello and Osborne advocate using oblique rotation by stating that "oblique rotation should theoretically render a more accurate, and perhaps more reproducible, solution." (2005, p. 3). Field (2013) adds to this by stating that some scholars argue that oblique rotation is the only sensible choice. Orthogonal rotation on the other hand is the most used rotation method in factor analysis, because of its straightforwardness and because the results are easy to interpret (Costello & Osborne, 2005). To make the choice even more complicated,

there is no consensus on the impact of the rotation method on the output it delivers. Kim et al. (1978) state that the issue of whether factors are (un)correlated may not even make a difference, whereas Abdi (2003) argues that the choice for a rotation method strongly influences the results of the analysis. In this study, it may be expected that factors correlate, indicating that oblique rotation is the most appropriate method for rotation. It may be logical to think that different capabilities regarding IT are in some way correlated to each other. To illustrate, when a firm scores higher on business intelligence, digital marketing may also be higher because firms know what customers want and can respond to those needs. Therefore, orthogonal rotation might yield biased results. In order to make the choice between orthogonal rotation and oblique rotation more explicit, Tabachnick & Fidell (2007) discuss a rule of thumb that should be used. In SPSS, oblique rotation should be requested with the desired number of factors, in this case 6. The resulting factor correlation matrix should then be checked on correlations of .32 and above. "If correlations exceed .32, then there is 10% (or more) overlap in variance among factors, enough variance to warrant oblique rotation unless there are compelling reasons for orthogonal rotation." (Tabachnick & Fidell, 2007, p. 646). As can be seen in the factor correlation matrix (table 19 in appendix E1), several correlations between factors exceed .32, indicating that oblique rotation should be used in this study. However, considering all arguments and to make sure that no significant differences between the two rotation methods are overlooked, a factor analysis with orthogonal rotation is also conducted. The comparison between the outcomes of both methods is briefly discussed at the end of section 4.3.3.

When using oblique rotation (direct oblimin in SPSS), both pattern and structure matrices are created in SPSS. The structure matrix gives coefficients that represent the zero-order correlation between items and factors. This means that the strength of the correlation between item and factor are given while ignoring the correlation of the factor with all other factors. The pattern matrix on the other hand gives coefficients that indicate the unique contribution of a factor to an item while controlling for the effect that other factors have on that item (Field, 2013). This indicates that in EFA it is valuable to look at the pattern matrix. In the pattern matrix it should be noticed that all items have a certain loading on all factors. The next step is checking whether items have to be eliminated. Items that should be eliminated are either items for which the highest factor loading is lower than .50, or cross-loaders. Cross-loaders are items that load on multiple factors with a difference in the loadings smaller than |.20|. This means that if an item has loadings on at least two factors within a range of .20, either positive or negative, it is labelled a cross-loader. Presence of cross-loading items indicates a problem regarding discriminant validity (Hair et al., 2010). To overcome this and to secure discriminant

validity, cross-loadings should be eliminated from the analysis. Additionally, items for which the highest factor loading is lower than .50 should be eliminated one by one. This is essential to enhance convergent validity, which measures if items of a factor have a high degree of common variance (Field, 2013). In appendix E2 the elimination process of those items is shown. The item for which the highest factor loading is lowest is eliminated first, then the second, and so on. Lastly, after several eliminations, one item cross-loaded on two factors. This item is also eliminated. Eventually this resulted in the pattern matrix shown in table 5. All remaining 16 items load on one factor with a loading of at least .50. Construct validity requirements, consisting of discriminant and convergent validity, therefore have been met. To secure the appropriateness of the analysis, the KMO value and Bartlett's test of sphericity have again been tested. As can be seen in appendix E3, the KMO value is still meritorious (Hutcheson & Sofroniou, 1999) and Bartlett's test of sphericity χ^2 (120) = 871.49, $p < .001$, which indicates that correlations between items in the data are still sufficiently large. Also, all communalities after extraction, see appendix E3, are above the threshold of .20.

Table 5: Pattern matrix

	Factor					
	1. Social and mobile platform management	2. IT management	3. Business intelligence	4. Online customer service	5. IT system configuration	6. Digital marketing and sales
Information distribution			-.66			
Data collection			-.71			
Data analysis			-.71			
Storing information					-.86	
Integrating information systems					-.61	
Scanning future IT establishment		.50				
Managing IT alignment		.80				
Managing IT capacity		.82				
Social media marketing	.77					
Mobile marketing	.85					

Interaction with online community	.71				
Email marketing					.57
Search engine optimization					.70
Search engine advertising					.54
Sales management					.62
Direct customer service			-.78		

Extraction Method: Principal Axis Factoring.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 10 iterations.

4.3.3 Factor interpretation

Six factors have been identified. In order to interpret the factors, the items that load on those factors together indicate the labels for the factors. The clusters of IT activities suggest the following capabilities: (1) social and mobile platform management, (2) IT management, (3) business intelligence, (4) online customer service, (5) IT system configuration, and (6) digital marketing and sales. The capability business intelligence contains the three activities: *data collection*, *data analysis* and *information distribution*. Those activities were expected to cluster beforehand. IT system configuration contains only two activities, *storing information* and *integrating information systems*. *Scanning future IT establishment, managing IT alignment* and *managing IT capacity* together make up the capability IT management. A fourth IT capability is digital marketing and sales. This is made up of the activities *e-mail marketing, search engine optimization*, *search engine advertising*, and *sales management*. These four together refer to a firm's digital efforts for acquiring customers and selling them products and/or services. Social and mobile platform management is the fifth IT capability. It comprises the activities *social media marketing, mobile marketing,* and *socializing with the online community* on online platforms. These three activities have in common that they are in particular aimed at acquiring, but also retaining, (potential) customers through social and mobile platforms. This capability differs from digital marketing and sales by specifically focusing on these platforms. Lastly, the factor analysis shows that *online customer service* is a factor on itself, which makes it easy to interpret. It is labeled as online customer service.

As stated before, a factor analysis with orthogonal rotation was also conducted to compare the results between the two methods. Orthogonal rotation essentially produced the

same pattern of loadings. Again, six factors are found with the same variables clustering on them. The only difference is that sales management was removed due to cross loading scores on two factors. The comparable results of both rotation methods give confidence in the reliability of the outcomes of the factor analysis.

After interpretation of the six factors, scales for those factors are developed. This is done by summing and averaging the items of those factors in order to create indices for the scales. By using these summated scales, multiple aspects in one factor are represented. Since six IT capabilities have been identified, six scales are calculated.

4.4 Reliability analysis

The scales made in the factor analysis should be tested on reliability. Additionally, the scale of firm performance should be subject of a reliability analysis. Firm performance consists of relatively few items and is a one factor variable. Factor analysis of this scale would be meaningless, but it is essential to test the items on reliability to be sure that they together measure firm performance. Reliability analysis of all scales is of critical importance to test whether they consistently reflect the construct it is measuring (Field, 2013). This internal consistency among items in a scale is measured by looking at the reliability coefficient Cronbach's Alpha. A higher alpha means that the internal consistency is better. In the academic community, the interpretation of Cronbach's Alpha scores differs among scholars. While some state that .60 is the generally accepted lower limit (Hair et al., 2010), others state that .70 or even .80 are the norm (Cortina, 1993; Kline, 2013). Guidelines of Field (2013) are used in interpreting the reliability. He states that a scale is reliable with a Cronbach's Alpha value of .60 and very reliable with a value of .80 and higher.

Table 6 shows the Cronbach's Alpha values for all scales. Only five of the six IT capabilities can be tested on internal consistency, because online customer service consists of only one item. Reliability analysis can therefore not be executed. As can be seen, all scales have at least good reliability since they all have a Cronbach's Alpha value higher than .70 (Field, 2013). For IT management, the reliability of the scale with three items as found in the factor analysis is .74. By deleting the activity *scanning future IT establishment*, the Cronbach's Alpha value increases to .87. This indicates a significant increase in reliability. Since the scale has so few items, the information of the factor can significantly decrease by removing the item. This is essential to assess when considering to remove the item. No clear rule of thumb is given in such a situation. Taking into account the possible loss of information, there is chosen to remove the item. The Cronbach's Alpha increases significantly and there is no crucial loss of

information in the capability. IT management now consists of *managing IT alignment* and *managing IT capacity* and has a very reliable scale (Field, 2013). Furthermore, by checking the reliability of the six capabilities combined, the internal consistency of the IT orientation concept is secured. The Cronbach's Alpha value indicates that the scale has good reliability, since it is over .70.

The dependent variable in this study, firm performance, is made up of seven performance measures. To check whether these seven measures actually represent a reliable scale and measure firm performance, a reliability analysis is conducted. This gives a Cronbach's Alpha value of .87, which can be increased a little by deleting the performance measure regarding corporate social responsibility. However, this increase in reliability is very small and as Dess et al. (2003) stated, taking a stakeholder perspective is essential to reflect the increasing importance that stakeholders have in getting a competitive advantage. Thus, corporate social responsibility is increasingly seen as an important performance measure for firms. Therefore, the researcher remains with the set of seven items. The complete output of the reliability analyses for all scales can be found in appendix F.

Table 6: Cronbach's Alpha values

Scale	Cronbach's Alpha	Number of items
Business intelligence	.75	3
IT system configuration	.73	2
IT management	.87	2
Digital marketing and sales	.81	4
Social and mobile platform management	.87	3
Online customer service	Does not apply	1
Capabilities 1 - 6	.75	6
Firm performance	.87	7

4.5 Multiple regression analysis

In order for IT orientation to be validated as a strategic orientation, it is important to measure the effect of the IT capabilities on firm performance. This comes from the assumption that strategic orientations lead to a competitive advantage and thus to better firm performance. When the IT capabilities do not positively affect firm performance, IT orientation possibly should not be seen as a strategic orientation.

By conducting a multiple regression analysis, the relationship between multiple

independent variables and a single dependent variable can be analysed (Field, 2013). Multiple regression analysis is used to fit a linear model to the data and use it to predict values of the dependent variable from multiple independent variables. In this study, the IT capabilities are the independent variables and firm performance is the dependent variable. The relationship between the capabilities and firm performance can potentially be disturbed by control variables. In other words, it is possible that the control variables cause significant differences in firm performance. By incorporating those control variables in the regression analysis, this can be tested.

Examining the effect of IT capabilities on firm performance has both a prediction and explanatory purpose. In the analysis, the degree to which all capabilities together predict firm performance is determined, as well as each capability separately. The capabilities are metric variables and their score is calculated by taking the average score of the corresponding activities. Further, four control variables are included in the regression analysis: firm size, firm age, selling products or services, and self-conducting or outsourcing IT capabilities. Firm performance is a metric variable of which the score is calculated by taking the average of its corresponding activities.

4.5.1 Assumptions

For making it possible to make statements about the results of a multiple regression analysis, it is essential to have a sample as close as possible to the actual situation and to have as little as possible standard error. The assumptions for regression analysis guarantee this to some degree. That is, when assumptions are met we can with greater confidence make statements about the results. When assumptions are violated, the quality of the results deteriorate. Therefore, five assumptions should be checked when conducting a regression analysis. These assumptions check whether errors in the prediction are the result of absence of relationships between variables, or if errors in the prediction are caused by characteristics of the data that is not accommodated by the regression analysis itself (Field, 2013). Four assumptions are checked by conducting the regression analysis and one assumption is checked by looking at the correlation matrix.

Regression analysis fits a linear model to the data, so the first assumption is linearity. This assesses the relation between an independent variable and the dependent variable. Linearity represents the degree to which a change in the dependent variable is associated with the independent variable. This assumption can be checked by looking at the normal P-P plot of regression standardized residuals (Field, 2013). For all the relations between the independent

variables and firm performance a clear line can be determined. The assumption of linearity therefore is met.

The second assumption that should be checked is the existence of heteroscedasticity instead of homoscedasticity. The desired situation is homoscedasticity in which the variance of the residual terms are constant for each level of the independent variable (Field, 2013). Heteroscedasticity is the violation of this assumption. This can be checked by looking at the scatterplots of regression standardized residuals. A strange pattern could indicate heteroscedasticity. In the scatterplots of each independent variable, no strange pattern is found. Therefore, homoscedasticity is met.

The third assumption is having independent errors. This means that the residual terms between any two observations should be uncorrelated. This is also referred to as a lack of autocorrelation. By running the regression analysis, the Durbin-Watson test helps in checking this assumption. The test measures if adjacent residuals are correlated. A rule of thumb is that values greater than 3 or less than 1 are cause for concern (Field, 2013). The results show that all variables have a Durbin-Watson score very close to 2. The assumption of independent errors therefore is met.

The fourth assumption is normality of errors. This does not mean that the data itself has to be normally distributed. This misconception probably stems from the given that normally distributed data also has normally distributed errors (Field, 2013). However, also non-normal data itself can have normality of errors. The assumption is that the residuals in the model are normally distributed variables with a mean of 0 (Field, 2013). This can be checked by conducting the regression analysis and looking at the histograms of regression standardized residuals. For all variables, the histograms show acceptable normality of errors. Therefore, the assumption is met.

Lastly, the independent variables should be checked on multicollinearity. This assesses whether the correlations between independent variables in the model are problematic. In an ideal world, no correlation between independent variables exist. This would indicate an unique contribution of every independent variable in predicting the dependent variable. However, since the independent variables are all factors of IT orientation, the independent variables in this research might correlate too much. To test this, the correlation matrix of the predictor variables is scanned on scores above .70 (Field, 2013). Those scores indicate problematic multicollinearity. Also, tolerance values are assessed. When tolerance values are below .10, they indicate problematic multicollinearity. Values below .25 indicate a potential problem and require alertness in making conclusions about the unique effect of independent variables on the

dependent variable (Menard, 2002). As can be seen in table 7, no correlations between independent variables are greater than .70. Also, no tolerance value is below .25. This indicates that multicollinearity is not problematic in this research.

4.5.2 Univariate and bivariate analysis

To give a first impression of the data, the Pearson correlation matrix and the descriptive statistics of the independent and dependent variables are given in table 7. This respectively shows the correlations between the different variables and some basis statistics regarding each separate variable. The variables are firm performance (FP), business intelligence (BI), IT system configuration (ITsc), IT management (ITmng), digital marketing and sales (DMS), social and mobile platform management (SMPM) and online customer service (OCS).

Table 7: Pearson correlation matrix and descriptives of all variables (n=114)

	1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**
1. FP	1						
2. BI	.39**	1					
3. ITsc	.27**	.37**	1				
4. ITmng	.48**	.35**	.42**	1			
5. DMS	.22*	.23*	.40**	.15	1		
6. SMPM	.18	.42**	.33**	.07	.61**	1	
7. OCS	.24*	.41**	.31**	.20	.46**	.53**	1
MEAN	4.72	4.62	4.75	5.526	3.97	4.65	3.78
SD	0.88	1.06	1.33	1.20	1.66	1.72	2.29
RANGE	4.29	4.54	5.50	5.50	6.00	6.00	6.00
MIN	2.71	2.39	1.50	1.50	1.00	1.00	1.00
MAX	7.00	6.93	7.00	7.00	7.00	7.00	7.00

(*p<0.05, **p<0.01)

4.5.3 Multivariate analysis

The most important tables in analyzing the data are the ‘model summary’ and ‘coefficients’. These tables provide the F-score, R-squared, adjusted R-squared, the significance, and the standardized β-score. The adjusted R-squared represents the variation in the dependent variable explained by the independent variables included in the model. The level of significance determines whether effects are significant. When there is a significant effect, the β-score will

be addressed. This measures the strength and nature of the effect (Field, 2013).

A first model is conducted with only the control variables and the dependent variable included. The four control variables are *number of employees*, *products or services*, *firm age*, and *self-conducting or outsourcing IT capabilities*. The number of employees has been categorized by the researcher into three groups that represent small firms (1 to 50 employees), medium sized firms (51 to 250 employees), and large firms (251 or more employees). When there are non-metric independent variables with more than two categories in a regression, dummy variables should be used (Field, 2013). Only with the use of dummies those variables can be included in the analysis. For the variable *number of employees*, dummy variables are therefore created for each group. These are named FirstDUMemployees (1 to 50 employees), SecondDUMemployees (51 to 250 employees) and ThirdDUMemployees (251 or more employees). The last two are incorporated in the regression analysis and FirstDUMemployees is used as the reference category. In this way, medium sized firms and large firms are compared to small firms in their effect on firm performance. The comparison between medium sized firms and large firms is also done in a separate regression analysis to check whether there are significant differences between them, but this is not the case. The other control variables are either metric or non-metric with only two categories and can therefore be used in the analysis without transformation of the variable. Table 8 shows the model summary with the control variables in isolation.

Table 8: Model 1 summary with control variables in isolation

Model	R^2	Adjusted R^2	F change	Sig. F change
1	.05	-.03	.62	.78

According to the statistics, Model 1 has an adjusted R^2 of -.031. This indicates that the model fit is very low. In other words, the control variables are very poorly related, or even unrelated, to firm performance. It can also indicate that the number of predictors, in this case the number of control variables which is eight (firm age, number of employees, products or services, and self-conducting or outsourcing five IT capabilities), is too high for the number of respondents. To check the appropriate sample size, a general rule of thumb is "no less than 50 participants for a correlation or regression with the number increasing with larger numbers of independent variables (IVs)." (VanVoorhis & Morgan, 2007, p. 48). Green (1991) makes this more specific by suggesting $N > 50 + 8$ m (with m referring to the number of IVs) when testing the overall model and $N > 104 + m$ for testing the individual predictors. M is 8 in this case, which makes

the suggested minimum N in Green's (1991) calculations 114 (50 + 64) and 112 (104 + 8). The N in this study is 114, which is exactly the required minimum sample size according to Green (1991). Nevertheless, to be sure that no individual control variable has an effect on firm performance, the relation of each control variable on firm performance is measured separately. As can be seen in appendix G, no control variable on itself has an effect on firm performance. Therefore, Model 1 can be interpreted: the control variables have no significant effect on firm performance (R^2 = -.03, F (9,104) = 0.62, p = .78). In more detail, the beta's (β) of the control variables are given in table 9. The beta's are the standardized coefficients and represent the strength of the effect of the independent variable on firm performance. By looking at the standardized coefficients, the effects of independents variables can be compared since the power of the effects are standardized. The β-scores give the relative importance of the control variables in explaining firm performance. All significance levels are >.05, which indicates that no control variable has a significant effect on firm performance.

Table 9: Beta coefficients Model 1

Model	Variable	Beta	Sig.
1	Products or services	.01	.92
	Firm age	.05	.68
	SecondDUMemployees	.11	.39
	ThirdDUMemployees	.18	.21
	MI / BI self-conducting or outsourcing	-.05	.65
	IT configuration self-conducting or outsourcing	-.03	.78
	IT management self-conducting or outsourcing	-.10	.40
	Marketing self-conducting or outsourcing	-.03	.75
	CRM self-conducting or outsourcing	.06	.57

In Model 2, the independent variables are added to the initial Model 1. These are the six IT capabilities that are found after conducting the factor analysis and reliability analyses. By adding these capabilities, the model states a significant F change. In other words, Model 2 explains a significant proportion of the variance in firm performance (R^2 = .23, F (6, 98) = 6.82, p < .01). This indicates that 23% of firm performance is explained by the six IT capabilities and control variables. As can be seen in table 10, the model fits the data sufficiently since the p-value is significant.

Table 10: Model 2 summary with addition of IT capabilities

Model	R^2	Adjusted R^2	F change	Sig. F change
2	.33	.23	6.82	.00

Next to assessing the model fit it is interesting to determine the contribution of each of the IT capabilities in predicting firm performance. The beta's of the independent variables and control variables are given in table 11. Only one capability shows a significant effect. As can be seen in table 11, IT management has a significant effect on firm performance, $\beta = .43$, $p < .01$. All other variables show significance values over .05, indicating that they have no effect on firm performance. Next to the standardized β-score of the effect, the unstandardized coefficient B should be checked. IT management has a B-value of .31. Increasing IT management with 1 leads to firm performance increasing with .31.

Table 11: Beta coefficients Model 2

Model	Variable	Beta	Sig.
2	Products or services	-.04	.65
	Firm age	.03	.75
	SecondDUMemployees	.04	.69
	ThirdDUMemployees	.11	.42
	MI / BI self-conducting or outsourcing	.02	.79
	IT configuration self-conducting or outsourcing	-.01	.92
	IT management self-conducting or outsourcing	-.01	.95
	Marketing self-conducting or outsourcing	-.09	.34
	CRM self-conducting or outsourcing	.16	.10
	Business intelligence	.18	.09
	IT system configuration	.03	.83
	IT management	.43	.00
	Digital marketing and sales	.08	.51
	Social and mobile platform management	.00	1.00
	Online customer service	.04	.71

Both models can be compared to see how the fit has improved. The explanatory power of the model has improved from -.03 to .23. Further, the impact of the control variables in both models can be compared to check whether the influence of these variables decreases when the model

also includes the IT capabilities. The β of *self-conducting or outsourcing marketing* increases slightly, just as the β regarding selling *products or services*. The only variable that stands out in this matter is self-conducting or outsourcing CRM. The β increases from .06 to .16. However, the variable still is not significant. For all other control variables, the β decreases, which means more prediction power is assigned to the IT capabilities. Ideally, full variance is explained by the IT capabilities, but this is practically impossible to achieve.

After the first two models, a third model can be run with interaction effects. Interaction effects, or moderation effects, are taken into account when it is believed that the effect of an independent variable on the dependent variable differs across groups or categories. Based on the expert interviews, variation in the effect of IT orientation on firm performance may be determined by the size and age of a firm. For instance, older firms may have outdated IT systems, whereas younger firms are expected to adapt IT systems and efforts to current technological opportunities and demands. Also, larger firms may have more explicit and clear IT processes and guidelines than small farms. This could lead to more benefits than small firms. Therefore, firm age and firm size are included in Model 3 as interaction effect with IT orientation. In this model, IT orientation is a variable in itself, computed by the average of the six capabilities. The interaction effects of IT orientation with firm size and with firm age are included in the model. Table 12 shows the summary of Model 3, in which can be seen that inclusion of both interaction effects in the model has no significant effect (adjusted R-squared = .24, F change (2, 96) = 1.77, p = .18).

Table 12: Model 3 summary with interaction of IT orientation with firm age and size

Model	R^2	Adjusted R^2	F change	Sig. F change
3	.35	.24	1.77	.18

More specifically, neither of the two interaction effects separately has a significant effect on firm performance. This can be seen at the bottom of table 13. The next chapter goes more in-depth regarding the results and makes conclusions and recommendations.

Table 13: Beta coefficients Model 3

Model	Variable	Beta	Sig.
3	Products or services	-.04	.65
	Firm age	.01	.94

	SecondDUMemployees	.05	.65
	ThirdDUMemployees	.10	.46
	MI / BI self-conducting or outsourcing	.01	.90
	IT configuration self-conducting or outsourcing	-.04	.72
	IT management self-conducting or outsourcing	.01	.91
	Marketing self-conducting or outsourcing	-.07	.47
	CRM self-conducting or outsourcing	.13	.18
	Business intelligence	.15	.17
	IT system configuration	.01	.95
	IT management	.41	.00
	Digital marketing and sales	.08	.51
	Social and mobile platform management	.04	.78
	Online customer service	.06	.60
	IT orientation x Firm age	.11	.27
	IT orientation x ThirdDUMemployees	.08	.38

5. Conclusion and discussion

The aim of this chapter is to provide a conclusion based on the analyses. The research question and hypothesis are discussed, followed by the discussion in which the results are interpreted and assessed in the light of existing scientific literature. Next, practical implications of the research are addressed. Additionally, a critiral reflection on the limitations of the research is given and directions for further research are discussed.

5.1 Conclusion

This study had a twofold objective: to identify what IT orientation is and what its effect on firm performance is. The corresponding research question based on this objective was: What comprises an IT orientation and does it affect firm performance? In order to achieve the research objective, multiple research methods were needed. There was a qualitative part and a quantitative part, each with a variety of methods.

The qualitative part consisted of an extensive literature review followed by five expert interviews. The objective here was to investigate what IT orientation is in terms of IT activities and their underlying IT capabilities. The findings from the literature were tested and complemented by the five expert interviews, which ensures that the selection of IT activities and capabilities is based on both theoretical findings and practical considerations (Hair et al., 2010). Literature review and interviews together resulted in a list of 25 IT activities. These are discussed in chapter two in five separate paragraphs. These paragraphs represent clusters of activities that were expected to be part of the same IT capability. However, those groups of IT activities are not definitive and had to be quantitatively tested. The total list of activities was translated to a survey. This survey was distributed and a number of 114 respondents has been obtained. The results of the survey are the input for quantitative analyses. By conducting an exploratory factor analysis it was statistically tested what IT orientation is in terms of IT capabilities, which are the underlying factors found in the analysis. Six IT capabilities are found. Several activities, from the initial list of 25 activities, are deleted due to factor loadings below .50 and cross-loadings. The final six IT capabilities are (1) business intelligence, (2) IT system configuration, (3) IT management, (4) digital marketing and sales, (5) social and mobile platform management, and (6) online customer service. These capabilities were subject to reliability analyses, which showed high internal consistency. After removing one item within IT management, all scales were ready for the multiple regression analysis. Table 14 gives an overview of the definitive set of capabilities and related activities, which answers the first part of the research question.

Table 14: IT capabilities and corresponding IT activities

Capability	Activity	Definition
Business intelligence	Data collection	Collecting data from various sources (e.g., from customers, suppliers, employees, etc.).
	Data analytics	Analyzing the collected data to find customer preferences, patterns, trends and other useful information to improve our business decisions and processes.
	Information distribution	Distributing information across departments so that it is available in every department.
IT system configuration	Storing information	Storing the generated information in a knowledge base.
	Integrating information systems	Configuring and integrating the information systems so that data and information can be easily exchanged.
IT management	Managing IT alignment	Tailoring the available IT resources to the needs of the various functions in a company.
	Managing IT capacity	Ensuring that the capacity of the IT establishment is able to realize the objectives in an effective and timely manner.
Digital marketing and sales	E-mail marketing	Using e-mail to promote products and services.
	Search engine optimization	Using search engine optimization (SEO) to analyze and use the most searched keywords on search engine pages.
	Search engine advertising	Placing advertisements on search engine pages for promoting products and services.
	Sales management	Ensuring that customers can easily and quickly make purchases through online sales channels.
Social and mobile platform management	Social media marketing	Using social media platforms to promote products and services.
	Mobile marketing	Using marketing aimed at smartphones, tablets and other mobile devices to promote products and services.
	Interaction with the online community	Socializing with the online community by communicating on online platforms (e.g., social media).

Online customer service	Direct customer service	Offering direct online customer service by responding to customer requests and inquiries (for example through a chat function).

After finding IT capabilities and testing their internal consistency, the goal of this study was to measure if these capabilities positively affect firm performance. This is examined by conducting a multiple regression analysis. A first model is run with four control variables in isolation: *firm age, firm size, selling products or services,* and *self-conducting or outsourcing IT capabilities*. The model shows that none of the control variables explain variances in firm performance. In the second model, the six IT capabilities are added as independent variables. This way, the relationship between IT orientation and firm performance is measured. The results of the analysis show that this model is significant, indicating that IT orientation indeed has an effect on firm performance. Hypothesis 1 therefore is accepted. By looking at the results in more detail, it is noticed that only one IT capability, IT management, has a significant effect on firm performance. It is a positive effect, indicating that firms with more emphasis on IT management yield higher firm performance. In terms of IT activities this means that (1) *managing IT alignment* for different departments and (2) *managing IT capacity* are expected to positively influence firm performance.

Based on the expert interviews, it became clear that firm age and firm size could affect the relation between IT orientation and firm performance. A third model in the regression analysis was run with those interaction effects on firm performance. The results show no significant effects. This means that the effect of IT orientation on firm performance is the same regardless of the age and size of the firm.

5.2 Academic contribution

As stated in the problem formulation, scholars from strategic management literature and MIS literature see the importance of IT in accomplishing a competitive advantage. However, previous research reports varying results regarding the impact of IT on firm performance (e.g., Bharadwaj, 2000; Bharadwaj et al., 2013a; Liu et al., 2013; Ray et al., 2005). The link between IT and firm performance remains unclear and scholars call for more empirical research in this field. By examining the relation between IT and firm performance from a strategic orientation stance, this study gives answer to this call. The validation of IT orientation provides a usable measuring instrument for future research. IT orientation in terms of (1) business intelligence, (2) IT system configuration, (3) IT management, (4) digital marketing and sales, (5) social and

mobile platform management, and (6) online customer service has a positive effect on firm performance. The unique combination of these capabilities inhibit the imitation of a firm's competitive advantage (Teece & Maritan, 2007). Firms with a higher degree of IT orientation have better firm performance and a competitive advantage over firms that have a lower degree of IT orientation. This conclusion is in line with previous research on the effect of strategic orientations on firm performance (e.g., Deutscher et al., 2016; Gatignon & Xuereb, 1997; Noble et al., 2002; Zhou et al., 2005; Ziggers & Henseler, 2009). Strategic orientations direct and influence the activities of a firm and are deployed by capabilities. According to RBV and DC, deployment of capabilities is central in achieving and sustaining a competitive advantage (Barney, 1991; Eisenhardt & Martin, 2000; Makadok, 2001; Morgen et al., 2009; Teece et al., 1997). IT orientation can be seen as a strategic focus for pursuing a competitive advantage and superior performance. However, there should be caution in seeing IT as a strategic orientation, since not all capabilities significantly positively affect firm performance. IT orientation in its totality significantly affects firm performance, but only one of the six capabilities has a significant effect. That capability is IT management. This effect can be explained by the crucial role IT has in the sustainability and growth of a business (Lunardi et al., 2014). Different departments (e.g., marketing, production, human resources) require different IT systems which help them operating in an efficient and effective way. This calls for governing or managing IT (De Haes & Van Grembergen, 2008). By tailoring IT to the demands of all departments, IT management positively affects firm performance. This makes it possible that all departments within a firm work efficiently and effectively. Also, managing the IT capacity in order to achieve objectives in an effective and timely manner leads to higher firm performance (Klosterboer, 2011). Managing IT capacity ensures that IT resources are right-sized in order to meet both current and future business requirements in a cost-effective manner. Therefore, IT management is crucial to profit from IT assets and is central to firm performance (Wilkin & Chenhall, 2010).

The findings explicitly show how IT influences firm performance. This enlarges the knowledge base on this relationship and makes a first step in conceptualizing IT as a strategic orientation. The resulting operationalization of IT orientation can be used in further research.

5.3 Managerial contribution

Firms, and managers, should get more knowledge on changing business environments and the implications they have for their firms. Due to fast improving technologies, an explosion of data generated on continuous basis and increasing connectivity of devices, organizations should

adapt their businesses (Kumar et al., 2013). These changes lead to new demands and needs. Organizations that do not dwell on this topic are expected to have lower firm performance than firms that do (Audia et al., 2000). More dramatically, neglecting technological changes could lead to the extinction of a firm (Gates, 1999; Raphan & Friedman, 2014). IT can be a strategic means to adapt to technological changes and deal with the needs of the business environment. The validation of the IT orientation concept helps managers in understanding this and in seeing that IT is more than a function in the firm. Knowledge on the performance increasing effects of IT therefore is essential for managers. This study found that firms with higher IT orientation yield higher firm performance. More specifically, firms that strongly focus on IT management have higher firm performance. In terms of IT activities this indicates that tailoring IT to the demands of different departments in the firm is crucial for the firm to work optimally. This is due to the fact that all departments require certain IT systems and these have to be integrated and connected. Also, managing IT capacity is essential for increasing firm performance, since it ensures that current and future business requirements are met. This indicates that firms are not constrained by IT limits, but are stimulated by IT.

IT orientation turns out to be a predictor for firm performance. Firms should focus on the capabilities (1) business intelligence, (2) IT system configuration, (3) IT management, (4) digital marketing and sales, (5) social and mobile platform management, and (6) online customer service for achieving a competitive advantage and superior performance. In particular, IT management strongly influences firm performance positively, indicating that firms should tailor IT to all departments and manage the IT capacity in the firm.

5.4 Research limitations

As every research, this study has some limitations. First of all, a theoretical limitation regarding IT orientation. It is possible that not all activities and capabilities regarding IT are found. The IT activities are derived from different studies and complemented by expert interviews. Nevertheless, there may be more IT activities and capabilities that should be included in the concept. IT orientation potentially can be expanded with inclusion of more activities.

Secondly, this study might to some degree be subject to common method variance, because the variables are measured by the same method (survey) with the same scale (7-point Likert scale) for all variables. Despite the fact that respondent anonymity is assured, evaluation apprehension is reduced, reversed items are included in the survey, and Harman's single factor test is conducted, it is possible that CMV is problematic. Podsakoff et al. (2003) state that Harman's single factor test is most often used for its simplicity and question the usability of the

test. They continue by stating that "it is much more likely that multiple factors will emerge from the factor analysis, and, contrary to what some have said, this is not evidence that the measures are free of common method variance" (Podsakoff et al., 2003, p. 889). Common method variance, according to Podsakoff et al. (2003), cannot be excluded with certainty.

Thirdly, a limitation regarding the data collection procedure should be discussed. As stated, the researcher had limited access to databases and respondents. Therefore, respondents are mainly acquired by personal connections and cold acquisition via Orbis. This type of data collection may lead to a form of selection, since firms specifically choose to be active on that database. Also, since respondent anonymity is assured, it is unclear what specific companies have cooperated in the survey.

Fourthly, differences in terms of firm performance between firms in different industries might be important to take into account. This study tried to include industry as a control variable by including a question in the survey. However, due to limited resources and access to respondents, firms from a wide variety of industries were asked to participate in the research. With 114 respondents, categorizing and controlling for different industry types would not give valid results to compare between industries, since respondents were active in over 20 industries. With this number of industries, approximately 3 to 6 respondents can be assigned to a certain industry. No statements about comparisons between industries can then be made since the sample size for each industry is way too low. Concluding, it was not the goal of this research to compare between industries, but validity of the study would be increased by controlling for it.

Lastly, a limitation regarding sample size should be stated. Model 1 of the multiple regression analysis had eight control variables as predictors for firm performance. In Model 2, six IT capabilities were added as predictors for firm performance. This means that a total of 14 independent variables were used in the analysis. When we take the threshold by Green (1991), calculated by $N > 50 + 8\ m$ (with m referring to the number of IVs), the required sample size to conduct the analysis then is 162 (50 + 8*14). The sample size in this study is 114, which is substantially lower than Green's (1991) suggested threshold. This can have implications for the results of the research. When the sample size is greater, non-significant effects in this study can become significant. This could for instance indicate that the effect of other IT capabilities on firm performance can become significant.

5.5 Directions for further research

Several interesting directions for future research are identified and discussed here. Some suggestions logically follow the limitations of this study, but also new ideas for further research are discussed. To start, this research calls for the completion of IT activities and capabilities. As stated in the previous section, the IT orientation concept might lack IT activities and capabilities. Further research could focus on adding more IT activities and IT capabilities to the current conceptualization of IT orientation. By doing this, the concept becomes more comprehensive over time. This is essential in capturing the full impact of IT on firm performance.

In order to be more confident about the effect of IT orientation on firm performance, this study can be replicated and carried out over a bigger sample. This is essential since more IT capabilities potentially affect firm performance positively when the research is conducted among more respondents.

A third direction for further research is to focus on differences of the effect of IT orientation on firm performance across industries. Knowledge regarding this topic is needed in order to make statements about the influence of being IT oriented in a variety of industries. This has practical relevance, since managers can then use the results of the study specified to the industry in which they operate. These results are more detailed than the general effect of IT orientation on firm performance, which is central in this study.

Including variables as moderators on the effect of IT orientation on firm performance increases knowledge on this link in a more configurational perspective. This is a call made by several scholars, since it leads to a more accurate understanding of the effect of IT orientation on firm performance (e.g., Deutscher et al., 2016; Sarkar et al., 2016; Hakala, 2011). Those scholars state that the link between strategic orientations and firm performance depends on multiple variables, whereas previous research has mainly focused on the isolated effect of strategic orientations on firm performance (e.g., Lumpkin & Dess, 1996; Noble et al., 2002).

A specific type of moderation effect that should be researched is the interaction between strategic orientations. Multiple strategic orientations can complement and mutually support each other, which could lead to bigger performance gains (Zhou et al., 2005). Firms often pursue different orientations simultaneously in order to become successful (Cadogan, 2012). The interaction between IT orientation and other strategic orientations therefore is interesting to examine, since the combined influence on firm performance can be identified. The interaction of IT orientation and market orientation might be especially interesting, since IT has become interrelated in new marketing practices (Edelman, 2010).

6. Bibliography

Abdi, H. (2003). Factor rotations in factor analyses. *Encyclopedia for Research Methods for the Social Sciences. Sage: Thousand Oaks, CA*, 792-795.

Ackerman, M. S. (1998). Augmenting organizational memory: a field study of answer garden. *ACM Transactions on Information Systems (TOIS)*, *16*(3), 203-224.

Alavi, M., & Leidner, D. E. (1999). Knowledge management systems: issues, challenges, and benefits. *Communications of the AIS*, *1*, 1.

Arora, B., & Rahman, Z. (2016). Information technology investment strategies: a review and synthesis of the literature. *Technology Analysis & Strategic Management*, *28*(9), 1073-1094.

Atinc, G., Simmering, M. J., & Kroll, M. J. (2012). Control variable use and reporting in macro and micro management research. *Organizational Research Methods*, *15*(1), 57-74.

Attaran, M. (2003). Information technology and business-process redesign. *Business Process Management Journal*, *9*(4), 440-458.

Audia, P. G., Locke, E. A., & Smith, K. G. (2000). The paradox of success: An archival and a laboratory study of strategic persistence following radical environmental change. *Academy of Management journal*, *43*(5), 837-853.

Azila, N., & Noor, M. (2011). Electronic Customer Relationship Management Performance: Its Impact on Loyalty From Customers' Perspectives. *International Journal of e-Education, e-Business, e-Management and e-Learning*, *1*(1), 1.

Babić Rosario, A., Sotgiu, F., De Valck, K., & Bijmolt, T. H. (2016). The effect of electronic word of mouth on sales: A meta-analytic review of platform, product, and metric factors. *Journal of Marketing Research*, *53*(3), 297-318.

Bahrami, M., Ghorbani, M., & Arabzad, S. M. (2012). Information technology (IT) as an improvement tool for customer relationship management (CRM). *Procedia-Social and Behavioral Sciences*, *41*, 59-64.

Bain, J. S. (1956). *Barriers to New Competition*. Cambridge, MA: Harvard University Press.

Bain, J. S. (1959). *Industrial Organization*. New York: Wiley.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, *17*(1), 99-120.

Barney, J. B., & Clark, D. N. (2007). *Resource-based theory: Creating and sustaining competitive advantage*. Oxford University Press on Demand.

Barreto, I. (2010). Dynamic capabilities: A review of past research and an agenda for the future. *Journal of management*, *36*(1), 256-280.

Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: an empirical investigation. *MIS quarterly*, 169-196.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. V. (2013a). Digital business strategy: toward a next generation of insights.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. V. (2013b). Visions and voices on emerging challenges in digital business strategy.

Bhatt, G. D., & Grover, V. (2005). Types of information technology capabilities and their role in competitive advantage: An empirical study. *Journal of management information systems*, *22*(2), 253-277.

Boar, B. H. (1997). *Strategic thinking for information technology: How to build the IT organization for the information age*. John Wiley & Sons, Inc..

Bowerman, B. L., & O'Connell, R. T. (1990). *Linear statistical models: An applied approach*. Brooks/Cole.

Brandenburger, A. M., & Stuart, H. W. (1996). Value-based business strategy. *Journal of Economics & Management Strategy*, *5*(1), 5-24.

Braojos, J., Benitez, J., & Llorens, J. (2015). Impact of IT infrastructure on customer service performance: The role of micro-IT capabilities and online customer engagement. *Proceedings of the 19th Pacific Asia Conference on Information Systems*, 1-17.

Buhl, H. U., Fridgen, G., König, W., Röglinger, M., & Wagner, C. (2012). Where's the competitive advantage in strategic information systems research? Making the case for boundary-spanning research based on the German business and information systems engineering tradition. *The Journal of Strategic Information Systems*, *21*(2), 172-178.

Cadogan, J. W. (2012). International marketing, strategic orientations and business success: reflections on the path ahead. *International Marketing Review*, *29*(4), 340-348.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological bulletin*, *56*(2), 81.

Cardona, M., Kretschmer, T., & Strobel, T. (2013). ICT and productivity: conclusions from the empirical literature. *Information Economics and Policy*, *25*(3), 109-125.

Carr, N. G. (2003). IT doesn't matter. *Educause Review*, *38*, 24-38.

Carr, A. S., & Smeltzer, L. R. (2002). The relationship between information technology use and buyer-supplier relationships: an exploratory analysis of the buying firm's perspective. *IEEE Transactions on Engineering Management*, *49*(3), 293-304.

Castells, M. (2003). The power of identity: The information Age: Economy, society and culture, Volume II (The information age).

Castronovo, C., & Huang, L. (2012). Social media in an alternative marketing communication model. *Journal of Marketing Development and Competitiveness*, *6*(1), 117.

Cerny, B. A., & Kaiser, H. F. (1977). A study of a measure of sampling adequacy for factor-analytic correlation matrices. *Multivariate behavioral research*, *12*(1), 43-47.

Chaffey, D. (2009). E-business and E-commerce Management: Strategy, Implementation and Practice. *Financial Times/Prentice Hall*, *4*.

Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS quarterly*, *36*(4).

Coase, R. H. (1937). The nature of the firm. *economica*, *4*(16), 386-405.

Combs, J. G., Russell Crook, T., & Shook, C. L. (2005). The dimensionality of organizational performance and its implications for strategic management research. In *Research methodology in strategy and management* (pp. 259-286). Emerald Group Publishing Limited.

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of applied psychology*, *78*(1), 98.

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical assessment, research & evaluation*, *10*(7), 1-9.

Craighead, C. W., Ketchen, D. J., Dunn, K. S., & Hult, G. T. M. (2011). Addressing common method variance: guidelines for survey research on information technology, operations, and supply chain management. *IEEE Transactions on Engineering Management*, *58*(3), 578-588.

Davenport, T. H., Barth, P., & Bean, R. (2012). How big data is different. *MIT Sloan Management Review*, *54*(1), 43.

Day, G. S. (1994). The capabilities of market-driven organizations. *the Journal of Marketing*, 37-52.

De Haes, S., & Van Grembergen, W. (2008). Analysing the relationship between IT governance and business/IT alignment maturity. *Hawaii International Conference on System Sciences, Proceedings of the 41st Annual*, 428-428.

De Mauro, A., Greco, M., & Grimaldi, M. (2016). A formal definition of Big Data based on its essential features. *Library Review*, *65*(3), 122-135.

Dess, G. G., Ireland, R. D., & Hitt, M. A. (1990). Industry effects and strategic management

research. *Journal of management*, *16*(1), 7-27.

Dess, G. G., & Robinson, R. B. (1984). Measuring organizational performance in the absence of objective measures: the case of the privately-held firm and conglomerate business unit. *Strategic management journal*, *5*(3), 265-273.

Dess, G. G., Ireland, R. D., Zahra, S. A., Floyd, S. W., Janney, J. J., & Lane, P. J. (2003). Emerging issues in corporate entrepreneurship. *Journal of management*, *29*(3), 351-378.

Deutscher, F., Zapkau, F. B., Schwens, C., Baum, M., & Kabst, R. (2016). Strategic orientations and performance: A configurational perspective. *Journal of Business Research*, *69*(2), 849-861.

Doty, D. H., & Glick, W. H. (1998). Common methods bias: does common methods variance really bias results?. *Organizational research methods*, *1*(4), 374-406.

Drnevich, P. L., & Croson, D. C. (2013). Information technology and business-level strategy: Toward an integrated theoretical perspective. *Mis Quarterly*, *37*(2), 483-509.

Edelman, D. C. (2010). Four ways to get more value from digital marketing. *McKinsey Quarterly*, *6*.

Eichhorn, B. R. (2014). Common method variance techniques. *Cleveland State University, Department of Operations & Supply Chain Management. Cleveland, OH: SAS Institute Inc*.

Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of management review*, *14*(1), 57-74.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: what are they?. *Strategic management journal*, 1105-1121.

Felix, R., Rauschnabel, P. A., & Hinsch, C. (2017). Elements of strategic social media marketing: A holistic framework. *Journal of Business Research*, *70*, 118-126.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage publications.

Foley, A., & Fahy, J. (2009). Seeing market orientation through a capabilities lens. *European Journal of Marketing*, *43*(1/2), 13-20.

Fowler, D., Pitta, D., & C. Leventhal, R. (2013). Technological advancements and social challenges for one-to-one marketing. *Journal of Consumer Marketing*, *30*(6), 509-516.

Freeman, R. E. (1984). Strategic management: A stakeholder perspective. *Boston: Pitman*, 13.

Fritz, W., Sohn, S., & Seegebarth, B. (2017). Broadening the perspective on mobile marketing: An introduction. *Psychology & Marketing*, *34*(2), 113-118.

Galliers, R. D., & Leidner, D. E. (2014). *Strategic information management: challenges and*

strategies in managing information systems. Routledge.

Garbani, J. P., & Cecere, M. (2011). IT infrastructure and operations: The next five years. *Cambridge: Forrester Research*.

Gates, B. (1999). Business @ the speed of thought: Using a digital nervous system. New York: Warner Books.

Gatignon, H., & Xuereb, J. M. (1997). Strategic orientation of the firm and new product performance. *Journal of marketing research*, 77-90.

Gerlich, R. N. (2001). The digital revolution. *Thunderbird International Business Review*, *43*(2), 321-328.

Gibson, C. F., & Nolan, R. L. (1974). *Managing the four stages of EDP growth* (pp. 76-87). Harvard Business Review.

Glick, W. H., Washburn, N. T., & Miller, C. C. (2005). The myth of firm performance. Paper presented in the Annual Meeting of the Academy of Management.

Gold-Bernstein, B., & Ruh, W. (2004). *Enterprise integration: the essential guide to integration solutions*. Addison Wesley Longman Publishing Co., Inc..

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic management journal*, *17*(2), 109-122.

Green, S. B. (1991). How many subjects does it take to do a regression analysis. *Multivariate behavioral research*, *26*(3), 499-510.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate data analysis*. NY: Pearson.

Hakala, H. (2011). Strategic orientations in management literature: three approaches to understanding the interaction between market, technology, entrepreneurial and learning orientations. *International Journal of Management Reviews*, *13*(2), 199-217.

Harrison, J. S., & Wicks, A. C. (2013). Stakeholder theory, value, and firm performance. *Business ethics quarterly*, *23*(1), 97-124.

Hart, S. L. (1992). An integrative framework for strategy-making processes. *Academy of management Review*, *17*(2), 327-351.

Harter, J. K., Schmidt, F. L., & Hayes, T. L. (2002). Business-unit-level relationship between employee satisfaction, employee engagement, and business outcomes: a meta-analysis. *Journal of applied psychology*, *87*(2), 268.

Henderson, J. C., & Venkatraman, H. (1993). Strategic alignment: Leveraging information technology for transforming organizations. *IBM systems journal*, *32*(1), 472-484.

Hollander, A., Denna, E., & Cherrington, J. O. (1999). *Accounting, information technology,*

and business solutions. McGraw-Hill Higher Education.

Homburg, C., Wieseke, J., & Hoyer, W. D. (2009). Social identity and the service–profit chain. *Journal of Marketing*, *73*(2), 38-54.

Hudson, S., & Hudson, R. (2013). Engaging with consumers using social media: a case study of music festivals. *International Journal of Event and Festival Management*, *4*(3), 206-223.

Hult, G. T. M., Ketchen, D. J., & Slater, S. F. (2005). Market orientation and performance: an integration of disparate approaches. *Strategic Management Journal*, *26*(12), 1173-1181.

Hunt, S. D., & Morgan, R. M. (1995). The comparative advantage theory of competition. *The Journal of Marketing*, 1-15.

Hutcheson, G. D., & Sofroniou, N. (1999). *The multivariate social scientist: Introductory statistics using generalized linear models*. Sage.

Ives, B., & Learmonth, G. P. (1984). The information system as a competitive weapon. *Communications of the ACM*, *27*(12), 1193-1201.

Jacobides, M. G., & Croson, D. C. (2001). Information policy: Shaping the value of agency relationships. *Academy of management review*, *26*(2), 202-223.

Johns, R. (2010). Likert items and scales. *Survey Question Bank: Methods Fact Sheet*, *1*, 1-11.

Jones, E., Brown, S. P., Zoltners, A. A., & Weitz, B. A. (2005). The changing environment of selling and sales management. *Journal of Personal Selling & Sales Management*, *25*(2), 105-111.

Kala Kamdjoug, J. R., Nguegang Tewamba, H. J., & Fosso Wamba, S. (2018). IT capabilities, firm performance and the mediating role of ISRM: A case study from a developing country. *Business Process Management Journal*.

Kim, J. O., Mueller, C. W., Kim, J. O., Ahtola, O., & Spector, P. E. (1978). *Introduction to factor analysis: What it is and how to do it* (No. 13). Sage.

Kline, P. (2013). *Handbook of psychological testing*. Routledge.

Klosterboer, L. (2011). *ITIL capacity management*. Pearson Education.

Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization science*, *3*(3), 383-397.

Kohli, A. K., Jaworski, B. J., & Kumar, A. (1993). MARKOR: a measure of market orientation. *Journal of Marketing research*, 467-477.

Korfhage, R. R. (2008). Information storage and retrieval.

Kumar, V., Chattaraman, V., Neghina, C., Skiera, B., Aksoy, L., Buoye, A., & Henseler, J.

(2013). Data-driven services marketing in a connected world. *Journal of Service Management*, *24*(3), 330-352.

Lamberton, C., & Stephen, A. T. (2016). A thematic exploration of digital, social media, and mobile marketing: research evolution from 2000 to 2015 and an agenda for future inquiry. *Journal of Marketing*, *80*(6), 146-172.

Leonard-Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. *Strategic management journal*, *13*(1), 111-125.

Liu, H., Ke, W., Wei, K. K., & Hua, Z. (2013). The impact of IT capabilities on firm performance: The mediating roles of absorptive capacity and supply chain agility. *Decision Support Systems*, *54*(3), 1452-1462.

Loderer, C. F., & Waelchli, U. (2010). Firm age and performance.

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of management Review*, *21*(1), 135-172.

Lunardi, G. L., Becker, J. L., Maçada, A. C. G., & Dolci, P. C. (2014). The impact of adopting IT governance on financial performance: An empirical analysis among Brazilian firms. *International Journal of Accounting Information Systems*, *15*(1), 66-81.

Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing research*, *35*(6), 382-386.

Mahdavi, I., Cho, N., Shirazi, B., & Sahebjamnia, N. (2008). Designing evolving user profile in e-CRM with dynamic clustering of Web documents. *Data & Knowledge Engineering*, *65*(2), 355-372.

Mahoney, J. T., & Pandian, J. R. (1992). The resource-based view within the conversation of strategic management. *Strategic Management Journal*, *13*(5), 363-380.

Makadok, R. (2001). Toward a synthesis of the resource-based and dynamic-capability views of rent creation. *Strategic Management Journal*, *22*(5), 387-401.

Makadok, R. (2010). The interaction effect of rivalry restraint and competitive advantage on profit: Why the whole is less than the sum of the parts. *Management Science*, *56*(2), 356-372.

Makadok, R. (2011). Invited editorial: the four theories of profit and their joint effects. *Journal of Management*, *37*(5), 1316-1334.

Malhotra, N. K., Birks, D. F., & Wills, P. (2013). *Essentials of marketing research*. Pearson.

Martin, J. (1990). *Information engineering, planning & analysis: book 2*. Prentice-Hall, Inc.

Matsuno, K., Mentzer, J. T., & Rentz, J. O. (2000). A refinement and validation of the

MARKOR scale. *Journal of the Academy of Marketing Science*, *28*(4), 527-539.

McAfee, A., & Brynjolfsson, E. (2008). Investing in the IT that makes a competitive difference. *Harvard Business Review*, *86*(7/8), 98.

McAfee, A., & Brynjolfsson, E. (2012). Big data: the management revolution. *Harvard business review*, *90*(10), 60-68.

Menard, S. (2002). *Applied logistic regression analysis* (Vol. 106). Sage.

Merali, Y., Papadopoulos, T., & Nadkarni, T. (2012). Information systems strategy: Past, present, future? *The Journal of Strategic Information Systems*, *21*(2), 125-153.

Miles, M. P., & Arnold, D. R. (1991). The relationship between marketing orientation and entrepreneurial orientation. *Entrepreneurship theory and practice*, *15*(4), 49-65.

Minami, C., & Dawson, J. (2008). The CRM process in retail and service sector firms in Japan: Loyalty development and financial return. *Journal of Retailing and Consumer Services*, *15*(5), 375-385.

Moharana, H. S., Murty, J. S., Senapati, S. K., & Khuntia, K. (2011). Importance of Information Technology for Effective Supply Chain Management. *International Journal of Modern Engineering Research (IJMER)*, *1*(2), 747-751.

Müller, B., Florès, L., Agrebi, M., & Chandon, J. L. (2008). The branding impact of brand websites: do newsletters and consumer magazines have a moderating role? *Journal of Advertising Research*, *48*(3), 465-472.

Murphy, G. B., Trailer, J. W., & Hill, R. C. (1996). Measuring performance in entrepreneurship research. *Journal of business research*, *36*(1), 15-23.

Musawa, M. S., & Wahab, E. (2012). The adoption of electronic data interchange (EDI) technology by Nigerian SMEs: A conceptual framework. *Journal of Business Management and Economics*, *3*(2), 55-68.

Narver, J. C., & Slater, S. F. (1990). The effect of a market orientation on business profitability. *The Journal of marketing*, 20-35.

Noble, C. H., Sinha, R. K., & Kumar, A. (2002). Market orientation and alternative strategic orientations: a longitudinal assessment of performance implications. *Journal of marketing*, *66*(4), 25-39.

Onn, C. W., & Sorooshian, S. (2013). Mini literature analysis on information technology definition. *Information and Knowledge Management*, *3*(2), 139-140.

Pagani, M. (2013). Digital business strategy and value creation: Framing the dynamic cycle of control points. *Mis Quarterly*, *37*(2), 617-632.

Pascale, R. (1985). The paradox of “corporate culture": Reconciling ourselves to

socialization. *California Management Review, 27*(2), 26-41.

Pelham, A. M. (2000). Market orientation and other potential influences on performance in small and medium-sized manufacturing firms. *Journal of small business management*, *38*(1), 48.

Penrose, E., & Penrose, E. T. (2009). *The Theory of the Growth of the Firm*. Oxford university press.

Piccoli, G., & Ives, B. (2005). Review: IT-dependent strategic initiatives and sustained competitive advantage: a review and synthesis of the literature. *Mis Quarterly*, *29*(4), 747-776.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of applied psychology*, *88*(5), 879.

Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard business review*, *86*(1), 25-40.

Rai, A., Pavlou, P. A., Im, G., & Du, S. (2012). Interfirm IT capability profiles and communications for cocreating relational value: evidence from the logistics industry. *MIS quarterly*, *36*(1), 233-262.

Rajagopalan, N., Rasheed, A. M., & Datta, D. K. (1993). Strategic decision processes: Critical review and future directions. *Journal of management*, *19*(2), 349-384.

Rangaswamy, A., Giles, C. L., & Seres, S. (2009). A strategic perspective on search engines: Thought candies for practitioners and researchers. *Journal of Interactive Marketing*, *23*(1), 49-60.

Raphan, M., & Friedman, H. H. (2014). Tools for organizational survival in the Internet age: Adaptivity, creativity, and diversification.

Ray, G., Muhanna, W. A., & Barney, J. B. (2005). Information technology and the performance of the customer service process: A resource-based analysis. *MIS quarterly*, 625-652.

Ricardo, D. (1891). *Principles of political economy and taxation*. G. Bell and sons.

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organizational performance: Towards methodological best practice. *Journal of management*, *35*(3), 718-804.

Robinson, R. B., & Pearce, J. A. (1988). Planned patterns of strategic behavior and their relationship to business-unit performance. *Strategic Management Journal*, *9*(1), 43-60.

Rockart, J. F. (1978). Chief executives define their own data needs. *Harvard business review*,

57(2), 81-93.

Roza, M., Van den Bosch, F. A., & Volberda, H. W. (2011). Offshoring strategy: Motives, functions, locations, and governance modes of small, medium-sized and large firms. *International Business Review*, *20*(3), 314-323.

Rumelt, R. P., & Lamb, R. (1984). Competitive strategic management. *Toward a Strategic Theory of the Firm*, 556-570.

Santos, J. B., & Brito, L. A. L. (2012). Toward a subjective measurement model for firm performance. *BAR-Brazilian Administration Review*, *9*, 95-117.

Sarkar, S., Coelho, D. M., & Maroco, J. (2016). Strategic Orientations, Dynamic Capabilities, and Firm Performance: an Analysis for Knowledge Intensive Business Services. *Journal of the Knowledge Economy*, *7*(4), 1000-1020.

Sarosa, S., & Zowghi, D. (2003). Strategy for adopting information technology for SMEs: Experience in adopting email within an Indonesian furniture company. *Electronic Journal of Information Systems Evaluation (EJISE)*.

Schumpeter, J. A. (1954). *History of economic analysis*. Psychology Press.

Schwab, D.P. (1999). Research methods for organizational studies. *Measurement Foundations: Validity and Validation., 2,* 31-48.

Shankar, V., Kleijnen, M., Ramanathan, S., Rizley, R., Holland, S., & Morrissey, S. (2016). Mobile shopper marketing: Key issues, current insights, and future research avenues. *Journal of Interactive Marketing*, *34*, 37-48.

Sharma, R., Yetton, P., & Crawford, J. (2009). Estimating the effect of common method variance: The method—Method pair technique with an Illustration from TAM Research. *Mis Quarterly*, 473-490.

Shields, P. M., & Rangarajan, N. (2013). *A playbook for research methods: Integrating conceptual frameworks and project management*. New Forums Press.

Skiera, B., Eckert, J., & Hinz, O. (2010). An analysis of the importance of the long tail in search engine marketing. *Electronic Commerce Research and Applications*, *9*(6), 488-494.

Slater, S. F., & Narver, J. C. (1994). Does competitive environment moderate the market orientation-performance relationship?. *The Journal of Marketing*, 46-55.

Stankovic, J. A. (2014). Research directions for the internet of things. *IEEE Internet of Things Journal*, *1*(1), 3-9.

Ström, R., Vendel, M., & Bredican, J. (2014). Mobile marketing: A literature review on its value for consumers and retailers. *Journal of Retailing and Consumer Services*, *21*(6),

1001-1012.

Symon, G., & Cassell, C. (2012). Assessing Qualitative Research 12. *Qualitative organizational research: Core methods and current challenges*, 204.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Allyn & Bacon/Pearson Education.

Teece, D. J., & Maritan, C. A. (2007). Dynamic capabilities and organizational process. *Dynamic Capabilities. Understanding Strategic Change in Organizations.* Oxford: Blackwell.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic management journal*, 509-533.

Teubner, R. A. (2006). IT/business alignment. *Wirtschaftsinformatik, 48*(5), 368-371.

Teubner, R. A. (2013). Information systems strategy. *Business & Information Systems Engineering*, *5*(4), 243-257.

Theodosiou, M., Kehagias, J., & Katsikea, E. (2012). Strategic orientations, marketing capabilities and firm performance: An empirical investigation in the context of frontline managers in service organizations. *Industrial Marketing Management, 41*(7), 1058-1070.

Thong, J. Y., & Yap, C. S. (1995). CEO characteristics, organizational characteristics and information technology adoption in small businesses. *Omega, 23*(4), 429-442.

VanVoorhis, C. W., & Morgan, B. L. (2007). Understanding power and rules of thumb for determining sample sizes. *Tutorials in Quantitative Methods for Psychology*, *3*(2), 43-50.

Venkatraman, N. U., & Ramanujam, V. (1987). Measurement of business economic performance: An examination of method convergence. *Journal of management*, *13*(1), 109-122.

Von Solms, R., & Van Niekerk, J. (2013). From information security to cyber security. *Computers & security*, *38*, 97-102.

Walsh, J. P., & Ungson, G. R. (1991). Organizational memory. *Academy of management review*, *16*(1), 57-91.

Ward, J. M., Griffiths, P. M., & Whitmore, P. (2002). *Strategic planning for information systems* (Vol. 3). Chichester: Wiley.

Ward, J. M. (2012). Information systems strategy: Quo vadis? *The Journal of Strategic Information Systems*, *21*(2), 165-171.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal*,

5(2), 171-180.

Wiklund, J., & Shepherd, D. (2003). Knowledge-based resources, entrepreneurial orientation and the performance of small and medium-sized businesses. *Strategic Management Journal*, *24*, 1307-1314.

Wilkin, C. L., & Chenhall, R. H. (2010). A review of IT governance: A taxonomy to inform accounting information systems. *Journal of Information Systems*, *24*(2), 107-146.

Williamson, O. E. (1975). Markets and hierarchies. *New York*, 26-30.

Williamson, O. E. (1979). Transaction-cost economics: the governance of contractual relations. *The journal of Law and Economics*, *22*(2), 233-261.

Wiseman, C. (1985). *Strategy and computers*. Dow Jones-Irwin.

Woodard, J. C., Ramasubbu, N., Tschang, F., & Sambamurthy, V. (2013). Design Capital and Design Moves: The Logic of Digital Business Strategy. *MIS Quarterly*, *37*(2), 537-564.

Wu, F., Yeniyurt, S., Kim, D., & Cavusgil, S. T. (2006). The impact of information technology on supply chain capabilities and firm performance: A resource-based view. *Industrial Marketing Management*, *35*(4), 493-504.

Zhou, K. Z., Yim, C. K., & Tse, D. K. (2005). The effects of strategic orientations on technology-and market-based breakthrough innovations. *Journal of marketing*, *69*(2), 42-60.

Zhu, K. (2004). The complementarity of information technology infrastructure and e-commerce capability: A resource-based assessment of their business value. *Journal of management information systems*, *21*(1), 167-202.

Ziggers, G. W., & Henseler, J. (2009). Inter-firm network capability: how it affects buyer-supplier performance. *British Food Journal*, *111*(8), 794-810.

Ziggers, G. W., & Henseler, J. (2016). The reinforcing effect of a firm's customer orientation and supply-base orientation on performance. *Industrial marketing management*, *52*, 18-26.

7. Appendices

Appendix C1 | Operationalization table

The table begins with the different variables and then describes dimensions of those variables in the next column. After that, by translating the dimensions into measurable characteristics, indicators for those dimensions are given. The indicators are the items of the survey.

Table 15: Complete operationalization table

Variable	Dimension	Item number	Item / Indicator	Source
Market orientation	Intelligence generation (IG)	V1	Our organization frequently collects and evaluates information concerning customers.	Kohli et al. (1993); Matsuno et al. (2000)
		V2	Our organization frequently collects and evaluates information concerning competitors.	Kohli et al. (1993); Matsuno et al. (2000)
		V3	Our organization frequently collects and evaluates information concerning general macro-economics.	Matsuno et al. (2000)
		V4	Our organization frequently collects and evaluates information concerning regulatory bodies.	Matsuno et al. (2000)
		V5	Our organization frequently collects and evaluates information concerning suppliers.	Matsuno et al. (2000)
		V6	Our organization frequently collects and evaluates information concerning social trends.	Matsuno et al. (2000)
		V7	Our organization frequently collects and evaluates information concerning end users.	Kohli et al. (1993); Matsuno et al. (2000)
		V8[a]	In our organization, only a few people are collecting competitor information.	Matsuno et al. (2000)
	Intelligence dissemination (ID)	V9	In our organization attention is paid to discussing the future needs of customers	Kohli et al. (1993); Matsuno et al. (2000)

			with other functions (marketing, production, etc.).	
		V10	In our organization we distribute documents with information about our customers.	Kohli et al. (1993); Matsuno et al. (2000)
		V11	In our organization we have meetings with different functions (marketing, production, etc.) to discuss trends and developments in the market.	Matsuno et al. (2000)
		V12	In our organization we have meetings with different functions (marketing, production, etc.) to update our knowledge of regulatory requirements.	Matsuno et al. (2000)
		V13	In our organization, people share information about technology for new products with other departments.	Matsuno et al. (2000)
		V14	In our organization, market information spreads quickly across all layers of the organization.	Matsuno et al. (2000)
	Responsiveness (RESP)	V15[a]	Our organization, for one reason or another, ignores changes in the product or service needs of our customers.	Kohli et al. (1993); Matsuno et al. (2000)
		V16[a]	In our organization, the product lines we sell depend more on our own business policy than real market needs.	Kohli et al. (1993); Matsuno et al. (2000)
		V17[a]	In our organization we are slow to enter into business relationships with new suppliers, even though we think they are better than existing suppliers.	Matsuno et al. (2000)
		V18	Our organization would immediately take action when a major competitor launched a big campaign aimed at our customers.	Kohli et al. (1993); Matsuno et al. (2000)

		V19	In our organization, the activities of the different departments are well coordinated.	Kohli et al. (1993); Matsuno et al. (2000)
		V20[a]	In our organization, even if we come up with a good marketing plan, we would probably not be able to implement that quickly.	Kohli et al. (1993); Matsuno et al. (2000)
		V21	Our organization reacts immediately when a special interest group (e.g., consumer group, environmental group) would publicly accuse us of harmful business practices.	Matsuno et al. (2000)
		V22[a]	Our organization tends to take more time to respond to a change in regulations than our competitors.	Matsuno et al. (2000)
Variable	**Dimension**	**Item number**	**Item / Indicator**	**Scale**
IT orientation	Business intelligence	V23	Our organization frequently collects and evaluates information concerning employees.	Ratio scale
		V24	Our organization collects large amounts of data from various sources (e.g., from customers, suppliers, employees, etc.).	Ratio scale
		V25	Our organization analyses the collected data to find customer preferences, patterns, trends and other useful information to improve our business decisions and processes.	Ratio scale
		V26	Our organization distributes information across departments so that this is available in every department.	Ratio scale
	IT system configuration	V27	Our organization stores the generated information in a knowledge base.	Ratio scale

		V28	Our organization protects information to ensure that it is only accessible to our company.	Ratio scale
		V29	Our organization configures and integrates the information systems so that data and information can be easily exchanged.	Ratio scale
		V30	Our organization integrates our database with others in our supply chain.	Ratio scale
		V31	Our organization streamlines communication by connecting various communication tools and platforms.	Ratio scale
		V32	Our organization automates routine processes with software applications.	Ratio scale
	IT management	V33	Our organization is looking for a suitable IT establishment for the future, taking into account our strategy and new available technologies.	Ratio scale
		V34	Our organization tailors the available IT resources to the needs of the various functions in our company.	Ratio scale
		V35	Our organization ensures that the capacity of the IT establishment is able to realize the objectives in an effective and timely manner.	Ratio scale
		V36	Our organization identifies and analyses the value and threats of our IT resources.	Ratio scale
	Digital marketing	V37	In our organization the marketing efforts are personalized by adapting these to the preferences and wishes of individual consumers.	Ratio scale

		V38	Our organization uses social media platforms to promote our products and services.	Ratio scale
		V39	Our organization uses marketing aimed at smartphones, tablets and other mobile devices to promote our products and services.	Ratio scale
		V40	Our organization uses e-mail to promote our products and services.	Ratio scale
		V41	Our organization uses search engine optimization (SEO) to analyse and use the most searched keywords on search engine pages.	Ratio scale
		V42	Our organization places advertisements on search engine pages for promoting our products and services.	Ratio scale
		V43	Our organization ensures that customers can easily and quickly make purchases through our online sales channels.	Ratio scale
	Electronic customer relationship management (e-CRM)	V44	Our organization builds and uses a customer database in which customer information is stored.	Ratio scale
		V45	Our organization offers direct online customer service by responding to customer requests and inquiries (for example through a chat function).	Ratio scale
		V46	Our organization socializes with our online community by communicating on online platforms (e.g., social media).	Ratio scale
		V47	Our organization offers customers support after they have made a purchase.	Ratio scale
		V48	In our organization we measure our customer satisfaction.	Ratio scale

Variable	Dimension	Item number	Item / Indicator	Scale
Firm performance	Revenue growth	V49	Our firm's revenue growth relative to major competitors in the last three years	1 = much worse 7 = much better
	Profit level	V50	Our firm's profit level relative to major competitors in the last three years	1 = much worse 7 = much better
	Return on investment	V51	Our firm's return on investment relative to major competitors in the last three years	1 = much worse 7 = much better
	Market share	V52	Our firm's market share relative to major competitors in the last three years	1 = much worse 7 = much better
	Customer value	V53	Our firm's customer value relative to major competitors in the last three years	1 = much worse 7 = much better
	Corporate social responsibility	V54	Our firm's corporate social responsibility relative to major competitors in the last three years	1 = much worse 7 = much better
	Overall performance	V55	Our firm's overall performance relative to major competitors in the last three years	1 = much worse 7 = much better
Variable	**Dimension**	**Item number**	**Item / Indicator**	**Scale**
Strategic importance of IT	Strategic importance	V56	Our organization involves the IT department in the strategic planning process.	Ratio scale
		V57	The IT department knows the strategic goals of the organization.	Ratio scale
		V58	The development / training of IT professionals is aligned with the strategy of the organization.	Ratio scale
		V59	The focus of IT is specified on the long term, which involves risks and uncertainties.	Ratio scale
		V60	IT has a formally written long-term plan.	Ratio scale
	Top-management support	V61	Top management supports the efforts to improve the IT department.	Ratio scale

		V62	Top management considers IT as an important part of the organizational strategy.	Ratio scale
		V63	IT's vision is important for most top managers.	Ratio scale
		V64	The head of IT is considered an important function by top management.	Ratio scale
		V65	Top management subscribes to the strategic role of the IT function.	Ratio scale
		V66	Top management usually honours IT requests for more resources.	Ratio scale
Control variable	**Dimension**	**Item number**	**Item / Indicator**	**Scale**
Firm size	Number of employees	V67	What is the number of employees in your firm?	Open ended question
	Turnover	V68	What is the annual turnover of your firm? (in euros)	Open ended question
Firm age	Age	V69	In which year was your firm founded?	Open ended question
Respondent qualification	Department	V70	In which department do you work in your firm?	Production department; marketing department; financial department; sales department; purchasing department; human resources department; CEO or owner; other
	Position title	V71	What is your position title in your firm?	Open ended question
Industry	Industry type	V72	In which industry is your firm operating?	Open ended question
Production	Products or services	V73	Does your firm sell products or services?	Products; services
Conducting self or outsourcing	Market / business intelligence	V74	Is your firm responsible for collecting, analysing and disseminating market information or do you outsource this?	Conducting self; outsourcing

	IT system configuration	V75	Is your firm responsible for configuring IT systems or do you outsource this?	Conducting self; outsourcing
	IT management	V76	Is your firm responsible for managing IT or do you outsource this?	Conducting self; outsourcing
	Marketing	V77	Is your firm responsible for your marketing or do you outsource this?	Conducting self; outsourcing
	E-CRM	V78	Is your firm responsible for maintaining customer relations or do you outsource this?	Conducting self; outsourcing

a. Reverse items.

Appendix C2 | Operationalization table (Dutch)

Since the research is conducted among respondents in The Netherlands, the survey is in Dutch. Therefore, the operationalization table is also given in Dutch below. The original items for market orientation, based on Matsuno et al. (2000) are shown to make it able to compare those items with their translated counterparts. It is essential that the translated items capture the real essence of the original items.

Table 16: Complete operationalization table in Dutch

Variable	Dimension	Item number	Item / Indicator	Source
Markt oriëntatie	Intelligentie generatie	V1	Onze organisatie verzamelt en evalueert informatie met betrekking tot klanten.	Kohli et al. (1993); Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*We periodically review the likely effect of changes in our business environment (e.g., regulation) on customers.*	
		V2	Onze organisatie verzamelt en evalueert informatie met betrekking tot concurrenten.	Kohli et al. (1993); Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*In our business unit, intelligence on our competitors is generated independently by several departments.*	
		V3	Onze organisatie verzamelt en evalueert informatie met betrekking tot economische ontwikkelingen.	Kohli et al. (1993); Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*In this business unit, we frequently collect and evaluate general macro-economic information (e.g., interest rate, exchange rate, GDP, industry growth rate, inflation rate).*	
		V4	Onze organisatie verzamelt en evalueert informatie met betrekking tot regulerende instanties.	Matsuno et al. (2000)

		Original item from Matsuno et al. (2000)	*In this business unit, we maintain contacts with officials of government and regulatory bodies (e.g., Department of Agriculture, FDA, FTC, Congress) in order to collect and evaluate pertinent information.*	
		V5	Onze organisatie verzamelt en evalueert informatie met betrekking tot leveranciers.	Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*In this business unit, we spend time with our suppliers to learn more about various aspects of their business (e.g., manufacturing process, industry practices, clientele).*	
		V6	Onze organisatie verzamelt en evalueert informatie met betrekking tot maatschappelijke trends.	Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*In this business unit, we collect and evaluate information concerning general social trends (e.g., environmental consciousness, emerging lifestyles) that might affect our business.*	
		V7	Onze organisatie verzamelt en evalueert informatie met betrekking tot eindgebruikers.	Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*We poll end users at least once a year to assess the quality of our products and services.*	
		V8[a]	In onze organisatie verzamelen maar een paar mensen informatie over concurrenten.	Matsuno et al. (2000)

		Original item from Matsuno et al. (2000)	*In our business unit, only a few people are collecting competitor information.*	
	Intelligentie verspreiding	V9	In onze organisatie wordt aandacht besteedt aan het bespreken van de toekomstige behoeften van klanten met andere functies (marketing, productie, etc.).	Kohli et al. (1993); Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*Marketing personnel in our business unit spend time discussing customers' future needs with other functional departments.*	
		V10	In onze organisatie verspreiden we documenten met informatie over onze klanten.	Kohli et al. (1993); Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*Our business unit periodically circulates documents (e.g., reports, newsletters) that provide information on our customers.*	
		V11	In onze organisatie hebben we bijeenkomsten met verschillende functies (marketing, productie, etc.) om trends en ontwikkelingen in de markt te bespreken.	Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*We have cross-functional meetings very often to discuss market trends and developments (e.g., customers, competition, suppliers).*	
		V12	In onze organisatie hebben we vergaderingen met verschillende functies (marketing, productie, etc.) om onze kennis van regelgevingsvereisten bij te werken.	Matsuno et al. (2000)

		Original item from Matsuno et al. (2000)	*We regularly have interdepartmental meetings to update our knowledge of regulatory requirements.*	
		V13	In onze organisatie delen mensen informatie over technologische ontwikkelingen voor nieuwe producten met andere afdelingen.	Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*Technical people in this business unit spend a lot of time sharing information about technology for new products with other departments.*	
		V14	In onze organisatie verspreidt marktinformatie zich snel over alle lagen van de organisatie.	Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*Market information spreads quickly through all levels in this business unit.*	
	Responsiviteit	V15[a]	Onze organisatie negeert om de een of andere reden wijzigingen in de product- of servicebehoeften van onze klanten.	Kohli et al. (1993); Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*For one reason or another, we tend to ignore changes in our customers' product or service needs.*	
		V16[a]	In onze organisatie zijn de productlijnen die we verkopen meer afhankelijk van onze eigen bedrijfspolicy dan echte marktbehoeften.	Kohli et al. (1993); Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*The product lines we sell depend more on internal politics than real market needs.*	
		V17[a]	In onze organisatie zijn we niet snel om zakelijke relaties aan te gaan met nieuwe	Matsuno et al. (2000)

			leveranciers, ook al denken we dat ze beter zijn dan bestaande leveranciers.	
		Original item from Matsuno et al. (2000)	*We are slow to start business with new suppliers even though we think they are better than existing ones.*	
		V18	Onze organisatie zou meteen actie ondernemen wanneer een grote concurrent een grote campagne zou lanceren gericht op onze klanten.	Kohli et al. (1993); Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*If a major competitor were to launch an intensive campaign targeted at our customers, we would implement a response immediately.*	
		V19	In onze organisatie zijn de activiteiten van de verschillende afdelingen goed op elkaar afgestemd.	Kohli et al. (1993); Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*The activities of the different departments in this business unit are well coordinated.*	
		V20[a]	In onze organisatie zouden we, zelfs als we met een goed marketingplan komen, waarschijnlijk niet in staat zijn om dat snel te implementeren.	Kohli et al. (1993); Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*Even if we came up with a great marketing plan, we probably would not be able to implement it in a timely fashion.*	
		V21	Onze organisatie reageert onmiddellijk wanneer een speciale belangengroep (bijvoorbeeld consumentengroep, milieugroep) ons in het openbaar zou beschuldigen van schadelijke bedrijfspraktijken.	Matsuno et al. (2000)

		Original item from Matsuno et al. (2000)	*If a special interest group (e.g., consumer group, environmental group) were to publicly accuse us of harmful business practices, we would respond to the criticism immediately.*	
		V22[a]	Onze organisatie neemt meer tijd om te reageren op een verandering in de regelgeving dan onze concurrenten.	Matsuno et al. (2000)
		Original item from Matsuno et al. (2000)	*We tend to take longer than our competitors to respond to a change in regulatory policy.*	
Variable	**Dimension**	**Item number**	**Item / Indicator**	**Scale**
IT oriëntatie	Business intelligentie	V23	Onze organisatie verzamelt en evalueert informatie met betrekking tot werknemers.	Ratio scale
		V24	Onze organisatie verzamelt grote hoeveelheden gegevens van verschillende bronnen (van bijvoorbeeld klanten, leveranciers, werknemers, etc.).	Ratio scale
		V25	Onze organisatie analyseert de verzamelde gegevens om klantvoorkeuren, patronen, trends en andere nuttige informatie te vinden om onze zakelijke beslissingen en processen te verbeteren.	Ratio scale
		V26	Onze organisatie verspreidt informatie over afdelingen zodat dit in elke afdeling beschikbaar is.	Ratio scale
	IT systeem configuratie	V27	Onze organisatie slaat de gegenereerde informatie op in een kennisbank.	Ratio scale
		V28	Onze organisatie beveiligt informatie om ervoor te zorgen dat het uitsluitend toegankelijk is voor ons bedrijf.	Ratio scale

		V29	Onze organisatie configureert en integreert de informatiesystemen zodat gegevens en informatie eenvoudig kunnen worden uitgewisseld.	Ratio scale
		V30	Onze organisatie integreert onze database met anderen in onze supply chain.	Ratio scale
		V31	Onze organisatie stroomlijnt communicatie door verschillende communicatiemiddelen en platforms met elkaar te verbinden.	Ratio scale
		V32	Onze organisatie automatiseert routinematige processen met software applicaties.	Ratio scale
	IT management	V33	Onze organisatie zoekt een geschikte IT inrichting voor de toekomst, rekening houdend met onze strategie en beschikbare technologieën.	Ratio scale
		V34	Onze organisatie stemt de beschikbare IT middelen af op de behoeften van de verschillende functies in ons bedrijf.	Ratio scale
		V35	Onze organisatie zorgt ervoor dat de capaciteit van de IT inrichting in staat is om de doelstellingen op een effectieve en tijdige manier te realiseren.	Ratio scale
		V36	Onze organisatie identificeert en analyseert de waarde en bedreigingen van onze IT middelen.	Ratio scale
	Digitale marketing	V37	In onze organisatie zijn de marketinginspanningen gepersonaliseerd door deze aan te passen aan de voorkeuren en wensen van individuele consumenten.	Ratio scale

		V38	Onze organisatie gebruikt sociale mediaplatforms voor het promoten van onze producten en diensten.	Ratio scale
		V39	Onze organisatie gebruikt marketing gericht op smartphones, tablets en andere mobiele apparaten voor het promoten van onze producten en diensten.	Ratio scale
		V40	Onze organisatie gebruikt e-mail voor het promoten van onze producten en diensten.	Ratio scale
		V41	Onze organisatie gebruikt search engine optimization (SEO) voor het analyseren en gebruiken van de meest gezochte zoekwoorden op pagina's van zoekmachines.	Ratio scale
		V42	Onze organisatie plaatst advertenties op search engine pagina's voor het promoten van onze producten en diensten.	Ratio scale
		V43	Onze organisatie zorgt ervoor dat klanten gemakkelijk en snel aankopen kunnen doen via onze online verkoopkanalen.	Ratio scale
	Electronisch customer relationship management (e-CRM)	V44	Onze organisatie bouwt en gebruikt een klantendatabase waarin klantinformatie wordt opgeslagen.	Ratio scale
		V45	Onze organisatie biedt directe online klantenservice door te reageren op verzoeken en vragen van klanten (bijvoorbeeld door een chat-functie).	Ratio scale
		V46	Onze organisatie socialiseert met onze online community door te	Ratio scale

			communiceren op online platforms (bijvoorbeeld sociale media).	
		V47	Onze organisatie biedt klanten ondersteuning nadat ze een aankoop hebben gedaan.	Ratio scale
		V48	In onze organisatie meten we onze klanttevredenheid.	Ratio scale
Variable	**Dimension**	**Item number**	**Item / Indicator**	**Scale**
Organisatie performance	Omzetgroei	V49	De omzetgroei van onze organisatie ten opzichte van de belangrijkste concurrenten in de afgelopen drie jaar	1 = veel slechter 7 = veel beter
	Winstniveau	V50	Het winstniveau van onze organisatie ten opzichte van de belangrijkste concurrenten in de afgelopen drie jaar	1 = veel slechter 7 = veel beter
	Rendement op investering	V51	Het rendement op onze investering van onze organisatie ten opzichte van de belangrijkste concurrenten in de afgelopen drie jaar	1 = veel slechter 7 = veel beter
	Marktaandeel	V52	Het marktaandeel van onze organisatie ten opzichte van de belangrijkste concurrenten in de afgelopen drie jaar	1 = veel slechter 7 = veel beter
	Klantwaarde	V53	De klantwaarde van onze organisatie ten opzichte van de belangrijkste concurrenten in de afgelopen drie jaar	1 = veel slechter 7 = veel beter
	Maatschappelijk verantwoord ondernemen	V54	De maatschappelijke verantwoordelijkheid van ons bedrijf ten opzichte van de belangrijkste concurrenten in de afgelopen drie jaar	1 = veel slechter 7 = veel beter
	Algemene performance	V55	De algemene prestaties van ons bedrijf ten opzichte van de belangrijkste concurrenten in de afgelopen drie jaar	1 = veel slechter 7 = veel beter
Variable	**Dimension**	**Item number**	**Item / Indicator**	**Scale**

Strategisch belang van IT	Strategisch belang	V56	Onze organisatie betrekt de afdeling IT in het strategische planningsproces.	Ratio scale
		V57	De afdeling IT weet wat de strategische doelen zijn van de organisatie.	Ratio scale
		V58	De ontwikkeling/opleiding van IT professionals is afgestemd op de strategie van de organisatie.	Ratio scale
		V59	De focus van IT is gericht op de lange termijn, wat gepaard gaat met risico's en onzekerheden.	Ratio scale
		V60	IT heeft een formeel geschreven lange-termijn plan.	Ratio scale
	Top management support	V61	Het topmanagement ondersteunt de inspanningen om de IT afdeling te verbeteren.	Ratio scale
		V62	Het top management beschouwt IT als een belangrijk onderdeel van de organisatiestrategie.	Ratio scale
		V63	De visie van IT is voor de meeste top managers belangrijk.	Ratio scale
		V64	Het hoofd IT wordt als een belangrijke functie beschouwd door het top management.	Ratio scale
		V65	Het top management onderschrijft de strategische rol van de IT functie.	Ratio scale
		V66	Het top management honoreert meestal de verzoeken van IT voor meer middelen.	Ratio scale
Control variable	**Dimension**	**Item number**	**Item / Indicator**	**Scale**
Organisatie-grootte	Aantal werknemers	V67	Wat is het aantal werknemers in uw bedrijf?	Open vraag

	Omzet	V68	Wat is de jaaromzet van uw bedrijf? (in euro)	Open vraag
Organisatie-leeftijd	Leeftijd	V69	Hoeveel jaar bestaat uw bedrijf?	Open vraag
Respondent kwalificatie	Afdeling	V70	Op welke afdeling werkt u in uw bedrijf?	Productieafdeling; marketingafdeling; financiële afdeling; sales afdeling; inkoopafdeling; human resources afdeling; CEO of eigenaar; anders
	Positie titel	V71	Wat is uw functie in uw bedrijf?	Open vraag
Industrie	Industrie type	V72	In welke branche is uw bedrijf actief?	Open vraag
Productie	Producten of services	V73	Verkoopt uw bedrijf producten of diensten?	Producten; services
Zelf doen of uitbesteden	Markt / business intelligentie	V74	Bent u zelf verantwoordelijk voor het verzamelen, analyseren en verspreiden van markt informatie of besteedt u dit uit?	Zelf uitvoeren; uitbesteden
	IT systeem configuratie	V75	Bent u zelf verantwoordelijk voor het configureren van IT systemen of besteedt u dit uit?	Zelf uitvoeren; uitbesteden
	IT management	V76	Bent u zelf verantwoordelijk voor het managen van IT of besteedt u dit uit?	Zelf uitvoeren; uitbesteden
	Digitale marketing	V77	Bent u zelf verantwoordelijk voor uw marketing of besteedt u dit uit?	Zelf uitvoeren; uitbesteden
	E-CRM	V78	Bent u zelf verantwoordelijk voor het onderhouden van klantrelaties of besteedt u dit uit?	Zelf uitvoeren; uitbesteden

a. Reverse items.

Appendix E1 | Factor analysis: communalities, eigenvalues and component correlation matrix before respecification

Table 17: Communalities before respecification

	Initial	Extraction
Information distribution	.49	.48
Data collection	.52	.45
Data analytics	.60	.70
Storing information	.49	.41
Securing information	.48	.41
Integrating information systems	.67	.85
Supply chain database integration	.37	.24
Streamlining communication	.65	.57
IT process automation	.58	.55
Scanning future IT establishment	.39	.37
Managing IT alignment	.70	.65
Managing IT capacity	.74	.72
Analyzing IT resources value	.70	.70
Data-driven marketing	.36	.19
Social media marketing	.65	.66
Mobile marketing	.72	.77
Email marketing	.54	.46
Search engine optimization (SEO)	.75	.79
Search engine advertising (SEA)	.65	.66
Sales management	.50	.45
Customer database building	.56	.43
Direct customer service	.59	.85
Interaction with the online community	.69	.73
After-sales support	.42	.40
Customer satisfaction measurement	.53	.39

Extraction Method: Principal Axis Factoring.

Table 18: Total variance explained and eigenvalues before respecification

	Initial eigenvalues		
Factor	Total	% of Variance	Cumulative %
1	8.056	32.224	32.224
2	3.215	12.860	45.084
3	1.812	7.250	52.334
4	1.221	4.884	57.218
5	1.097	4.387	61.604
6	1.012	4.049	65.653
7	.952	3.809	69.462
8	.865	3.458	72.921
9	.810	3.241	76.162
10	.739	2.954	79.116
11	.626	2.506	81.622
12	.572	2.289	83.911
13	.545	2.179	86.089
14	.499	1.998	88.087
15	.453	1.813	89.900
16	.427	1.706	91.607
17	.371	1.483	93.090
18	.312	1.246	94.336
19	.278	1.110	95.446
20	.250	.998	96.444
21	.235	.941	97.386
22	.205	.819	98.204
23	.169	.678	98.882
24	.155	.620	99.502
25	.124	.498	100.000

Extraction Method: Principal Axis Factoring.

Table 19: Factor correlation matrix

Factor	1	2	3	4	5	6
1	1.00	.13	.19	-.31	-.21	-.49
2		1.00	.26	-.33	-.13	-.01
3			1.00	-.43	-.31	-.35
4				1.00	.30	.30
5					1.00	.33
6						1.00

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

Appendix E2 | Factor analysis: Initial pattern matrix and item elimination process

	Factor					
	1	2	3	4	5	6
Information distribution	-.02	.13	.61	-.07	.03	-.04
Data collection	-.04	.00	.63	.00	-.07	-.07
Data analysis	-.10	-.07	.81	.04	.00	-.18
Storing information	.11	.07	.18	-.45	.12	-.11
Securing information	.11	.44	.22	-.15	.00	.08
Configuring and integrating information systems	.04	.22	-.09	-.87	.08	-.00
Supply chain database integration	.02	-.18	.05	-.40	-.15	-.04
Streamlining communication	.12	.25	.01	-.49	-.17	-.00
Automating processes	-.02	.37	.04	-.41	-.19	-.05
Scanning future IT establishment	.08	.62	-.10	.06	.13	-.01
Managing IT alignment	-.06	.70	.17	-.11	.00	.01
Managing IT capacity	-.18	.74	.13	-.11	-.15	.03
Analyzing IT resources value	-.14	.60	.14	-.31	-.11	-.01
Data-driven marketing	.25	-.05	.16	-.12	-.01	-.08
Social media marketing	.09	.01	.11	-.00	.08	-.74
Mobile marketing	.08	-.05	.00	-.03	-.01	-.83
Email marketing	.61	-.19	.10	-.09	.10	-.07
Search engine optimization (SEO)	.63	.22	-.17	-.03	-.13	-.31
Search engine advertising (SEA)	.61	.13	-.13	-.06	-.09	-.26
Sales management	.43	-.00	-.01	-.04	-.38	-.05
Customer database building	.16	.02	.40	-.21	.08	-.16
Direct customer service	-.03	-.11	.11	-.11	-.76	-.20
Interaction with online community	-.04	-.00	.07	-.03	-.18	-.75
After-sales support	.24	.15	.48	.02	-.16	.17
Customer satisfaction measurement	.14	.32	.14	.10	-.22	-.25

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 16 iterations.

	Factor					
	1	2	3	4	5	6
Information distribution	.07	-.04	.62	.12	.02	-.03
Data collection	-.00	-.09	.61	.01	-.07	-.07
Data analysis	-.05	-.16	.84	-.10	.01	-.09
Storing information	.45	-.10	.19	.05	.13	.11
Securing information	.17	.10	.24	.41	.02	.13
Configuring and integrating information systems	.88	.03	-.07	.18	.10	.06
Supply chain database integration	.40	-.07	.03	-.17	-.15	-.00
Streamlining communication	.49	-.01	.01	.23	-.15	.17
Automating processes	.43	-.06	.04	.36	-.19	-.01
Scanning future IT establishment	-.05	-.02	-.11	.63	.13	.06
Managing IT alignment	.13	.03	.18	.69	-.01	-.05
Managing IT capacity	.13	.05	.14	.72	-.16	-.14
Analyzing IT resources value	.32	-.00	.15	.59	-.11	-.11
Social media marketing	.01	-.75	.11	.02	.09	.09
Mobile marketing	.03	-.80	.01	-.05	-.00	.10
Email marketing	.08	-.08	.11	-.20	.12	.57
Search engine optimization (SEO)	.04	-.27	-.14	.19	-.09	.70
Search engine advertising (SEA)	.07	-.24	-.11	.12	-.05	.63
Sales management	.04	-.02	.03	-.03	-.35	.50
Customer database building	.21	-.11	.45	-.02	.11	.19
Direct customer service	.13	-.20	.12	-.12	-.73	.04
Interaction with online community	.04	-.74	.08	-.00	-.17	-.00
After-sales support	-.02	.15	.48	.14	-.14	.24
Customer satisfaction measurement	-.09	-.28	.12	.33	-.22	.13

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 16 iterations.

	Factor					
	1	2	3	4	5	6
Information distribution	.06	-.05	.60	.14	.01	-.04
Data collection	-.01	-.10	.61	.03	-.08	-.06
Data analysis	-.05	-.16	.83	-.06	.00	-.09
Storing information	.53	-.09	.17	-.01	.13	.05
Securing information	.21	.11	.24	.36	.06	.13
Configuring and integrating information systems	.94	.03	-.10	.13	.06	.00
Supply chain database integration	.33	-.08	.03	-.12	-.21	.00
Streamlining communication	.46	-.01	.01	.24	-.17	.19
Automating processes	.43	-.05	.03	.35	-.19	.01
Scanning future IT establishment	-.00	.00	-.11	.56	.17	.07
Managing IT alignment	.02	-.03	.16	.77	-.02	-.02
Managing IT capacity	.03	-.00	.13	.80	-.17	-.10
Analyzing IT resources value	.29	-.02	.13	.60	-.12	-.09
Social media marketing	.04	-.71	.11	.01	.09	.10
Mobile marketing	.00	-.83	-.00	-.00	-.01	.10
Email marketing	.07	-.09	.11	-.19	.13	.54
Search engine optimization (SEO)	-.02	-.28	-.13	.21	-.05	.75
Search engine advertising (SEA)	.08	-.23	-.10	.09	.00	.64
Sales management	.02	-.01	.05	-.02	-.31	.55
Customer database building	.25	-.12	.44	-.04	.12	.15
Direct customer service	.07	-.21	.15	-.04	-.67	.13
Interaction with online community	.01	-.73	.08	.04	-.18	.04
After-sales support	.03	.16	.48	.11	-.09	.24

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 18 iterations.

	Factor					
	1	2	3	4	5	6
Information distribution	.07	-.05	.60	.02	.13	-.03
Data collection	-.02	-.10	.62	-.06	.04	-.05
Data analysis	-.01	-.16	.81	-.02	-.08	-.10
Storing information	.62	-.09	.13	.06	-.09	.03
Securing information	.26	.11	.22	.01	.33	.11
Configuring and integrating information systems	.94	.03	-.13	-.03	.07	-.01
Streamlining communication	.42	-.02	.02	-.19	.23	.18
Automating processes	.42	-.05	.02	-.21	.31	-.01
Scanning future IT establishment	.02	.01	-.09	.16	.55	.08
Managing IT alignment	.01	-.03	.18	-.01	.78	-.02
Managing IT capacity	.04	.00	.13	-.16	.78	-.12
Analyzing IT resources value	.33	-.01	.11	-.16	.54	-.13
Social media marketing	.04	-.71	.12	.08	.02	.12
Mobile marketing	.03	-.83	-.01	-.04	-.02	.09
Email marketing	.07	-.10	.11	.10	-.17	.54
Search engine optimization (SEO)	-.03	-.28	-.11	-.08	.24	.74
Search engine advertising (SEA)	.09	-.23	-.09	-.05	.09	.63
Sales management	.05	-.01	.03	-.36	-.06	.49
Customer database building	.31	-.11	.40	.05	-.08	.14
Direct customer service	.06	-.19	.10	-.82	-.12	.04
Interaction with online community	-.00	-.72	.09	-.19	.03	.03
After-sales support	.02	.16	.48	-.10	.12	.24

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 12 iterations.

	Factor					
	1	2	3	4	5	6
Information distribution	.08	.14	.63	.03	.03	-.01
Data collection	-.02	.04	.61	-.06	.10	-.05
Data analysis	-.01	-.08	.80	-.02	.16	-.09
Storing information	.61	-.08	.14	.06	.08	.03
Configuring and integrating information systems	.95	.07	-.12	-.02	-.04	-.01
Streamlining communication	.42	.24	.02	-.18	.03	.17
Automating processes	.42	.31	.03	-.20	.05	-.01
Scanning future IT establishment	.03	.54	-.09	.16	-.01	.07
Managing IT alignment	.02	.77	.20	.00	.01	-.00
Managing IT capacity	.04	.78	.15	-.15	-.02	-.10
Analyzing IT resources value	.33	.54	.13	-.15	.01	-.12
Social media marketing	.02	.01	.09	.08	.75	.07
Mobile marketing	.02	-.03	-.02	-.03	.83	.08
Email marketing	.07	-.16	.12	.11	.08	.56
Search engine optimization (SEO)	-.02	.24	-.10	-.06	.27	.75
Search engine advertising (SEA)	.09	.09	-.10	-.04	.24	.60
Sales management	.05	-.05	.04	-.35	.00	.50
Customer database building	.31	-.07	.40	.06	.11	.14
Direct customer service	.06	-.12	.09	-.82	.20	.04
Interaction with online community	-.01	.03	.08	-.18	.73	.02
After-sales support	.03	.12	.47	-.10	-.14	.23

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 11 iterations.

	Factor					
	1	2	3	4	5	6
Information distribution	.02	.14	-.63	.03	-.08	-.01
Data collection	.10	.03	-.62	-.05	.02	-.05
Data analysis	.15	-.09	-.80	-.02	-.00	-.10
Storing information	.07	-.07	-.12	.05	-.63	.04
Configuring and integrating information systems	-.04	.12	.13	-.04	-.91	.01
Automating processes	.06	.33	-.04	-.20	-.38	.00
Scanning future IT establishment	-.00	.54	.08	.16	-.02	.07
Managing IT alignment	.01	.76	-.20	.00	-.02	.00
Managing IT capacity	-.03	.78	-.14	-.17	-.06	-.10
Analyzing IT resources value	.00	.55	-.11	-.17	-.34	-.11
Social media marketing	.76	.01	-.10	.09	-.02	.07
Mobile marketing	.82	-.04	.03	-.05	-.05	.08
Email marketing	.07	-.16	-.11	.11	-.09	.56
Search engine optimization (SEO)	.28	.25	.10	-.06	.03	.74
Search engine advertising (SEA)	.26	.10	.10	-.04	-.08	.60
Sales management	-.01	-.04	-.03	-.36	-.06	.52
Customer database building	.11	-.07	-.39	.05	-.31	.14
Direct customer service	.21	-.09	-.09	-.80	-.06	.05
Interaction with online community	.73	.03	-.08	-.18	.01	.02
After-sales support	-.13	.13	-.47	-.09	-.02	.22

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 15 iterations.

	Factor					
	1	2	3	4	5	6
Information distribution	.02	.14	-.63	.03	-.08	-.01
Data collection	.09	.03	-.65	-.04	.05	-.03
Data analysis	.16	-.08	-.78	-.03	-.03	-.11
Storing information	.07	-.05	-.12	.04	-.61	.04
Configuring and integrating information systems	-.04	.13	.14	-.05	-.92	-.00
Scanning future IT establishment	-.00	.53	.07	.17	-.00	.07
Managing IT alignment	.01	.76	-.19	-.01	-.04	-.01
Managing IT capacity	-.02	.80	-.12	-.19	-.08	-.11
Analyzing IT resources value	.00	.56	-.11	-.17	-.34	-.11
Social media marketing	.76	.00	-.10	.09	-.02	.07
Mobile marketing	.82	-.03	.03	-.05	-.04	.07
Email marketing	.07	-.16	-.11	.11	-.09	.57
Search engine optimization (SEO)	.29	.25	.11	-.06	.01	.72
Search engine advertising (SEA)	.26	.11	.11	-.04	-.10	.59
Sales management	-.01	-.03	-.04	-.34	-.04	.53
Customer database building	.12	-.06	-.37	.04	-.33	.12
Direct customer service	.20	-.08	-.09	-.81	-.06	.06
Interaction with online community	.73	.03	-.08	-.18	.01	.02
After-sales support	-.13	.13	-.46	-.09	-.03	.22

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 12 iterations.

	Factor					
	1	2	3	4	5	6
Information distribution	.01	.11	-.66	.06	-.10	.00
Data collection	.06	-.03	-.71	.01	-.00	-.02
Data analysis	.18	-.04	-.71	-.01	-.00	-.10
Storing information	.05	-.11	-.11	.06	-.71	.03
Configuring and integrating information systems	-.02	.19	.11	-.07	-.78	.03
Scanning future IT establishment	-.02	.51	.05	.19	-.02	.08
Managing IT alignment	.02	.76	-.18	.00	-.03	-.01
Managing IT capacity	.01	.84	-.09	-.20	-.06	-.12
Analyzing IT resources value	-.01	.54	-.11	-.16	-.37	-.10
Social media marketing	.76	-.01	-.11	.10	-.03	.07
Mobile marketing	.82	-.04	.03	-.04	-.06	.07
Email marketing	.07	-.17	-.10	.11	-.09	.55
Search engine optimization (SEO)	.28	.24	.10	-.03	.02	.74
Search engine advertising (SEA)	.26	.10	.10	-.02	-.09	.60
Sales management	-.03	-.05	-.06	-.31	-.06	.56
Direct customer service	.21	-.06	-.09	-.79	-.08	.08
Interaction with online community	.74	.05	-.08	-.18	.03	.03
After-sales support	-.10	.15	-.43	-.10	-.01	.21

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 10 iterations.

	Factor					
	1	2	3	4	5	6
Information distribution	-.01	.15	-.64	.04	-.10	.04
Data collection	.01	.02	-.72	-.01	.02	.05
Data analysis	.16	-.01	-.69	-.08	-.00	-.06
Storing information	.04	-.11	-.13	.06	-.70	.05
Configuring and integrating information systems	-.00	.16	.12	-.06	-.81	.01
Scanning future IT establishment	-.03	.51	.05	.19	-.02	.07
Managing IT alignment	-.01	.79	-.20	-.01	-.01	.02
Managing IT capacity	.01	.82	-.07	-.21	-.07	-.13
Analyzing IT resources value	-.02	.53	-.12	-.16	-.38	-.09
Social media marketing	.78	-.03	-.11	.11	-.03	.03
Mobile marketing	.85	-.07	.03	-.03	-.06	.02
Email marketing	.05	-.13	-.12	.12	-.07	.59
Search engine optimization (SEO)	.33	.27	.14	-.03	-.00	.66
Search engine advertising (SEA)	.31	.12	.14	-.02	-.11	.53
Sales management	-.06	-.01	-.07	-.33	-.04	.61
Direct customer service	.19	-.06	-.11	-.76	-.07	.12
Interaction with online community	.72	.03	-.10	-.18	.04	.02

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 10 iterations.

	Factor					
	1	2	3	4	5	6
Information distribution	-.02	.14	-.66	.05	-.07	.06
Data collection	.01	-.00	-.71	-.00	-.01	.03
Data analysis	.15	-.01	-.71	-.07	.01	-.06
Storing information	.02	-.11	-.08	.04	-.86	-.02
Configuring and integrating information systems	.00	.27	.06	-.09	-.61	.06
Scanning future IT establishment	-.03	.50	.04	.18	-.03	.06
Managing IT alignment	-.02	.80	-.21	-.03	-.02	.00
Managing IT capacity	.00	.82	-.08	-.23	-.09	-.15
Social media marketing	.77	-.03	-.12	.11	-.02	.04
Mobile marketing	.85	-.06	.03	-.04	-.07	.02
Email marketing	.05	-.14	-.10	.12	-.08	.57
Search engine optimization (SEO)	.31	.25	.12	-.01	.02	.70
Search engine advertising (SEA)	.30	.12	.13	-.02	-.09	.54
Sales management	-.07	-.02	-.08	-.30	-.03	.62
Direct customer service	.18	-.05	-.10	-.78	-.08	.12
Interaction with online community	.71	.03	-.10	-.18	.03	.03

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 10 iterations.

Appendix E3 | Factor analysis: KMO, Bartlett's test of sphericity and communalities after respecification

KMO and Bartlett's test of sphericity after respecification

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.814
Bartlett's Test of Sphericity	Approx. Chi-Square	871.49
	df	120
	Sig.	.000

Communalities after respecification

	Initial	Extraction
Information distribution	.44	.52
Data collection	.44	.53
Data analysis	.49	.62
Storing information	.45	.73
Configuring and integrating information systems	.50	.58
Scanning future IT establishment	.33	.29
Managing IT alignment	.67	.75
Managing IT capacity	.67	.82
Social media marketing	.62	.69
Mobile marketing	.69	.78
Email marketing	.40	.41
Search engine optimization (SEO)	.72	.86
Search engine advertising (SEA)	.61	.62
Sales management	.47	.53
Direct customer service	.53	.88
Interaction with online community	.63	.69

Extraction Method: Principal Axis Factoring.

Appendix F | Reliability analysis: Cronbach's Alpha values

Business intelligence

Cronbach's Alpha	N of Items
.75	3

	Cronbach's Alpha if Item Deleted
Information distribution	.66
Data collection	.68
Data analysis	.66

IT system configuration

Cronbach's Alpha	N of Items
.73	2

	Cronbach's Alpha if Item Deleted
Storing information	-
Integrating information systems	-

IT management

Cronbach's Alpha	N of Items
.74	3

	Cronbach's Alpha if Item Deleted
Scanning future IT establishment	.87
Managing IT alignment	.53
Managing IT capacity	.58

After deletion of *scanning future IT establishment*

Cronbach's Alpha	N of Items
.87	2

Digital marketing and sales

Cronbach's Alpha	N of Items
.81	4

	Cronbach's Alpha if Item Deleted
E-mail marketing	.81
Search engine optimization	.69
Search engine advertising	.74
Sales management	.80

Social and mobile platform management

Cronbach's Alpha	N of Items
.87	3

	Cronbach's Alpha if Item Deleted
Social media marketing	.83
Mobile marketing	.78
Interaction with the online community	.83

Online customer service

No Cronbach's Alpha value since the factor consists of only one item.

Six IT capabilities combined

Cronbach's Alpha	N of Items
.75	6

	Cronbach's Alpha if Item Deleted
Business intelligence	.73
IT system configuration	.72
IT management	.76
Digital marketing sales	.70
Social and mobile platform management	.68
Online customer service	.71

Firm performance

Cronbach's Alpha	N of Items
.87	7

	Cronbach's Alpha if Item Deleted
Revenue growth	.85
Profit level	.85
Return on investment	.84
Market share	.85
Customer value	.85
Corporate social responsibility	.88
Overall performance	.83

Appendix G | Regression analysis output

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.23[a]	.05	-.03	.89091	.05	.62	9	104	.78
2	.58[b]	.33	.23	.77088	.28	6.82	6	98	.000

a. Predictors: (Constant), ThirdDUMemployees, ITMARKETuitbestVSzelf, MIuitbestVSzelf, ITMNGuitbestVSzelf, ProductenVsServices, ITCRMuitbestVSzelf, FirmAge, ITCONFuitbestVSzelf, SecondDUMemployees

b. Predictors: (Constant), ThirdDUMemployees, ITMARKETuitbestVSzelf, MIuitbestVSzelf, ITMNGuitbestVSzelf, ProductenVsServices, ITCRMuitbestVSzelf, FirmAge, ITCONFuitbestVSzelf, SecondDUMemployees, F1_BusinessIntelligence, F4_DigitalMarketingSales, F3_ITmanagement, F6_OnlineCustomerService, F2_ITsystemConfiguration, F5_SocialMobilePlatMng

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.45	9	.50	.62	.78[b]
	Residual	82.55	104	.79		
	Total	87.00	113			
2	Regression	28.76	15	1.92	3.23	.000[c]
	Residual	58.24	98	.59		
	Total	87.00	113			

a. Dependent Variable: DV_FirmPerformance

b. Predictors: (Constant), ThirdDUMemployees, ITMARKETuitbestVSzelf, MIuitbestVSzelf, ITMNGuitbestVSzelf, ProductenVsServices, ITCRMuitbestVSzelf, FirmAge, ITCONFuitbestVSzelf, SecondDUMemployees

c. Predictors: (Constant), ThirdDUMemployees, ITMARKETuitbestVSzelf, MIuitbestVSzelf, ITMNGuitbestVSzelf, ProductenVsServices, ITCRMuitbestVSzelf, FirmAge, ITCONFuitbestVSzelf, SecondDUMemployees, F1_BusinessIntelligence, F4_DigitalMarketingSales, F3_ITmanagement, F6_OnlineCustomerService, F2_ITsystemConfiguration, F5_SocialMobilePlatMng

Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.78	.67		7.10	.00
	ProductenVsServices	.02	.18	.01	.10	.92
	FirmAge	.00	.00	.05	.42	.68
	SecondDUMemployees	.19	.22	.11	.86	.39
	ThirdDUMemployees	.33	.26	.18	1.28	.21
	MIuitbestVSzelf	-.12	.26	-.05	-.46	.65
	ITCONFuitbestVSzelf	-.06	.20	-.03	-.28	.78
	ITMNGuitbestVSzelf	-.20	.23	-.10	-.84	.40
	ITMARKETuitbestVSzelf	-.10	.32	-.03	-.32	.75
	ITCRMuitbestVSzelf	.22	.38	.06	.57	.57
2	(Constant)	1.69	.77		2.20	.03
	ProductenVsServices	-.08	.17	-.04	-.46	.65
	FirmAge	.00	.00	.03	.32	.75
	SecondDUMemployees	.08	.20	.04	.41	.69
	ThirdDUMemployees	.19	.23	.11	.81	.42
	MIuitbestVSzelf	.06	.23	.02	.27	.79
	ITCONFuitbestVSzelf	-.02	.17	-.01	-.10	.92
	ITMNGuitbestVSzelf	-.01	.21	-.01	-.06	.95
	ITMARKETuitbestVSzelf	-.27	.28	-.09	-.97	.34
	ITCRMuitbestVSzelf	.59	.35	.16	1.68	.10
	F1_BusinessIntelligence	.15	.09	.18	1.70	.09
	F2_ITsystemConfiguration	.02	.07	.03	.22	.83
	F3new_ITmanagement	.31	.08	.43	4.14	.00
	F4_DigitalMarketingSales	.04	.06	.08	.66	.51
	F5_SocialMobilePlatMng	1.166E-5	.06	.00	.00	1.00
	F6_OnlineCustomerService	.02	.04	.04	.37	.71

a. Dependent Variable: DV_FirmPerformance

Effects of separate control variables on firm performance

Model	R	R Square	Adjusted R Square	Change Statistics			
				F Change	df1	df2	Sig. F Change
1	.11[a]	.01	.00	1.28	1	112	.26

a. Predictors: (Constant), *FirmAge*

Model	R	R Square	Adjusted R Square	Change Statistics			
				F Change	df1	df2	Sig. F Change
1	.19[a]	.04	.02	2.03	2	111	.14

a. Predictors: (Constant), *ThirdDUMemployees, SecondDUMemployees*

Model	R	R Square	Adjusted R Square	Change Statistics			
				F Change	df1	df2	Sig. F Change
1	.06[a]	.00	-.01	.35	1	112	.55

a. Predictors: (Constant), *ProductenVsServices*

Model	R	R Square	Adjusted R Square	Change Statistics			
				F Change	df1	df2	Sig. F Change
1	.03[a]	.00	-.01	.08	1	112	.78

a. Predictors: (Constant), *MIuitbestVSzelf (Self-conducting or outsourcing market / business intelligence)*

Model	R	R Square	Adjusted R Square	Change Statistics			
				F Change	df1	df2	Sig. F Change
1	.12[a]	.02	.01	1.71	1	112	.19

a. Predictors: (Constant), *ITCONFuitbestVSzelf (Self-conducting or outsourcing IT system configuration)*

Model	R	R Square	Adjusted R Square	Change Statistics			
				F Change	df1	df2	Sig. F Change
1	.13[a]	.02	.01	1.90	1	112	.17

a. Predictors: (Constant), *ITMNGuitbestVSzelf (Self-conducting or outsourcing IT management)*

Model	R	R Square	Adjusted R Square	Change Statistics			
				F Change	df1	df2	Sig. F Change
1	.05[a]	.00	-.01	.24	1	112	.63

a. Predictors: (Constant), *ITMARKETuitbestVSzelf (Self-conducting or outsourcing marketing)*

Model	R	R Square	Adjusted R Square	Change Statistics			
				F Change	df1	df2	Sig. F Change
1	.02[a]	.00	-.01	.04	1	112	.85

a. Predictors: (Constant), *ITCRMuitbestVSzelf (Self-conducting or outsourcing CRM)*