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# **The role of IT in creating customer value**

*The reinforcing effect of IT orientation and market orientation on customer value*

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## **Abstract**

This research aims to assess the reinforcing effect of market orientation and IT orientation on customer value. The study therefore advocates the need for scholars to look beyond main effects of strategic orientations on performance outcomes, since such an approach fails to capture synergetic effects. In specific, this research examines the moderating effects of market orientation and IT orientation in which it is proposed that IT management and IT system configuration reinforce the effect of market orientation capabilities on customer value. The results indicate that firms that match their products or services with market needs create higher customer value. Furthermore, firms that tailor the IT resources to needs of different departments and manage the required IT capacity are able to achieve objectives in an efficient and effective way. In this way, IT management assures that firms offer products and services effectively and in timely manner, which leads to higher customer value. Reinforcing effects between the two orientations are also found. IT management not only has a standalone effect on customer value, but also reinforces the effect of market orientation on customer value. Firms with better IT management experience a stronger positive effect of matching products and services with market needs on customer value. Also, firms with high levels of IT system configuration experience a positive effect of counter reacting to competitor moves on customer value. The findings provide support for the reinforcing proposition and demonstrate that the effect of both orientations on customer value is strongest when they are bundled together. This supports previous literature on RBV and dynamic capabilities theory and gives evidence for the role of IT within the market orientation concept.

**Keywords:** market orientation, IT orientation, strategic orientation, customer value, capabilities, dynamic capabilities

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# 1. Introduction

## 1.1 Background

Market orientation (MO) may be one of the most crucial topics in firms, since it gives firms insights in trends, stakeholders demands, customer behavior and so on. Firms that do not know what their stakeholders want and need cannot deliver value to those stakeholders. To illustrate, General Motors was one of the most important car manufacturers for over 100 years and one of the biggest companies worldwide. However, the firm failed to innovate, ignored competition, and didn't adapt to changing customer needs. Lack of market orientation within General Motors resulted in one of the largest bankruptcies ever in 2009. Firms without some degree of market orientation will be outperformed by firms that are market oriented. Previous research has examined and confirmed this (e.g., Kohli & Jaworski, 1990; Narver & Slater, 1990). However, the link between MO and a firm's performance is expected to be affected by other variables, such as the (strategic) use of information technology (IT). In the beginning years of the Internet, Min et al. (2002) stated that Internet technologies would transform traditional market orientation into a more effective and efficient one, since these technologies are used to collect and disseminate information. Nowadays, there is a broad spectrum of information technologies, comprising way more than the Internet, that is expected to affect the relation between MO and firm performance measures. This is due to multiple technological developments which are occurring at fast pace. The explosion of data, increased connectivity, social media, higher digital intensity and other technological developments together create new opportunities and challenges for firms. The term 'information age' is often used to refer to the time we now live in, characterized by the technological changes (Bharadwaj et al., 2013). The information age changes the way businesses operate and create value (Castells, 2003). The opportunities and challenges are expected to influence the relationship between MO and firm performance. For instance, on the one hand firms can find deeper insights in customer demands by analyzing buying patterns, but on the other hand it may become more difficult for firms to know customer needs and demands, since there is information abundance. Firms have great difficulty in finding relevant information in the huge amount of available data. The data explosion, sometimes referred to as big data, is one of the biggest challenges that firms face nowadays (Leeflang et al., 2014). Knowing what your stakeholders want, in particular customers, therefore is increasingly problematic and creating customer value becomes a bigger challenge.

Strategic use of information technology may be the solution to the opportunities and challenges firms face in being market oriented and creating customer value. In essence, MO is

the application of the marketing concept in which a firm's offerings are matched with the needs and wants of their customers, or stakeholders in a broader sense. Scholars state that IT is taking a prominent role in the marketing practice (Edelman, 2010). In other words, IT increasingly is essential for marketers and the marketing practice (Fowler et al., 2013). These scholars from marketing, strategy and management information systems (MIS) found a significant role of IT in improving a firm's performance (e.g., Bharadwaj et al., 2013; Fowler et al., 2013). This is based on the notion that IT has an impact on various mechanisms through which organizations create and capture value (Makadok, 2011). IT can help firms in collecting, analyzing and distributing information and may become essential for organizational survival (Arora & Rahman, 2016). IT can therefore be the solution to becoming market oriented in an environment where creating value from big data seems impossible (Snijders et al., 2012). The effectiveness of market orientation depends on these information gathering and sharing processes (Wang et al., 2012). A firm's ability to respond to market intelligence is also expected to be reinforced by strategic use of IT. Firms can for instance use new digital types of marketing to target customers with personalized offerings (Lamberton & Stephen, 2016; Sundsøy et al., 2014). Focusing on strategic use of IT might therefore reinforce the positive effect of MO on customer value by strengthening a firm's ability to being market oriented.

However, there is still little empirical evidence on if and how strategic use of IT can increase firm performance directly or indirectly. This thesis extends a prior thesis (Diesveld, 2018) in which IT is studied from the perspective of strategic orientations, which are "principles that direct and influence the activities of a firm and generate the behaviours intended to ensure its viability and performance of the firm" (Hakala, 2011, p. 200). Strategic orientations consist of capabilities and the effectiveness of the orientations depends on how these capabilities are deployed (Hult et al., 2005). Further, firms can choose to focus on multiple strategic orientations simultaneously which can potentially lead to even bigger performance gains (Ziggers & Henseler, 2016). By researching the reinforcing effect of two strategic orientations, market orientation and IT orientation, this study provides new knowledge and insights on the influence of IT in the market orientation concept, and the marketing practice, and their joint impact on customer value. This is central in this study.

## **1.2 Problem formulation**

Market orientation is a concept in which the market intelligence aspect is fundamental (e.g. Kohli et al., 1993; Narver & Slater, 1990). In previous conceptualizations of the orientation no specific emphasis is put on the technological side of generating, dissemination and responding

to the market intelligence. This, however, increasingly is essential since technological developments and opportunities are challenging firms to create value from big data. These developments for instance are the explosion of data, increased interconnectivity between devices, social media and higher digital intensity. They create opportunities and challenges for firms, where traditional ways of collecting and analyzing data may not be effective anymore. IT therefore potentially becomes a fundamental aspect of the market orientation concept. Strategic management literature, marketing literature and the MIS literature stream are paying more attention to the importance of IT throughout organizations (e.g., Buhl et al., 2012; Merali et al., 2012). IT potentially can be seen as a facilitator and a complementary asset for firms in being market oriented and in their marketing practices, since it can facilitate the gathering and internal dissemination of market information by use of information systems. Also, using IT makes it possible to create value from available data and information. IT can be used in finding and analyzing customer patterns, trends, wants, and so on, even if these are latent in nature (Fowler et al., 2013). Strategic use of IT then strengthens the effect of a firm's market orientation on creating customer value.

Summarizing, market oriented firms have great understanding of customer needs and wants and therefore have high customer value since they can match their products and services to the market needs (Slater & Narver, 1994a; Slater & Narver, 1999; Von Hippel et al., 1999; Williams & Naumann, 2011). This gives market oriented firms a source of competitive advantage and this increases firm performance (e.g., Dobni & Luffman, 2003; Hult & Ketchen, 2001; Jaworski & Kohli, 1993). However, being market oriented is becoming more difficult due to technological developments and opportunities. The role of IT can become essential in being market oriented. Nevertheless, research on the role of IT in the market orientation concept is very limited. In this study, the reinforcing effect of IT orientation and market orientation on customer value will be researched in which it will become clear if the two concepts are complementary and if they reinforce each other in their effect on the customer value of a firm.

The objective of this study is to identify the role of IT within the market orientation concept in its effect on customer value. The corresponding research question based on the objective is: *What is the role of information technology in the effect of market orientation on customer value?* Answering the research question leads to knowledge on the effect of market orientation and IT orientation on customer value in a configurational way by taking into account multiple orientations and capabilities.

### **1.3 Relevance**

Now that the research objective is clear, the following two sections explain how the results of this study are expected to complement previous research and how it helps managers, marketers and organizations in their operations and processes. The academic relevance is discussed first, followed by the managerial relevance.

#### **1.3.1 Academic relevance**

This thesis complements research about market orientation, the marketing practice, information technology and strategic orientations in general. Hult and Ketchen (2001) note that market orientation affects firm performance positively, but that it should be considered together with other firm capabilities. Sarkar et al. (2016) add to this by stating that a market orientation is a pivotal resource in affecting a firm's strategy and performance, but that the fullest potential of the orientation is only achieved with other firm capabilities. Furthermore, Ketchen et al. (2007) state that "current portrayals of the RBV make clear that strategic resources only have potential value, and that realizing this potential requires alignment with other important organizational elements." (p. 962). This indicates that research should be done on the moderation effects of strategic orientations with other capabilities, for instance with other strategic orientations (Zhou et al., 2005; Sarkar et al., 2016). Scholars also state that pursuing multiple strategic orientations can potentially increase the benefits for firms even further (Ziggers & Henseler, 2016). Examining the reinforcing effect of market orientation and IT orientation therefore contributes to literature by providing insights on how market orientation and IT orientation affect customer value separately and together (Wales et al., 2013; Wiklund & Shepherd, 2003). This configurational approach in researching the relation between strategic orientations and a form of firm performance is a call made by scholars, since previous research has mainly focused on the effect of specific orientations on firm performance (Gnizy et al., 2014; Lumpkin & Dess, 1996; Noble et al., 2002; Zhou et al., 2005). A configurational approach in researching strategic orientations is needed to get a more accurate understanding of the effect of strategic orientations on firm performance by adding more variables and creating a more comprehensive view (e.g., Deutscher et al., 2016; Sarkar et al., 2016; Hakala, 2011). This approach provides insights in the interaction of market orientation and IT orientation and in the importance of capability deployment. More precisely, it contributes to literature by creating clarity on the question whether and how the effect of market orientation on customer value is strengthened by the strategic use of information technology.



### **1.3.2 Managerial relevance**

The time in which products were made and pushed towards customers has taken place for a time where customers and other stakeholders have the power. Customers and stakeholders are unique and have their own preferences. Firms should therefore know their markets better than ever before in order to serve the needs and wants of their stakeholders. However, it is increasingly difficult to be market oriented and this is seen as one of the main challenges of marketers and firms (Leeflang et al., 2014). More data and information is available through divergent channels and this is all amplified by the Internet of Things (Stankovic, 2014), which created the information age. In this information age being market oriented is perceived increasingly difficult since finding relevant data to collect and analyze out of all data that is available gets harder. ‘Big data’ is the norm, referring to the amount of data generated on continuous basis (De Mauro et al., 2016). “The most important challenge in a digital marketing world is the ability to generate and leverage deep customer insights.” (Leeflang et al., 2014, p. 5). Firms are confronted with complex and rapidly changing markets and managers need to know how to cope with them (Day, 2011). The importance of using IT strategically seems to become crucial. Nevertheless, empirical evidence for the strengthening role of IT on the effectiveness of being market oriented lacks and it is therefore not clear for firms and managers how they should use IT in order to improve this.

By examining the interaction effects of different dimensions of IT orientation and market orientation on customer value, this research helps managers in understanding how both concepts are interrelated and what the role of IT is in the effectiveness of market orientation. This provides managers with knowledge in how they can and should use IT in order to increase customer value by the ability to generate market intelligence, disseminate market intelligence, and respond to this market intelligence. In this way firms can fully utilize their market focus by mutually focusing on IT and being market oriented to improve customer value.

### **1.4 Outline of the thesis**

In this chapter, the background of the research has been discussed, the problem statement is formulated and the relevance for the academic and managerial community has been described. In the next chapter the theoretical framework will be discussed, in which the central concepts and their relations to each other are discussed. In chapter three the methodology, measurement and context of the study are described. The results of this research are given in chapter four and interpreted and discussed in chapter five. In this last chapter the research implications for managers and scholars, limitations of the study and directions for future research are discussed.

## **2. Theoretical framework**

### **2.1 Resource-based view (RBV) and dynamic capabilities (DC) theory**

Differences in firm performance can be explained on the basis of different theories. One stream in management literature is the resource-based view (RBV). RBV is an inside-out view that posits that firms' competitive advantages stem from the resources they possess (Barney, 1991; Wernerfelt, 1984; Zhu, 2004). According to the RBV, these resources and capabilities should be valuable, rare, inimitable, and non-substitutable (Amit & Schoemaker, 1993). This is referred to as the VRIN framework (e.g., Barney, 1991). However, scholars started to criticize the RBV for being unable to explain how resources are developed and deployed in order to achieve a competitive advantage. Also, scholars state that the RBV fails in considering the impact of changing market environments (Morgan et al., 2009; Priem & Butler, 2001). This criticism resulted in developing new ideas, collectively known as 'dynamic capabilities theory', which addresses the limitations of RBV as stated above (e.g., Eisenhardt & Martin, 2000; Newbert, 2007; Teece et al., 1997; Zott, 2003).

Dynamic capabilities (DC) theory states that market environments are dynamic. This theory helps in understanding the processes by which firms build, integrate and configure their strategic resources in order to respond to a changing environment in an effective way (Eisenhardt & Martin, 2000; Ziggers & Henseler, 2016). More precisely, "DC theory focuses particular attention on the ways in which firms configure and deploy their resources to reflect the needs of the market environment." (Morgan et al., 2009, p. 917). DC theory implicates that not heterogeneity in firms' resources endowments, but dynamic capabilities cause variance in interfirm performance (Eisenhardt & Martin, 2000; Makadok, 2001; Morgan et al., 2009). Firms have capabilities by which they acquire and deploy their resources and these are essential in achieving and sustaining a competitive advantage (Barney, 1991; Eisenhardt, 1989; Teece et al., 1997). Those capabilities are difficult to quantify monetarily, are intangible and they encompass skills that are deeply embedded in organizational routines and practices (Zhou et al., 2005). Those capabilities are needed in order to get a competitive advantage by transforming and bundling available resources in different and new ways and thus strategically reacting to changing market conditions (Sirmon et al., 2007). The capabilities are a firm's capacity to purposefully create, extend or modify their resource base, and adjust them to a changing market and deploy them (Helfat et al., 2009).

Capabilities consist of a set of activities. During these activities resources are deployed by using certain knowledge and processes. Capabilities can be bundled into a coherent set of

capabilities. Those bundles of capabilities, which thus in turn consist of a set of activities, are called strategic orientations (Foley & Fahy, 2009). Different strategic orientations consist of different capabilities and focus on other resources to create and capture value (Miles & Arnold, 1991). Strategic orientations in itself do not provide an increasing performance directly (Hult et al., 2005). Moreover, it depends on how these orientations are used in order to achieve an increase in performance and competitive advantage (Morgan et al., 2009). The capabilities are intangible and based on interaction. These capabilities are very complex routines that are firm-specific and they remain effective despite attempts by rivals to imitate the capabilities (Grant, 1996; Hoopes et al., 2003; Hunt & Morgan, 1995). This indicates that these capabilities could be a source of competitive advantage (Theodosiou et al., 2012). In line with the RBV, research found that strategic orientations comprise firm-specific, complex capabilities and that they can lead to better firm performance and competitive advantages (Zhou et al. 2005; Day, 1994; Hunt & Morgan, 1995).

## **2.2 Strategic orientations**

In the previous section it is briefly explained how strategic orientations can lead to better firm performance. In this section the concept of strategic orientations is discussed in further detail. Strategy is defined in numerous ways. For instance Mintzberg (1987) and Porter (1980) have different views on the strategy concept, while both scholars are among the most cited scholars in this field. Mintzberg (1987) talks about five different definitions of strategy in which it can be a plan, a pattern, a position, a ploy, or a perspective. Porter (1980) defines strategy as a broad formula for how an organization will compete, what its goals should be, and how these goals can be achieved. The strategy of a firm determines what resources the firm uses and how these resources are used to reach the firm's objectives.

Firms can focus on a wide variety of resources, which depends on the strategic orientation(s) the firm pursues. "A firm's strategic orientation reflects the strategic directions implemented by a firm in order to create the proper behaviors for the continuous superior performance of the business." (Gatignon & Xuereb, 1997, p. 3). The strategic orientation of a firm can be seen as principles that give guidance to the activities in a firm (Noble et al., 2002). In this study, the definition for strategic orientation from Hakala et al. (2011) is used. The authors state that strategic orientations are "principles that direct and influence the activities of a firm and generate the behaviours intended to ensure its viability and performance of the firm" (Hakala, 2011, p. 200). Scholars state that strategic orientations can provide sources for competitive advantage, which guides firms in achieving superior firm performance by aligning

the firms' postures and strategic direction with their environment (Narver & Slater, 1990; Sarkar et al., 2016; Zhou et al., 2005). Different strategic orientations have different values and beliefs. This leads to a preference for certain resources and capabilities for firms. These resources and capabilities are used in deploying the strategic orientation. The capabilities are intangible and firm-specific. Deployment of capabilities is essential in achieving and sustaining a competitive advantage (Barney, 1991; Eisenhardt & Martin, 2000; Teece et al., 1997; Teece & Maritan, 2007). Strategic decisions are influenced by strategic orientations and this encompasses the total range of activities in a firm (Pascale, 1985).

There is consensus among scholars on the effect of strategic orientations on firm performance (Sarkar et al., 2016). Research indicates that there are multiple strategic orientations that can lead to a competitive advantage and superior firm performance (e.g. Deutscher et al. 2016; Ziggers & Henseler, 2016). This indicates that different strategic orientations have the potential to increase firm performance through different mechanisms. In other words, different strategic orientations lead to a different sustainable competitive advantage, which in turn positively affects firm performance. Multiple strategic orientations can reinforce each other in their effect on firm performance by complementing and mutually supporting one another (Kirca et al., 2005; Noble et al., 2002). This can even lead to higher firm performance (Zhou et al., 2005; Ziggers & Henseler, 2016). Firms therefore often pursue different orientations simultaneously. It is a firm's choice to focus on a certain orientation, or orientations, and this can be explained by heterogeneity between firms (Barreto, 2010).

### **2.3 Market orientation**

Arguably the most mentioned and researched strategic orientation is market orientation. In this section the most important findings and views on market orientation are discussed in order to define the concept for this study.

Market orientation often is central in previous strategic orientation research and is an essential focus for a big variety of firms and industries (e.g., Covin & Wales, 2012; Deutscher et al., 2016; Sarkar et al., 2016). The concept reflects a firm's organization-wide generation of market intelligence, distribution of this across the firm, and the responsiveness to it (Deutscher et al., 2016). Market orientation, also referred to as marketing orientation, is based on the adoption and implementation of the marketing concept (Noble et al., 2002). The marketing concept is integrated throughout the whole organization. "A market oriented organization is one whose actions are consistent with the concept marketing." (Borges et al., 2009, p. 884). This implies that firms with a market orientation have a philosophy that is focused on

discovering and meeting the needs and desires of customers. Marketing thus aims to satisfy demands of stakeholders and the firm simultaneously. Together with this marketing thinking and continuous market analysis, customer-oriented thinking is important. Customer oriented firms listen to customers and focus on customer needs (Deshpandé et al., 1993). Market oriented firms not only analyze customers, but also other stakeholders and facets of their market. Further, market oriented firms commit understanding not only to expressed customer needs, but also latent customer needs (Slater & Narver, 1999; Von Hippel et al., 1999).

Among the most cited authors on the concept market orientation are Kohli et al. (1993) and Narver and Slater (e.g., 1990). Narver and Slater (1990) inferred three behavioral components of market orientation: customer orientation, competitor orientation, and interfunctional coordination. Customer orientation and competitor orientation refer to the activities involving acquiring information about customers and competitors and disseminating this information throughout the firm. Interfunctional coordination is based on the first two orientations by comprising the firm's efforts to create superior value for customers. Summarizing, the three components comprehend the activities of market information acquisition, market information dissemination, and the coordinated firm's efforts to create superior customer value (Narver & Slater, 1990). This view by Narver and Slater is consistent with findings by Kohli and Jaworski (1990), who state that market orientation is "the organizationwide information generation and dissemination and appropriate response related to current and future customer needs and preferences." (Narver & Slater, 1990, p. 21). Kohli et al. (1993) however stated that the study by Narver and Slater (1990) lacks essential features of market orientation: (1) it has a focused view of markets by focusing on customers and competitors only; (2) they do not tap the speed of market intelligence generation and dissemination; (3) and the study includes items that do not tap particular activities and/or behaviours that are representative for market orientation. Kohli et al. (1993) gave attention to these features and eventually came up with the MARKOR scale, a scale to measure market orientation. For this research, the definition for market orientation by Kohli et al. (1993) is used, which is: 'the degree to which firms generate market intelligence, disseminate this market intelligence, and responsiveness based on this market intelligence.'

In essence, the two views by Kohli et al. (1993) and Narver and Slater (1990) share many underlying concepts and activities, like understanding customer needs, cross-functional integration in the firm, and the importance of decisive action in responding to market opportunities (Noble et al., 2002). However, the view and operationalization of Kohli et al. (1993) takes into account a more comprehensive view on a firm's marketplace. In their study,

Kohli et al. (1993) called for future improvement of their MARKOR scale in order to capture the market orientation concept even better. Matsuno et al. (2000) responded to this. They revised the MARKOR scale by taking into account additional market factors. They created the Market Orientation Scale (MOS). The MOS broadens the activities of a firm in information gathering and disseminating. Furthermore, it captures a broader view of markets than only customers and competitors (Matsuno et al., 2000). The marketplace consists of multiple stakeholders, like customers, competitors, retailers and wholesalers, consultants and trade associates, and institutions. Scanning and analyzing all of them is therefore important in creating market intelligence (Dickson, 1992). The MOS will be used in this research for measuring market orientation, since it in essence is an adjusted and improved scale of previous work by Kohli et al. (1993), who at their turn gave attention to the lack of some essential features in the work of Narver and Slater (1990). The operationalization of market orientation as used in this study and a more detailed explanation of the MOS come up in section 3.5.1.

## **2.4 IT orientation**

Market orientation is the most researched strategic orientation in literature, but there are more strategic orientations that could be a strategic focus for firms. This section explains how the strategic use of IT evolved over the years and how scholars and managers began to look at IT differently. Through the years managers and firms began to see opportunities of using IT in multiple aspects of their firms (Ward et al., 2002). In the beginning years, roughly 50 years ago, IT was used for planning and controlling only (Gibson & Nolan, 1974; Martin, 1990; Rockart, 1978). Firms tried to link IT and business processes to increase efficiency. This, however, became a commodity because it was easy to imitate and therefore did not lead to a sustainable competitive advantage (Carr, 2003; McAfee & Brynjolfsson, 2008). Currently, business environments are rapidly changing and new challenges and approaches to look into IT have risen (Buhl et al., 2012; Merali et al., 2012; Ward, 2012). New technological developments and opportunities have led scholars to view IT from the RBV and DC perspective, which imply that a sustainable competitive advantage stems from the deployment of unique capabilities of a firm (Piccoli & Yves, 2005). IT can then be seen as a means in order to achieve strategic goals. More specifically, IT can be seen from the strategic orientation perspective. Recent research addressed this by conceptualizing IT as a strategic orientation, IT orientation, and examining its effect on firm performance (Diesveld, 2018). Based on literature review by Onn and Sorooshian (2013) regarding definitions of information technology, Diesveld (2018) defined IT 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.” (p. 11). Firms can differ in their degree of IT orientation and thus in applying and exploiting strategic use of IT.

Several IT capabilities can be identified which together represent the concept IT orientation. IT orientation comprises six IT capabilities: business intelligence, IT system configuration, IT management, digital marketing and sales, social and mobile platform management, and online customer service (Diesveld, 2018). All these capabilities are typical for IT orientation since they require strategic use of IT in order to realize its full potential. This will be briefly explained. Business intelligence implies that firms should collect data from various sources, analyze the data and share it within their firm (Davenport et al., 2012; Drnevich & Croson, 2013; Moharana et al., 2011). Business intelligence can be intelligence about a firm’s market, but also about the firm’s internal operations and processes. IT system configuration allows firms to store information in a knowledge base and makes sure that information systems in a firm are configured and integrated (Galliers & Leidner, 2014; Korfhage, 2008). This makes information sharing possible. IT management ensures that firms are able to realize objectives in a timely and effective manner by managing the IT resources to needs of various functions within a firm and simultaneously managing the IT capacity that is needed (De Haes & Van Grembergen, 2008; Klosterboer, 2011; Wilkin & Chenhall, 2010). The digital marketing and sales capability comprises search engine marketing, e-mail marketing and sales management. These are cost-effective ways for acquiring customers (Castronovo & Huang, 2012). Search engine marketing creates traffic to the site and channels of a firm and is increasingly important for acquiring customers (Skiera et al., 2010). Further, social and mobile platform management relates to marketing efforts focused on social media and mobile devices (Felix et al., 2017; Hudson & Hudson, 2013). Also, the use of IT makes it increasingly effective for a firm to socialize with their online community (Chaffey, 2015). A specific case is online customer service, which is characteristic for IT orientation because IT increasingly has a prominent role in the customer service process (Ray et al., 2005).

Based on these findings IT orientation can be defined as ‘the degree to which firms focus on business intelligence, IT system configuration, IT management, digital marketing and sales, social and mobile platform management, and online customer service in their business operations.’ IT orientation and market orientation share some basic ideas and processes. Most important is the shared focus on creating market and business intelligence. Additionally, both strategic orientations state the strategic importance of distributing the intelligence throughout the firm. Differences between both orientations are that IT orientation is more technical in the sense of how intelligence is created and shared within firms, while market orientation can be

distinguished by the in-depth focus on responding to the intelligence. To see how both strategic orientations are interrelated, in this study a factor analysis will first be conducted. This will reveal the shared and unique capabilities of both orientations and creates clarity in the similarities and differences of both concepts. This makes it possible to examine the shared proportion of variance in customer value of both concepts, but also the unique contribution of both orientations in explaining customer value. The role of IT in the effectiveness of being market oriented, which is the focus of this study, can then be assessed. The operationalization of IT orientation as used in this study is described in section 3.5.2.

## **2.5 Customer value**

A firm's strategy determines the way firms do business and this has effects on their firm performance. The assumption with strategic orientations is that they have a positive effect on firm performance, since the capabilities are firm-specific which make them a source for sustainable competitive advantage. This sustainable competitive advantage leads to higher firm performance. The path from strategic orientation towards firm performance varies for different strategic orientations. Better said, strategic orientations lead to a sustainable competitive advantage in a particular field, which in turn leads to higher firm performance. However, this mechanism, or competitive advantage, through which a strategic orientation influences firm performance differs among strategic orientations. This study focuses on market orientation and IT orientation. Market oriented and IT oriented firms, with a high focus on creating market and business intelligence, pursue the creation of customer value. Especially for those firms, but also for firms in general, this may be one of the most important mechanisms through which firm performance can be increased. "To satisfy the customer is the mission and purpose of every business" (Drucker, 1973, p. 79). This is done by delivering superior customer value (Slater, 1997). Customer value can be conceptualized as the comparison between what a customer gets and what he gives (Lam et al., 2004). It is focused on the perceived relative preference of a certain product or service over others (Nasution et al., 2011). Firms have the need to know the demands and wants of their customers (Woodruff, 1997). Currently, customers are gaining more power and want to be identified as being unique, which strengthens the need for firms to know the customer wants (Kumar & Reinartz, 2016). Customer value therefore becomes an increasingly important indicator for firms (Bititci et al., 2012). In order to define customer value, the work by Woodruff (1997) is guiding. Woodruff (1997) states that customer value is often defined in varying ways, but that some areas of consensus are identified. Customer value is inherently linked to the use of a product or service, is perceived by customers rather than



objectively measured, and customer value involves a trade-off between what a customer gets and what he or she gives up to buy and use the product or service. Therefore, in this study the definition for customer value by Woodruff (1997) is used, which defines customer value as “a customer's perceived preference for and evaluation of those product attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations.” (p. 142). A product or service with high customer value is linked to the sustained performance of that product or service versus the competition (Parasuraman, 1997). The two main attributes in differentiating among products are the quality and price of a product, meaning that a product with relatively better quality and/or price has more value for the customer.

### **2.5.1 Market orientation and customer value**

The effect of market orientation on firm performance outcomes has been studied extensively over the last decades. “A business that increases its market orientation will improve its market performance.” (Narver & Slater, 1990, p. 20). Achieving above-normal market performance asks for the need of creating a sustainable competitive advantage (Porter, 1985). This means that firms offer products or services with a higher perceived value for customers than alternative products or services of other firms. Firms with a market orientation understand this concept, those firms have an organizational culture that creates the behaviors for creating continuous superior firm performance (Aaker, 1989; Andreasen et al., 2003; Peters et al., 1982; Webster, 1988). By continuously examining the market, firms can generate and distribute market intelligence and respond to it, which will increase firm performance (Deutscher et al., 2016). Pelham (2000) found that market orientation positively affects profitability, market share, and sales. Slater and Narver (1994a; 1994b) found that market orientation positively affects new product success, return on assets and results in superior customer value. Kirca et al. (2005) did a meta-analysis on the market orientation – firm performance link, which resulted in finding evidence for this effect. In general, most scholars found support for the positive relation between market orientation and different firm performance indicators.

Focusing on RBV and DC theory, it can be stated that market oriented firms achieve superior performance because they have greater understanding of expressed and latent customer needs and demands (Slater & Narver, 1999; Von Hippel et al., 1999), competitor strategies, and they have greater understanding of developments, channel requirements and the broad business environment than their competitors (Hult & Ketchen, 2001; Jaworski & Kohli, 1993). This leads to great knowledge that helps them in selecting the best resources, effectively and efficiently,

in order to match the market conditions of the firm and to create high customer value (Kumar & Reinartz, 2016; Slater & Narver, 1995). To summarize, strategic management and marketing researchers state that market orientation gives firms a source of competitive advantage (e.g., Dobni & Luffman, 2003; Hult & Ketchen, 2001; Jaworski & Kohli, 1993), which increases customer value. Therefore, it is hypothesized that market orientation positively predicts customer value. In more detail, firms that generate and disseminate market intelligence know their market needs and are expected to have higher customer value by responding to customer needs with the generated market intelligence. Hypothesis 1 is therefore suggested.

*Hypothesis 1: Market orientation has a positive effect on customer value.*

### **2.5.2 IT orientation and customer value**

Research on the link between using IT and firm performance outcomes is very limited, especially from the RBV and DC theory. By using this perspective, it can be stated if and how IT orientation affects types of firm performance. Firms with a higher IT orientation are expected to better create understanding in stakeholder needs by their business intelligence capability. The use of IT is essential in collecting data and distributing the intelligence across departments in a firm (Drnevich & Croson, 2013). This capability shares underlying ideas with the market intelligence generation and dissemination dimensions of market orientation. In addition, IT system management is expected to ensure a competitive advantage by creating a central knowledge base and integration between different information systems in a firm. Firms can retrieve their knowledge to make business decisions at any time (Galliers & Leidner, 2014). By tailoring the IT resources to demands of different functions within a firm and managing the overall IT capacity that is needed, IT management makes it possible for firms to achieve business goals in an effective and efficient way (Klosterboer, 2011; Wilkin & Chenhall, 2010). Furthermore, strategic use of IT makes it possible to carry out personalized and data-driven marketing and customer relationship management efforts. Together with online customer service this is expected to increase customer satisfaction and loyalty (Azila & Noor, 2011).

Based on the six IT capabilities (Diesveld, 2018), IT orientation is expected to have a positive effect on customer value. The fundamental emphasis on creating intelligence together with delivering personalized marketing, interaction with the online community and online customer service is expected to have a positive effect on customer value. In more detail, firms with higher IT orientation are expected to create more unique value for individual customers. A higher emphasis on the use of IT in terms of the different IT capabilities could possibly lead to being able to better serve customers and therefore deliver higher customer value.

Furthermore, IT orientation enables firms to operate at their full potential due to IT system configuration and IT management. Both effectiveness and efficiency in achieving superior customer value can be created by focusing on IT orientation. Hypothesis 2 is suggested.

*Hypothesis 2: IT orientation has a positive effect on customer value.*

### **2.5.3 Market orientation, IT orientation and customer value**

As is discussed in the previous sections, market orientation and IT orientation share a fundamental focus on creating and sharing intelligence. Next to these overlapping dimensions, the orientations have unique capabilities. Market orientation focuses on reacting on the generated intelligence in various ways to meet market needs, for example the matching of product lines with market needs. Responses based on generated market intelligence are not typically characteristic for IT orientation. IT orientation has unique capabilities regarding the management of IT and the configuration of information systems, which represent the organizational side of arranging IT in a firm. Furthermore, IT orientation comprises the IT capabilities social and mobile platform management, digital marketing and online customer service, which are all characterized by the strategic use of IT.

In essence, market orientation consists of generating, disseminating, and responding to market intelligence (Kohli et al., 1993). Market oriented firms know their market and customers and can therefore make better decisions than less market oriented firms, which leads to superior customer value (Hult & Ketchen, 2001; Jaworski & Kohli, 1993; Slater & Narver, 1999). Firms however experience difficulties in creating value from large amounts of data in the current information age, which makes being market oriented challenging (Leeflang, 2014). The use of IT can then become essential in realizing the full potential of market orientation. IT can improve a firm's performance by implementation and integration with other resources and capabilities, in this case market orientation (Hoopes & Madsen, 2008). Generation and dissemination of market intelligence are expected to be influenced by IT possibilities. Borges et al. (2009) stated that electronic channels and internet-based technologies can facilitate the gathering and internal dissemination of market information by use of information systems. Information gathering and dissemination however are often seen as problematic due to the occurrence of big data. Traditionally, firms did not collect much data since it was expensive and not a lot of data was available. This changed and firms can now easily and cheaply collect large amounts of data (Savitz, 2012). Using IT to capture, curate, store, share, search, visualize, analyze and transfer information becomes essential (Snijders et al., 2012). It may therefore be logical to think that the two IT capabilities IT management and IT system configuration can facilitate firms in being

market oriented by supporting market intelligence generation and dissemination processes. It can help firms performing those processes by aligning IT resources to the needs of different departments, managing the IT capacity that is needed, storing information and integrating information systems which makes information sharing more effective and efficient.

To examine this, the reinforcing effect of IT orientation and market orientation on customer value will be measured. This leads to knowledge on the effect of market orientation and IT orientation on customer value in a configurational perspective, which is called for by many scholars in this field (e.g., Deutscher et al., 2016; Sarkar et al., 2016; Hakala, 2011). Firms with higher IT orientation are expected to have a significantly stronger positive effect of market orientation on customer value. More specifically, this reinforcing effect is expected to be the result of IT management and IT system configuration capabilities by which firms are better able to collect, analyze and distribute market intelligence. Complementary, those firms have the required IT resources and capacity in all departments, which assures that information is available and responding to market needs is possible.

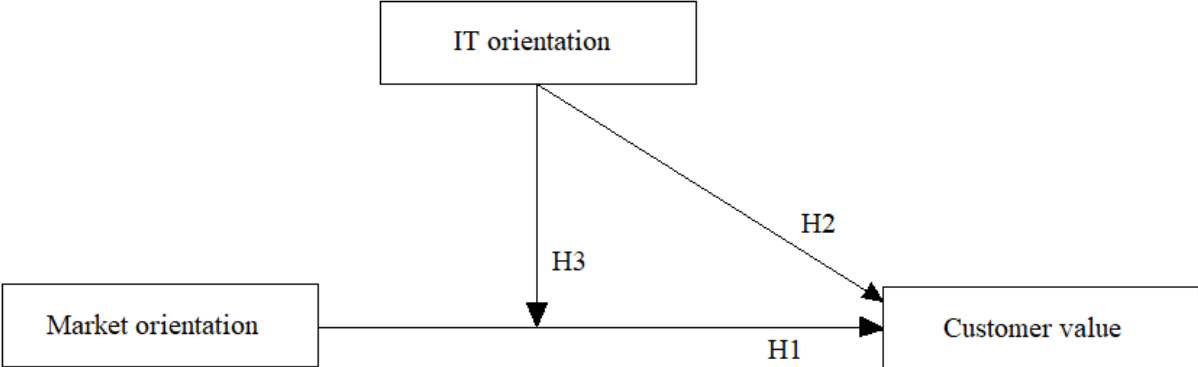
To conclude, firms with a strong market orientation make better use of market information, have knowledge about market trends and can translate value for customers to value for the firm by matching the offerings of the firm to the wants of customers (Borges et al., 2009). This effect of market orientation on customer value is expected to be reinforced by IT orientation, since firms with a stronger IT orientation have more effective and efficient market intelligence generation and dissemination processes. This assures that those firms better know customer needs and can respond to those needs. Both strategic orientations may be complementary strategic assets that help firms in achieving a competitive advantage and superior customer value. The effect of market orientation on customer value is therefore hypothesized to be stronger for firms with a stronger IT orientation, in particular with more focus on IT management and IT system configuration. Hypotheses 3 is suggested.

*Hypothesis 3: The better a firm's IT orientation is in terms of IT system configuration and IT management, the stronger the effect of market orientation on customer value is.*

## **2.6 Conceptual model**

In the previous sections the hypotheses of market orientation and IT orientation on customer value are discussed. In figure 1, the conclusion of the theoretical framework is shown in which the hypotheses are integrated into a conceptual model.

**Figure 1: Conceptual model**



### **3. Methodology**

In this chapter the methodology of the research is described. This includes the research design and method, context and sample, measurement of the central concepts, operationalization and data analysis procedure. Research ethics are addressed at the end of this chapter.

#### **3.1 Research design and method**

This study extends a prior thesis in which the validation of the IT orientation concept is central. In that study, it is defined what IT orientation comprises by conducting a factor analysis. Further, the effects of IT capabilities on firm performance were discussed. This thesis focuses on the role of IT for the market orientation concept by examining the reinforcing effect of IT orientation and market orientation on customer value. In detail, it is researched how the IT capabilities found in the previous research interact with market intelligence generation, market intelligence dissemination, and responsiveness to this market intelligence. The central concepts in this research are: market orientation, IT orientation and customer value. These three concepts, together with the control variables, are operationalized in paragraph 3.5.

Research can be classified as exploratory or conclusive research (Malhotra et al., 2013). In exploratory research the focus is on providing insights about a certain phenomenon, whereas conclusive research is conducted in order to test hypotheses or examine relationships. This thesis therefore should be considered conclusive research, as it aims to examine the relationship between market orientation, IT orientation and customer value. Conclusive research can either have a descriptive research design, or a causal (also called explanatory) research design (Malhotra et al., 2013). Descriptive research aims at describing characteristics of a certain concept or phenomenon, while causal research aims to provide evidence for causal relationships between multiple concepts. Since hypotheses on the relationships between strategic orientations and customer value are examined in this study, it has a causal research design. The hypotheses will be researched by quantitative analyses. A survey was distributed among respondents in which items regarding market orientation, IT orientation, customer value and control variables are asked. The survey responses are input for a factor analysis, in which dimensions/capabilities for both strategic orientations are specified. In this way it can first be seen if and how market orientation and IT orientation overlap and differentiate from each other. Subsequently, the effects of both scales on customer value are examined by a multiple regression analysis. Lastly, and perhaps most interesting in this study, interaction effects of IT capabilities and market orientation capabilities in their influence on customer value are also examined in the regression analysis.

### **3.2 Research population**

This research was conducted in the Netherlands. The objective was to identify the role of strategically using IT within market orientation. This leads to knowledge on the effect of market orientation and IT orientation on customer value in a configurational way by taking into account multiple orientations and capabilities. The study did not focus on a specific industry or company type, since it is expected that both market orientation and IT orientation are essential concepts across a broad spectrum of firms and industries. Respondents differ in job types and position, however all respondents were Dutch professionals with the required knowledge level regarding information provision and market oriented processes within their firms. For instance owners of firms, supervisors and employees from marketing and strategic departments have participated in the study. To assure that the appropriate respondents filled in the survey, in the invitation to participate it is explicitly stated which knowledge is required to be able to participate in the research. To check whether respondents actually have the required knowledge, two questions are incorporated in the survey with regard to the respondent's department and function within their firm. Data collection was limited for the researcher, since there was no access to an already existing dataset. The survey is distributed among a wide array of firms in varying industries. This wide scope made it possible to distribute the survey among a large group of firms and people.

### **3.3 Data collection**

Data was collected through cold acquisition and personal connections. For cold acquisition the Orbis database was mainly used, which is available for students from the Radboud University. The database has filtering options which made it possible to contact the appropriate firms for this study. E-mails were sent to those companies. These e-mails contain a short introduction on the study and the incentive to participate. The incentive holds that respondents that fill in the survey can indicate that they want to receive the results of the research in a management summary. This incentive is expected to increase the willingness to participate.

Regarding personal connections, people are approached that are potential participants with required knowledge themselves or with a connection to a potential participant. These people are also approached with a message with a short introduction to the study and the incentive to participate. E-mail is also used here, but other channels like LinkedIn, Facebook and WhatsApp are also used. The link to the survey is included in both cold acquisition and personal connection messages.

### **3.4 Measurement and common method variance**

As stated before, the data for this study is collected by the use of a survey. This survey consists of items regarding market orientation, IT orientation and customer value. Furthermore, the survey has some generic questions regarding the characteristics of the firms of respondents. These items serve as control variables and are included to control for effects other than the hypothesized ones, for instance differences regarding customer value between product companies and service companies. All items in the survey can be ranked with a Likert-scale with seven choice options. The left end of the scale is specified as strongly disagree / never (1), while the right end of the scale is specified as strongly agree / always (7). There is chosen to give respondents seven choice options since research finds that the accuracy of results from Likert items is significantly lower when the choice options of the scale are above seven or below five (Johns, 2010). This implies that too many or too little options might lead to a distorting image of the actual answers of respondents. No differences in accuracy between a five-point scale and a seven-point scale are found (Johns, 2010). The choice for a seven-point scale is made since it is expected that this provides respondents with the possibility to more adequately indicate the extent to which their firm executes activities regarding market orientation and IT orientation than a five-point scale. The survey can be found in appendix A.

Research can be subject to measurement error. This can be random error or systematic error (Schwab, 1999). Systematic error can have negative consequences for the validity of the research and is caused mainly by the chosen method for measuring the items (Podsakoff et al., 2003; Richardson et al., 2009). Systematic error, better known as common method variance (CMV) or common method bias, needs to be controlled for as much as possible (Sharma et al., 2009). Common method variance can have different causes, like common measurement method, common item context and common rater. Common method biases are more likely to be problematic in studies where data is obtained from one person by the same measurement method and the same item context (Podsakoff et al., 2003). Therefore, this study might have problematic common method variance, since the measurement method for all variables is by the use of a survey and this could lead to systematic error (Richardson, 2009). In order to reduce measurement error as much as possible, respondent anonymity is assured. Besides that, the survey explicitly states that there are no right or wrong answers. This is done to reduce evaluation apprehension, which is expected to lead to less socially desirable and more honest answers. Further, Harman's single factor test is conducted in order to check for common method variance. All items for market orientation and IT orientation are included in a factor analysis and the number of factors is fixed on 1. In the unrotated factor solution can then be checked



whether common method bias may be present. The rule of thumb is that when the single factor, the common latent factor to be more specific, explains over 50% of the variance, common method variance may be present (Eichhorn, 2014). As can be seen in appendix B, the results of Harman’s single factor test show that the single factor explains only 25% of the variance. This gives reason to assume that common method bias is not a problem in this study.

### 3.5 Operationalization

The central concepts of this study are discussed and defined in chapter two, together with the hypotheses. To research the hypotheses, the central concepts should be translated to measurable variables. Therefore, market orientation, IT orientation, customer value and the control variables should be operationalized. The operationalization for the variables is taken from previous research. Both strategic orientations are measured by their underlying capabilities, which in turn are measured by a set of activities. The activities are incorporated as items in the survey. Customer value is the dependent variable and is a single item construct. Furthermore, control variables are added to control for possible variations in customer value that are caused by external factors, instead of differences caused by the degree of market orientation and/or IT orientation. In table 1 the summarized operationalization table is given. Both the independent variables, market orientation and IT orientation, are metric with a ratio scale. The same applies for customer value. In appendix C1 (and appendix C2 for the Dutch version) the comprehensive operationalization of all variables is shown.

**Table 1: Summarized operationalization table**

<b>Variable name</b>	<b>Dimension</b>	<b>Unit</b>	<b>Numeric coding</b>
Market orientation	Market intelligence generation	Metric	Ratio scale
	Market intelligence dissemination	Metric	Ratio scale
	Responsiveness to market intelligence	Metric	Ratio scale
IT orientation	Business intelligence	Metric	Ratio scale
	IT system configuration	Metric	Ratio scale
	IT management	Metric	Ratio scale
	Digital marketing and sales	Metric	Ratio scale
	Social and mobile platform management	Metric	Ratio scale

	Online customer service	Metric	Ratio scale
Firm performance	Customer value	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
Production/services	Production or services	Non-metric	Nominal scale

### 3.5.1 Market orientation

The operationalization of market orientation in this study is based on the MOS (Matsuno et al., 2000). This is an adjusted version of the MARKOR scale by Kohli et al. (1993). The MARKOR scale is a scale to measure market orientation, treating it as a second-order factor with three first-order indicators: market intelligence generation, market intelligence dissemination, and responsiveness on this market intelligence. A meta-analysis of Cano et al. (2004) points out that the measurement instrument for MO of Kohli and Jaworski outperforms others, since it captures more variance in the relationship between market orientation and firm performance. In general, the key features of this MARKOR scale are that market orientation comprises more than customer orientation, distribution of market intelligence through the organization is essential, and activities based on market intelligence are central. The scale allows to assess the degree to which firms are market-oriented. Kohli et al. (1993) generated scale items to measure market orientation and tested these by conducting three pre-tests. Further, the authors used single-informant assessment and multi-informant replication and extension. The results of their study indicate a 20-item scale. This is a 5-point Likert scale, with the ends of the scale specified as strongly disagree (1) and strongly agree (5). The 20 items represent the three dimensions of market orientation: market intelligence generation, market intelligence dissemination, and responsiveness.

The existing MARKOR scale by Kohli et al. (1993) is operationalized within a limited number of stakeholder domains. “It captures mostly customers and competitors as focal domains for understanding the market environment and does not explicitly address how other market factors suggested in the literature (e.g., legal and regulatory environment, macroeconomic environment) may influence competition and customers.” (Matsuno et al.,

2000). This is a problem since this narrow view of market orientation was criticism of Kohli et al. (1993) themselves on the work of Narver and Slater (1990). Kohli et al. (1993) therefore noted that the scale items had to be revised, expanded, and revalidated. Market orientation is not equal to customer orientation, as market orientation refers to a broader set of stakeholders and market factors than only customers (Jaworski & Kohli, 1996). Matsuno et al. (2000) improved the 20-item MARKOR scale by Kohli et al. (1993) by broadening and extending the operationalization of market orientation. They did this to capture a more complete set of factors that market orientation consists of, as explicated by theory (Matsuno et al., 2000). By doing this, the content validity of MOS is greater than that of the MARKOR scale. Matsuno et al. (2000) also argue that the construct validity of MOS is greater than the MARKOR construct validity, since MOS extends the breadth of the construct operationalization and it retains the second-order factorial structure with three dimensions of market orientation (Kohli & Jaworski, 1990; Kohli et al., 1993). The MOS comprises 22 items, eight for market intelligence generation, six for market intelligence dissemination and eight for responsiveness to market intelligence. The items are measured on a seven-point Likert scale. The complete operationalization of market orientation can be found in appendix C1 (and appendix C2 for the Dutch version).

### **3.5.2 IT orientation**

The operationalization of IT orientation is based on the findings by Diesveld (2018). In that study IT orientation is conceptualized by first combining findings from a literature review and expert interviews into a survey. At that stage the concept comprises 25 items and is based on multiple sources. This is followed by quantitative analyses on the data gathered from the survey. Six IT capabilities are found that together represent the concept IT orientation: business intelligence, IT system configuration, IT management, digital marketing and sales, social and mobile platform management and online customer service. These are measured by their underlying activities. After quantitative analyses the list of items is reduced to 15. For business intelligence, the operationalization of its three items is mainly based on work by Davenport et al. (2012), Drnevich and Croson (2013) and also Matsuno et al. (2000). The latter indicates once again that there is overlap between the two strategic orientations. IT system configuration has two indicators, which are based on findings of Galliers and Leidner (2014), Gold-Bernstein and Ruh (2004) and Korfhage (2008). IT management also has two indicators, which were initially based on expert interviews. Research by De Haes and Van Grembergen (2008), Klosterboer (2011) and Wilkin and Chenhall (2010) support the findings of the importance of

IT management in relation to firm performance. The four items of digital marketing and sales are based on work by Castronovo and Huang (2012), Müller et al. (2008), Rangaswamy et al. (2009), Skiera et al. (2010) and Jones et al. (2005). Social and mobile platform management consists of three items. The operationalization of these items is based on studies of Chaffey (2015), Felix et al. (2017), Hudson and Hudson (2013), Shankar et al. (2016) and Ström et al. (2014). Lastly, online customer service is based on work by Chaffey (2015) and Ray et al. (2005). This IT capability only has one item. All items of IT orientation are measured by a seven-point Likert scale. The complete operationalization of IT orientation can be found in appendix C1 (and appendix C2 for the Dutch version).

### **3.5.3 Customer value**

Customer value can be seen as a specific form of firm performance, which in particular is crucial for market oriented firms. These type of firms aim to achieve superior customer value. This determines the strength of a firm's competitive advantage and therefore also of the level of performance (Tournois, 2013). It is the mechanism through which being market oriented is expected to lead to higher financial performance. Customer value is a subjective measure, focused on the relative preference of a certain product or service over another one (Nasution et al., 2011). In this study, firms are asked to assess the delivered customer value of their firm compared to their most important competitors over the past three years. This makes it possible to include firms from multiple industries, since each firm compares their delivered customer value against the delivered customer value of direct competitors. Customer value is the perceived value a customer gives to a certain product or service or firm in a broader sense. It therefore would be most accurate to measure the perceived customer value that customers themselves indicate. However, this is extremely difficult and time-consuming since a large number of firms and a large number of customers of those firms should participate and the survey results of both should then be integrated. Given the focus of this study, researching the reinforcing effects of IT orientation on the link between market orientation and customer value, there is chosen to only distribute the survey among firms instead of customers as well. The participating firms assess the customer value they deliver, instead of the customers themselves. This makes it possible to include a large group of participating firms and examine them.

### **3.5.4 Control variables**

Next to the independent and dependent variables, some control variables are included in the research and survey in order to control for possible alternative variations in customer value. By doing this, the variations in the dependent variables can with more certainty be assigned to the

independent variables (Carlson & Wu, 2012). Three control variables are taken into account in this study: selling products vs. selling services, firm size and firm age. The first one, selling products vs. selling services, is included because the two types of firms in general have different characteristics. The processes of production firms are different compared to those of service firms and it may be possible that the two types of firms differ in customer value. Secondly, firm size is incorporated as differences in firm performance may be explained by advantages of large firms over small firms. These advantages can be network benefits, but also economies of scale and scope (Bhatt & Grover, 2005). Lastly, firm age is included as a control variable. Older firms can be expected to have better firm performance, or customer value, due to learning effects (O'Sullivan & Sheffrin, 2003). In contrast, Loderer and Waelchi (2010) state that older firms tend to have lower firm performance since they experience organizational rigidities. Potential effects of firm age on customer value are therefore controlled for in this study.

### **3.6 Data analysis**

In this study, data collected through a survey is analyzed by conducting several quantitative analyses. The dataset is first subject to a factor analysis in which all items for market orientation and IT orientation are the input. This analysis gives insight in how all items are explained by a smaller set of explanatory constructs, which are referred to as factors (Field, 2013). The results of the factor analysis test the conceptualizations of market orientation and IT orientation. Furthermore, the factor analysis tests to which degree the items represent the capabilities. There are two types of factor analysis: confirmatory factor analysis (CFA) and exploratory factor analysis (EFA). CFA is conducted to validate a factor structure which is based on previous studies, before it is statistically tested. In EFA, the factor structure is statistically derived and all items relate to some degree to all factors in the structure (Hair et al., 2010). Both conceptualizations of market orientation and IT orientation are based on previous research, but there is strong reason to believe that the two concepts overlap each other. EFA in this study is deemed the best option for conducting a factor analysis, since it provides clarity in how all items of market orientation and IT orientation together are represented by a smaller set of capabilities, without holding on to the conceptualizations of both concepts. This gives insight in whether or not market intelligence generation, dissemination and the business intelligence capability are separate capabilities and which items load on those capabilities. The latter differs among the two strategic orientations. Business intelligence in IT orientation for instance contains both intelligence generation and dissemination, whereas these are two separate capabilities in market orientation.

Construct validity of the capabilities is checked during the factor analysis. Construct validity consists of convergent and discriminant validity (Campbell & Fiske, 1959). Convergent validity refers to correlation between variables that load on the same factor and measures whether these variables have a high degree of shared variance. Discriminant validity refers to correlation between different factors. High correlation between variables of a factor means that convergent validity is good, while low correlation between different factors indicates that discriminant validity is good. To assure convergent validity, during the factor analysis procedure items for which the highest factor loading is below .50 are deleted, since these items do not explain the factor sufficiently (Field, 2013). To assure discriminant validity cross-loaders are eliminated, because these items load on multiple factors (Hair et al., 2010).

Next to assuring construct validity, reliability should be checked. The capabilities that are found in the EFA are input for reliability analyses. These analyses test if the internal consistency between items of a factor is sufficient, which implies whether or not scales are reliable (Field, 2013). This is assessed by the Cronbach's Alpha value. Items that do not contribute to the reliability of a scale are deleted.

When the scales are tested on construct validity and reliability, multiple regression analysis is conducted to examine the effects of market orientation and IT orientation on customer value. The effects of market orientation and IT orientation separately are measured, but also the moderation effects of IT orientation capabilities on the link between market orientation and customer value. This analysis indicates whether the capabilities of both orientations significantly predict customer value and how strong these effects are. Multiple regression analysis is used in which all variables are included in the model: control variables, market orientation capabilities, IT orientation capabilities, hypothesized interaction effects and customer value. The model significance reveals, on a high aggregation level, if all independent variables and interaction effects together predict customer value. Going more in-depth, by assessing the regression coefficients, statements on the separate effects can be made and the hypotheses can be validated. Together the quantitative analyses provide insights in the role of IT within the market orientation concept.

### **3.7 Research ethics**

The American Psychological Association states that academic research must meet several research ethics requirements (Diener & Crandall, 1978). These requirements assure that research is conducted according to an ethically desired code of behavior. This is not very strict in terms of rules, but it provides a framework in which research should be conducted. The

guarantee of transparency, anonymity, honesty and discreetness in handling participant relationships and data are the standard (Bersoff, 2003). In this research, all collected data was not shared with other parties and is handled with the highest possible care. Clarity on the topics of the research was provided by giving a short introduction before each question. Also, the duration of the survey was communicated and anonymity was assured and protected. There were no questions regarding personal information in the survey. Further, respondents could indicate that they wanted to receive a management summary with the results of the research. To conclude, this research complies with the research ethics code as transparency, anonymity, honesty and discreetness are guaranteed.

## **4. Results**

In this chapter the results of the data analyses are presented. The first subsection discusses research population characteristics, which provide a good starting point for further quantitative analyses. After that, variables are constructed by conducting a factor analysis in order to find the underlying factors in the dataset. The factor analysis clarifies overlapping and unique dimensions with regard to market orientation and IT orientation. Construct validity will also be discussed in this section. Subsequently, reliability analyses are conducted to check the internal consistency of all scales. A multiple regression analysis thereafter is executed to research the separate and combined effects of market orientation and IT orientation on customer value.

### **4.1 Research population**

A total of 114 responses has been gathered. No responses had to be deleted because there were no missing values and no remarkable data was found. This research population of 114 responses is the basis for further analyses. In table 2 an overview is given in which the characteristics of the population are shown. Product firms and service firms are proportionally divided among the research population with 59 firms selling (tangible) products and 55 firms selling (intangible) services. The second control variable, firm size, is measured by the number of employees. For interpretation of the results, the researcher has chosen to create three groups regarding firm size: small firms (1 to 50 employees), medium-sized firms (51 to 250 employees) and large firms (251 and more employees). This categorization is made to distinguish between small, medium and large firms. This approach for taking into account firm size is often used in previous research (e.g. Roza et al., 2011). The rationale here is that creating three groups gives better insight than using the number of employees as a continuous variable, since the latter implies that an increase in employees always should be interpreted the same. In other words, using number of employees as a continuous variable implies that an increase from 30 to 50 employees should be interpreted the same as an increase from 1480 to 1500. To overcome this, three groups have been made, which all have a sufficient sample size. Regarding firm age, respondents are asked to indicate the founding year of their firm. By taking the year 2019 and subtracting this with the foundation year of a firm, the variable firm age is computed. No values of 0 are found, indicating that this method for calculating firm age can be used. In the table can be seen that the sample contains firms varying from 3 years old to 202 years old. The standard deviation of 46.09 indicates that there is a big dispersion in firm age across the participants. Lastly, the table shows in which departments the participants are working. It can be noticed that participants work in varying departments, in total 10 to 12 different departments can be



distinguished. Next to the eight option categories, some participants work in other departments. These respondents are working in logistics, consultancy or customer operations within their firm.

**Table 2: Research population characteristics (n=114)**

<b>Products vs. services</b>	<b>N</b>	<b>% of total</b>		
Products	59	51.8		
Services	55	48.2		
<b>Number of employees</b>	<b>N</b>	<b>% of total</b>		
1-50	32	28.1		
51-250	39	34.2		
251+	43	37.7		
<b>Firm age</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
Firm age	60.15	46.09	3	202
<b>Respondent working in department</b>	<b>N</b>	<b>% of total</b>		
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		

#### **4.2 Factor analysis**

An exploratory factor analysis is conducted to find a structure in the variables. This is essential since both strategic orientations show overlap in their conceptualizations. By conducting a factor analysis, it becomes clear how the initial conceptualizations of both concepts taken from Matsuno et al. (2000) and Diesveld (2018) show overlap and how they differ from each other. Guidelines by Field (2013) are used in executing the analysis. By conducting the factor analysis, an underlying structure will be found. The set of activities regarding market orientation and IT orientation is included in the analysis. This means that a total of 45 items is included, all metric.

Common factor analysis is preferred over component analysis, since the main objective is to identify the underlying factor structure. Principal axis factoring (PAF) should then be used as the extraction method, since it is an adequate technique for identifying latent constructs in a set of data (Hair et al., 2010).

#### **4.2.1 Assumptions**

Before a factor analysis can be executed, statistical assumptions should be checked. These assumptions determine whether or not factor analysis is an appropriate technique for the dataset (Field, 2013). To start, the dataset should not contain any outliers and data should at least be interval level in order to be useful in a factor analysis. These two assumptions are met. Next, there should be collinearity to some degree among variables within the dataset. Since factor analysis is an interdependency technique, there should be no perfect multicollinearity. This assumption can be tested for by checking the pattern of relations of variables in the correlation matrix. Variables should correlate 'enough' with others. Therefore, the matrix should first be examined on correlations greater than .3. Problematic multicollinearity can occur when variables only have a few correlations greater than the .3 threshold (Field, 2013). On the other end, correlations of .9 or higher could indicate problematic multicollinearity. For this study no problematic multicollinearity is expected, because no variables have correlation coefficients greater than .9 and there are no variables that do not correlate enough with others. Lastly, the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity should be checked before conducting the factor analysis. The first one should be conducted to test whether the data is suited for factor analysis. The sampling adequacy for the separate variables and the complete model are measured (Cerny & Kaiser, 1977). The KMO value should be at least .50 in order for factor analysis to be considered as an adequate technique. Bartlett's test of sphericity measures the correlation between items in the data. Enough correlation between items should be found, otherwise no factors can be extracted. When Bartlett's test is significant at the level of  $< .05$ , enough correlation between items is present. For this study, the KMO value is .783, which implies that it is far above the .50 threshold. According to guidelines described by Hutcheson and Sofroniou (1999), .783 indicates middling sampling adequacy. Additionally, Bartlett's test of sphericity  $\chi^2 (990) = 2791.99$ ,  $p < .001$ , which implies that there is sufficient correlation between items in the data. All assumptions are met, indicating that factor analysis can be considered an adequate technique (Field, 2013). Table 3 shows the KMO measure and Bartlett's test of sphericity.

**Table 3: KMO measure and Bartlett's test of sphericity**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.783
Bartlett's Test of Sphericity	Approx. Chi-Square	2791.99
	df	990
	Sig.	.000

#### **4.2.2 Factor extraction and rotation, elimination of items and construct validity**

The first step in conducting a factor analysis is the extraction of factors. This is based on the obtained eigenvalues in the data. Factors with an eigenvalue greater than one should be extracted, according to Kaiser's criterion (Field, 2013). The initial factor analysis shows that 12 factors should be extracted. They together explain 69.86% of the variance. These 12 factors are taken into account in further analysis. This can be seen in appendix D.

The analysis is run again with the number of factors fixed on 12. Factor rotation is also applied to simplify the structure and to be able to interpret the results better. There should be chosen between orthogonal rotation or oblique rotation. In orthogonal rotation, the factors remain uncorrelated after they have been rotated. In contrast, oblique rotation allows factors to be correlated (Field, 2013). Scholars are divided in their opinion on which rotation method is best (Costello & Osborne, 2005). Some state that oblique rotation renders a more precise solution, while others suggest that orthogonal rotation should be used because of its straightforwardness and highly interpretable results. A rule of thumb for choosing between both methods is discussed by Tabachnick & Fidell (2007). They state that to choose between the two rotation methods, first oblique rotation should be used with the fixed number of factors. The factor correlation matrix that results should be checked on correlations higher than .32. When correlations between factors exceed this threshold, oblique rotation may be most appropriate because then there is at least 10% overlap in variance among the factors (Tabachnick & Fidell, 2007). In this study, the factor correlations are lower than .32, implying that orthogonal rotation is most appropriate.

The next step after factor extraction and orthogonal rotation is looking at the loading matrix, which is called the rotated factor matrix in SPSS. Values in the rotated factor matrix are bivariate correlations between variables and factors. All items have a certain loading on all 12 factors. Based on the matrix some items should be eliminated. The items that must be eliminated are cross-loaders and items for which the highest factor loading is below .50. Cross-loaders refer to the items that load on more than one factor with a loading difference smaller than  $|\cdot 20|$ .

In other words, the absolute difference in two factor loadings of a cross-loader is smaller than .20. Cross-loaders indicate a discriminant validity problem and should therefore be eliminated (Hair et al., 2010). Furthermore, to enhance convergent validity, items for which the highest factor loading is below .50 should be excluded from further analysis (Field, 2013). Convergent validity measures whether the items that load on the same factor have a high degree of shared variance. In appendix D the initial rotated factor matrix is shown. This matrix is the starting point for the elimination process of items. Firstly the item is deleted for which the highest factor loading is the lowest (and below .50), then the second item is deleted and so on. Furthermore cross-loaders were deleted. After the item elimination process there were 23 remaining items. The chronological order in which items were deleted and based on which value(s) is given in appendix D. The final rotated factor matrix is shown in table 4. All remaining items load on one factor with a factor loading of .50 or above. Also, the communalities after extraction for all items are above the threshold of .20 (Field, 2013). The factor solution therefore meets construct requirements, consisting of convergent and discriminant validity.

**Table 4: Rotated factor matrix after item elimination**

	Factor											
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Collect and evaluate information regarding customers					.79							
Collect and evaluate information regarding competitors					.65							
Data analysis					.56							
Collect and evaluate information regarding regulating bodies									.79			
Collect and evaluate information regarding societal trends									.80			
Meetings to discuss market developments and trends			.82									
Meetings to update knowledge of laws and regulations			.72									
Inter-functional info sharing about technological developments for product development			.75									
Adjusting to changing product or service needs of customers								.66				
Basing product lines on market needs instead of own business policy								.71				

Taking action when a competitor launches a campaign aimed at our customers		.67
Storing information		.62
Integrating information systems		.76
Managing IT alignment	.87	
Managing IT capacity	.86	
Identification of IT resources value and threats	.68	
Social media marketing	.73	
Mobile marketing	.82	
Interaction with online community	.69	
Email marketing		.58
Search engine optimization		.86
Search engine advertising		.64
Direct customer service		.75

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 14 iterations.

#### 4.2.3 Factor interpretation

Instead of 12 factors, 11 factors have been identified because no items loaded on the last factor. The 11 factors that are found will now be interpreted based on the items that load on those factors. Table 5 shows the labels for all factors and their corresponding sets of items.

**Table 5: Factor labels and corresponding items**

Factor		Items	
1	Social and mobile platform management	1	Social media marketing
		2	Mobile marketing
		3	Interaction with online community
2	IT management	1	Managing IT alignment
		2	Managing IT capacity
		3	Identification of IT resources value and threats
3	Market intelligence dissemination	1	Meetings to discuss market developments and trends
		2	Meetings to update knowledge of laws and regulations
		3	Inter-functional info sharing about technological developments for product development
4	Digital marketing	1	Email marketing

		2	Search engine optimization
		3	Search engine advertising
5	Market intelligence generation	1	Collect and evaluate information regarding customers
		2	Collect and evaluate information regarding competitors
		3	Data analysis
6	IT system configuration	1	Storing information
		2	Integrating information systems
7	Matching product/service lines with market needs	1	Adjusting to changing product or service needs of customers
		2	Basing product lines on market needs instead of own business policy
8	Monitoring societal trends	1	Collect and evaluate information regarding societal trends
9	Monitoring regulations	1	Collect and evaluate information regarding regulating bodies
10	Online customer service	1	Direct customer service
11	Competitive counter reaction	1	Taking action when a competitor launches a campaign aimed at our customers

As already discussed in paragraph 2.5.3, the concepts market orientation and IT orientation are expected to be complementary assets and both concepts share underlying ideas and capabilities. This implies that IT orientation and market orientation share a common piece of variance. Furthermore, it is hypothesized that IT orientation reinforces market orientation. The 11 factors that are found in this analysis reveal the overlapping and unique dimensions of both concepts. A first important aspect to discuss is the difference in the conceptualization of business intelligence in IT orientation and market intelligence in market orientation, since both strategic orientations focus on creating intelligence from various data sources. The intelligence generation and dissemination capabilities therefore are fundamental in both strategic orientations. In IT orientation, the capability business intelligence contains data collection (from various sources), data analysis and information distribution. In market orientation, however, market intelligence generation and market intelligence dissemination are separate capabilities. Thus, whereas in IT orientation collection and dissemination are part of the same

capability, in MO they are separate capabilities. The results of the factor analysis give evidence for the latter. Thus, market intelligence generation, consisting of data collection (from various sources) and data analysis, and market intelligence dissemination are separate factors.

When going in-depth into the items that make up the factor market intelligence generation, the results show that data collection from customers and competitors correlated together with data analytics. Additionally, the results show that data collection concerning macro-economics, suppliers and end-users did not correlate enough and had to be deleted. Collecting and evaluating data about societal trends and regulations showed high factor loadings, but are two separate factors since they do not correlate with other items. The dimension market intelligence dissemination consists of three items. These three items represent activities regarding sharing information about market development and trends, knowledge of regulation and about technological developments for product development. All three items have high factor loadings, respectively .82, .72 and .75. Next to market intelligence generation and dissemination, market orientation comprises responsiveness based on the generated market intelligence (Kohli et al., 1993; Matsuno et al., 2000). Originally, following the study by Matsuno et al. (2000), this dimension consists of eight activities regarding responsiveness in the field of service needs, product lines, suppliers, competitors, department coordination, marketing, interest groups and regulations. The results of the factor analysis show two separate factors, made up of portions of these eight items. One factor is found on which the items *adjusting to changing product or service needs of customers* and *basing product lines on market needs instead of own business policy* load respectively .66 and .71. Furthermore, *taking action when a competitor launches a campaign aimed at our customers* is a standalone factor with a factor loading of .67. The other five of the original eight items regarding responsiveness on market intelligence had to be deleted due to too small factor loadings.

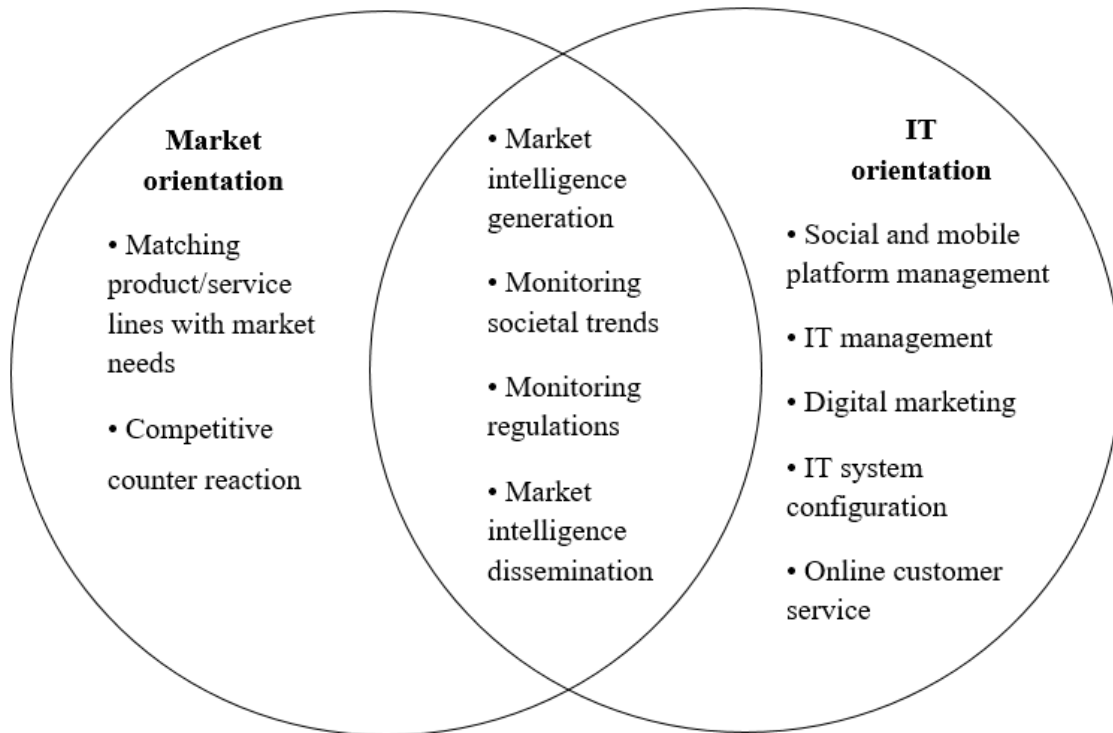
Next to the items of the MOS by Matsuno et al. (2000), the items of the IT orientation conceptualization by Diesveld (2018) were included in the factor analysis. As is previously stated, both market orientation and IT orientation comprise activities regarding data collection (from various sources), data analysis and data dissemination. However, contrary to the conceptualization of the capability business intelligence, in which data collection and dissemination were both included, the results show that data collection and data dissemination are two separate capabilities. The capability IT system configuration with activities *storing information* and *information system integration* is found in the factor analysis. Also, the capability IT management is found. However, instead of the two items *managing IT alignment* and *managing IT capacity* found by Diesveld (2018), a third item is added to the capability.

This item is the *identification of IT resources value and threats* and has a factor loading of .68. Another capability is found, digital marketing, which is made up of the items *email marketing*, *search engine optimization* and *search engine advertising*. These items have factor loadings of respectively .58, .86 and .64. Furthermore, the capability social and mobile platform management is found. This capability comprises three items: *social media marketing* (.73), *mobile marketing* (.82) and *interaction with online community* (.69). Lastly, the capability online customer service is identified, consisting of only one item with a factor loading of .75. All factor loadings of the items can be found in table 4.

Summarizing, the results of the factor analysis indicate that the factors that have been identified differ to some degree from the original operationalizations by Matsuno et al. (2000) and Diesveld (2018). Comparing with these operationalizations, broadly the same clusters of items have been found, but there are some differences in the outcomes of the factor analysis and the way market orientation and IT orientation have been operationalized before. Regarding market orientation, the market intelligence dissemination factor has been found. The market intelligence generation factor has also been found, but has been split up into several specific factors. The same applies to responsiveness based on market intelligence. Whereas the scale by Matsuno et al. (2000) argues that it should be seen as a single factor, the factor analysis in this study finds two separate factors regarding responsiveness to market intelligence: matching products and/or services with market needs and competitive counter reaction. Furthermore, several items had to be deleted due to low factor loadings. Regarding IT orientation, the six factors as operationalized by Diesveld (2018) have not identically been identified by the factor analysis in this study. The factor business intelligence is not found as a factor on itself, moreover the aspects of the capability are split into intelligence generation and dissemination capabilities. The other capabilities are found, but some slightly differ by having an extra item or one less item than previously conceptualized. In figure 2 a visual representation of the overlap between both concepts is shown. Both strategic orientations put emphasis on intelligence generation and dissemination activities, implying that the two concepts have a shared portion of variance. After interpretation of the 11 factors that are found, scales are made by summing and averaging the items of the factors. These summated scales allow for multiple aspects of a factor to be represented.



**Figure 2: Overlapping concepts market orientation and IT orientation**



### 4.3 Reliability analysis

In order to assess the internal consistency of all 11 scales, reliability analyses should be conducted. Internal consistency should be tested for all scales to make sure that the items of a scale together represent the construct they measure (Field, 2013). By looking at the reliability coefficient Cronbach's Alpha, internal consistency can be measured. The higher the alpha the better the internal consistency. The interpretation in terms of the minimum accepted threshold differs among scholars. Most scholars advocate for a minimum alpha of .60 to be the generally accepted lower limit to consider a scale reliable (Hair et al., 2010). However, some argue that .70 or even .80 should be considered the norm (e.g. Kline, 2013). Field (2013) states that a scale with a Cronbach's Alpha of .60 should be considered reliable and a scale with an alpha of .80 should be considered very reliable.

Seven of the 11 factors of market orientation and IT orientation can be tested on internal consistency. The other four factors comprise only one item, testing them on internal consistency would not make sense. Table 6 shows the Cronbach's Alpha values for the scales of market orientation, IT orientation and customer value. All scales have alpha values of .60 and greater, indicating that they can be considered reliable. Matching product/service lines with market needs has the lowest internal consistency with an alpha value of .63. Market intelligence generation and IT system configuration have good reliability, indicated by a Cronbach's Alpha

above .70. Furthermore, the remaining four scales have a very reliable scale with Cronbach's Alpha values over .80 (Field, 2013). The scale for digital marketing has a Cronbach's Alpha of .80 with the three items *email marketing*, *search engine optimization* and *search engine advertising*. However, the alpha value increases to .86 when deleting *email marketing*. Next to the fact that this is a significant increase in reliability, deleting the item also makes it easier to interpret the factor since the two remaining items are both types of search engine marketing. The researcher therefore has chosen to continue with the two items *search engine optimization* and *search engine advertising* and rename the factor digital marketing into search engine marketing. Customer value is a single item factor, a reliability analysis should therefore not be applied. In appendix E the complete output of the reliability analysis can be found.

**Table 6: Cronbach's Alpha for all scales**

Scale	Number of items	Cronbach's Alpha
Market intelligence generation	3	.76
Monitoring societal trends	1	Does not apply
Monitoring regulations	1	Does not apply
Market intelligence dissemination	3	.84
Matching product/service lines with market needs	2	.63
Competitive counter reaction	1	Does not apply
Social and mobile platform management	3	.87
IT management	3	.88
Search engine marketing (digital marketing)	2 (3)	.86 (.80)
IT system configuration	2	.73
Online customer service	1	Does not apply
Customer value	1	Does not apply

#### 4.4 Multiple regression analysis

In order to examine the hypotheses, a multiple regression analysis will be conducted. This type of analysis allows to measure and analyze the relations between multiple independent variables and a single dependent variable (Hair et al., 2010). Values in the dependent variable are predicted by values in the independent variables, also called predictor variables. The effect of market orientation and IT orientation on customer value will be examined. Instead of creating scales for market orientation and IT orientation, the different capabilities of the orientations are the independent variables in the regression analysis. This way, it can be examined how both

orientations uniquely influence customer value and how the overlapping dimensions affect customer value. The capabilities are all metric variables and their score is computed by taking the average score of the corresponding activities of that capability. Ideally, differences in customer value are explained by the independent variables. However, it may also be possible that other variables, other than the strategic orientations, may cause different customer value outcomes. To check this, control variables regarding firm size, firm age and selling either products or services are included in the analysis.

#### **4.4.1 Assumptions**

Before making statements about the results of the analysis, several assumptions should be checked. These assumptions test whether errors in the prediction are caused by absence of relations between certain variables, or if these errors are the result of characteristics of data which is not accommodated by the analysis. This presumes that the sample of the research is as close as possible to the actual situation and has the lowest possible standard error (Field, 2013). When the assumptions for regression analysis are met, statements about the results can be made with greater confidence.

First of all, since regression analysis simply fits a linear model to data, the assumption of linearity should be checked. This refers to the degree to which changes in the dependent variable relate to the independent variable (Field, 2013). By looking at the P-P plot or regression standardized residuals, this assumption can be checked for each independent variable. For the relationships between the independent variables and customer value, standardized residuals are plotted close to the linear line, indicating that the assumption of linearity is met.

Secondly, the data should be tested on homoscedasticity. This phenomenon refers to the situation in which residual terms are consistent across all levels of the independent variable. This assumption is violated when there is heteroscedasticity in the data (Field, 2013). By looking at the scatterplots or the standardized residuals, this assumption can be checked for all independent variables in their relation with customer value. The output in SPSS shows that for all independent variables the dots are scattered randomly over the plots, which gives reason to assume that homoscedasticity is met for all independent variables.

Thirdly, the normality of errors should be checked. The regression standardized residuals should be normally distributed with a mean of 0. This can be checked by requesting the histograms of the regression standardized residuals for all independent variables. When the histograms somehow show the traditional bell shaped distribution of residuals, the data is assumed to have normality of errors (Field, 2013). The results show that the data fits the bell

shape line, indicating that the assumption is met.

The fourth assumption that should be met is having independent errors. Residual terms between two observations should not be correlated. In other words, there should be no autocorrelation. In SPSS, the Durbin-Watson test can be conducted which tests whether residual terms are correlated. Field (2013) states that values smaller than 1 or greater than 3 are a cause for concern. The output shows that for all independent variables, the Durbin-Watson score lays in the range of 1.7 and 2.0. This indicates that the assumption is met and the data has independent errors.

The last assumption that should be checked is multicollinearity. This refers to the degree of correlations between independent variables in the regression model. Too much correlation between independent variables is problematic, since the unique contribution of the variables in that case cannot be attributed to the different variables. Since the independent variables in this study are either dimensions of market orientation or dimensions of IT orientation, it might be expected that several independent variables show high correlations. To test whether problematic multicollinearity is present in the data, two approaches can be used. The correlation matrix of independent variables should be scanned on scores above .70, because these scores show problematic correlations between independent variables (Field, 2013). Also, the tolerance values can be assessed. When these values are lower than .10, there is problematic multicollinearity. Tolerance values below .25 indicate a potential problem in the data, which requires alertness in making statements about the data. By looking at the correlations between the variables one up to and concluding 11 in the Pearson correlation matrix shown in table 7, it can be seen that no correlations between any two independent variables is greater than .70. Furthermore, by running a regression analysis, the results show that the lowest tolerance value for any independent variable is .43, indicating that it can be assumed that multicollinearity is not problematic in this study (Menard, 2002).

#### **4.4.2 Univariate and bivariate statistics**

In order to get a first impression of the data, the univariate and bivariate statistics are shown in table 7. The Pearson correlation matrix represents the bivariate statistics. Additionally, the mean, standard deviation, range, minimum and maximum are given. The first 11 variables are the independent variables of the study, which are either dimensions of market orientation or dimensions of IT orientation. These are market intelligence generation (MIG), monitoring social trends (MST), monitoring regulations (MR), market intelligence dissemination (MID), matching products/services with market needs (MPS), competitive counter reaction (CCR),

social and mobile platform management (SMPM), IT management (ITM), search engine marketing (SEM), IT system configuration (ITSC) and online customer service (OCS). Variable 12 in table 7 is the dependent variable customer value (CV).

**Table 7: Pearson correlation matrix and descriptive statistics of variables (n=114)**

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
<b>1. MIG</b>	1											
<b>2. MST</b>	.31**	1										
<b>3. MR</b>	.36**	.51**	1									
<b>4. MID</b>	.32**	.20*	.40**	1								
<b>5. MPS</b>	.26**	.12	.04	.22*	1							
<b>6. CCR</b>	.44**	.00	.22*	.34**	.30**	1						
<b>7. SMPM</b>	.41**	.25**	.13	.26**	.24*	.25**	1					
<b>8. ITM</b>	.22*	.17	.18	.40**	.25**	.20*	.11	1				
<b>9. SEM</b>	.14	.10	-.02	.20*	.15	.21*	.62**	.23*	1			
<b>10. ITSC</b>	.27**	.18	.20*	.28**	.19*	.19*	.33**	.51**	.39**	1		
<b>11. OCS</b>	.31**	.29**	.13	.24*	.26**	.16	.53**	.25**	.39**	.31**	1	
<b>12. CV</b>	.29**	.20*	.19*	.32**	.37**	.21*	.12	.53**	.10	.31**	.14	1
<b>MEAN</b>	4.88	4.83	4.70	4.54	5.30	4.28	4.65	5.25	3.93	4.75	3.78	5.03
<b>SD</b>	1.29	1.56	1.61	1.44	1.25	1.74	1.72	1.17	1.95	1.33	2.29	1.22
<b>RANGE</b>	6.00	6.00	6.00	6.00	5.00	6.00	6.00	5.33	6.00	5.50	6.00	6.00
<b>MIN</b>	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.67	1.00	1.50	1.00	1.00
<b>MAX</b>	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

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

#### 4.4.3 Multivariate analysis

In this study, a multiple regression analysis is used to test the hypotheses. This type of analysis is used to fit a linear model to the data and predict values in customer value from the independent variables. A model is run in which the hypothesized direct effects of market orientation and IT orientation and the hypothesized interaction effects on customer value can be measured. Next to the independent and dependent variables, three control variables are included in the regression analysis to control for variances in customer value caused by other factors than market orientation and IT orientation: firm size, firm age and products vs. services. Firm size is measured by the number of employees and has three groups: small firms (1 – 50

employees), medium-sized firms (51 – 250 employees) and large firms (251+ firms). In a regression analysis, non-metric variables with more than two categories cannot be used, unless dummy variables are created (Field, 2013). Dummies for firm size therefore have been made. Small firms are the reference category, while the dummies for medium-sized firms and large firms are incorporated in the analysis. This way, medium-sized firms and large firms are compared to small firms in the effect on firm performance. Also, a separate regression analysis is done to check whether there are customer value differences between medium-sized firms and large firms, but no significant differences are found. Furthermore, firm age is metric and products vs. services is non-metric with two categories. Those variables can be used in regression analysis without transforming them.

The six capabilities that together make up market orientation and the five IT orientation capabilities are included in the regression analysis. The market orientation capabilities are market intelligence generation (MIG), monitoring social trends (MST), monitoring regulations (MR), market intelligence dissemination (MID), matching products/services with market needs (MPS) and competitive counter reaction (CCR). The five IT orientation capabilities are social and mobile platform management (SMPM), IT management (ITM), search engine marketing (SEM), IT system configuration (ITSC) and online customer service (OCS). Furthermore, the interaction effects between IT system configuration and the market orientation capabilities as well as the interaction effects between IT management and the market orientation capabilities are included in the model. In order to measure the hypothesized reinforcing effects, moderation terms should be included in the model of the regression analysis. IT management and IT system configuration are the moderator variables. Since market orientation consists of six capabilities and two moderators are taken into account in the effects on customer value, there are 12 interaction effects that are included. Important in examining moderation effects is centering the variables to eliminate problematic collinearity and making effects interpretable. Furthermore, the interaction term of the moderation effect should be created. After these two steps have been executed in SPSS, the 12 interaction effects are included in the model.

Model 1 is significant and explains 40% of variance in customer value ( $R^2 = .40$ ,  $F(27, 86) = 3.75$ ,  $p < .01$ ). In table 8, the model summary for the regression analysis is given.

**Table 8: Market orientation, IT orientation, interaction effects, control variables and customer value**

Model	$R^2$	Adjusted $R^2$	F-score	df1	df2	Significance
1	.54	.40	3.75	27	86	.00

The significance of the model implies that the total model including all independent variables, control variables and interaction terms, significantly explains 40% of customer value. In order to make statements about the hypotheses of this study, the contribution of the separate capabilities and interaction terms in predicting customer value should be assessed by looking at the beta's. These are the standardized coefficients and show the strength of the effects of independent variables on customer value. Standardized coefficients make it possible to compare between effects, since the power is standardized. The regression coefficients can be found in table 9.

**Table 9: Regression coefficients and significance values**

Model	Variable	B	Beta ( $\beta$ )	Sig.
1	Products vs. services	.21	.09	.34
	Medium-sized firms	-.18	-.07	.52
	Large firms	-.12	-.05	.71
	Firm age	.00	.08	.40
	MI generation (MIG)	.13	.14	.19
	Monitoring societal trends (MST)	.02	.02	.83
	Monitoring regulations (MR)	.01	.01	.91
	MI dissemination (MID)	.06	.07	.44
	Matching products/services with market needs (MPS)	.20	.20	.03
	Competitive counter reaction (CCR)	.03	.05	.60
	Social and mobile platform management (SMPM)	.05	.07	.59
	IT management (ITM)	.41	.40	.00
	Search engine marketing (SEM)	-.09	-.15	.19
	IT system configuration (ITSC)	-.02	-.03	.82
	Online customer service (OCS)	-.03	-.06	.52
	ITM * MIG	.08	.10	.46
	ITM * MST	-.17	-.28	.05
	ITM * MR	.05	.08	.55
	ITM * MID	.10	.12	.29
	ITM * MPS	.30	.33	.00
ITM * CCR	-.07	-.11	.33	
ITSC * MIG	-.22	-.34	.01	
ITSC * MST	.09	.14	.26	

ITSC * MR	-0.00	-.01	.97
ITSC * MID	-.07	-.11	.33
ITSC * MPS	-.01	-.02	.88
ITSC * CCR	.14	.27	.02

a. Dependent Variable: Customer value

As can be seen in table 9, none of the three control variables has a significant effect on customer value. Furthermore, the first important finding in making statements about the hypotheses is the significant effect of one market orientation capability on customer value: matching products/services with market needs ( $\beta = .20$ ,  $p < .01$ ). The other market orientation capabilities have significance values greater than .05, which implies that they have no significant effect on customer value. By further looking at the unstandardized regression coefficient B, the results indicate that an increase of 1 unit in matching products/services with market needs leads to an increase in customer value of .20. Since only one market orientation capability has a significant effect on customer value, *hypothesis 1 is partially accepted*.

In order to validate hypothesis 2, the effects of the IT orientation capabilities should be assessed. One IT orientation capability significantly predicts customer value: IT management ( $\beta = .40$ ,  $p < .01$ ). All other capabilities have significance values greater than .05, indicating that they do not significantly predict customer value. By examining the unstandardized coefficient B, the results show that increasing IT management with 1 unit leads to an increase of .41 in customer value. Based on this significant effect, it can be stated that IT orientation has a positive significant effect on customer value only through IT management. Therefore, *hypothesis 2 is partially accepted*.

Next to the direct effects of both strategic orientations on customer value, multiple interaction effects are included in the regression analysis. The results indicate that four moderation effects are significant: (1) IT management \* monitoring societal trends; (2) IT management \* matching products and services with market needs; (3) IT system configuration \* market intelligence generation; and (4) IT system configuration \* competitive counter reaction. Unlike the effect of an independent variable on a dependent variable, moderation effects cannot be interpreted by only looking at the significance value and regression coefficients (Field, 2013). A significant moderation effect can have various explanations and the nature of the effect should be assessed by doing simple slopes analysis or using the Johnson-Neyman procedure (Aiken & West, 1991). Simple slopes analysis is fairly straightforward and compares the relation between the independent variable and dependent variable for low, mean



and high values of the moderator variable (Field, 2013; Hayes, 2012). The Johnson-Neyman technique does the same but for a wider range of values in the moderator value (Field, 2013). Looking at table 9, the effect of monitoring societal trends on customer value is significantly moderated by IT management ( $\beta = -.28, p < .05$ ). Simple slopes analysis results show three different regressions: when IT management is low (one standard deviation below the mean value), at the mean value of IT management (which is zero because the variable is centred), and when IT management is high (one standard deviation above the mean value). The results give no insights regarding the nature of the effect, since no significant values for the three regressions are found. Moreover, the Johnson-Neyman procedure can be used. This procedure indicates that monitoring societal trends significantly positively affects customer value when IT management is -2.59 or lower. This can be seen in table 10, where the confidence intervals indicate that for values in IT management of -2.59 or lower, there is a significant positive effect of monitoring societal trends on customer value.

**Table 10: Conditional effects of monitoring societal trends on customer value**

IT management	<i>b</i>	Sig.	LLCI	ULCI
-3.59	.63	.05	.0103	1.2564
-3.32	.59	.05	.0079	1.1670
-3.05	.54	.05	.0053	1.0780
-2.79	.50	.05	.0024	.9892
-2.59	.46	.05	.0000	.9244
-2.52	.45	.05	-.0009	.9008

Another significant interaction effect was found between IT management and matching products and services with market needs on customer value ( $\beta = .33, p < .01$ ). Simple slopes analysis is used to determine the nature of this effect. The results of this analysis are summarized in table 11 and indicate the following:

1. When IT management is low, there is a non-significant negative relation between matching products and services with market needs and customer value,  $b = -.15$ , 95% CI [-.4487, .1438],  $p = .31$ .
2. At the mean value of IT management, there is a significant positive relationship between matching products and services with market needs and customer value,  $b = .20$ , 95% CI [.0231, .3694],  $p < .05$ .

- When IT management is high, there is a significant positive relation between matching products and services with market needs and customer value,  $b = .55$ , 95% CI [.2956, .7943],  $p < .01$ .

**Table 11: Conditional effects of matching products and services with market needs on customer value**

IT management	<i>b</i>	Sig.	LLCI	ULCI
-1.17	-.15	.31	-.4487	.1438
.00	.20	.03	.0231	.3694
1.17	.55	.00	.2956	.7943

In table 9, a third significant moderation effect value can be noticed between IT system configuration and market intelligence generation on customer value ( $\beta = -.34$ ,  $p < .05$ ). Again, simple slopes analysis is used to determine the nature of this interaction effect. The results of this analysis are summarized in table 12. They indicate the following for low, mean and high values of IT system configuration:

- When IT system configuration is low, there is a significant positive relation between market intelligence generation and customer value,  $b = .41$ , 95% CI [.1257, .7027],  $p < .01$ .
- At the mean value of IT system configuration, there is a non-significant relationship between market intelligence generation and customer value,  $b = .13$ , 95% CI [-.0655, .3242],  $p = .19$ .
- When IT system configuration is high, there is a non-significant relation between market intelligence generation and customer value,  $b = -.16$ , 95% CI [-.4640, .1530],  $p = .32$ .

**Table 12: Conditional effects of market intelligence generation on customer value**

IT system configuration	<i>b</i>	Sig.	LLCI	ULCI
-1.33	.41	.01	.1257	.7027
.00	.13	.19	-.0655	.3242
1.33	-.16	.32	-.4640	.1530

A fourth significant moderation effect is found between IT system configuration and competitive counter reaction on customer value ( $\beta = .27$ ,  $p < .05$ ). Simple slopes analysis is

used to determine the nature of this effect and the results of this analysis are summarized in table 13. These results indicate the following for low, mean and high levels of IT system configuration:

1. When IT system configuration is low, there is a non-significant negative relation between competitive counter reaction and customer value,  $b = -.16$ , 95% CI [-.3663, .0533],  $p = .14$ .
2. At the mean value of IT system configuration, there is a non-significant relationship between competitive counter reaction and customer value,  $b = .03$ , 95% CI [-.0972, .1660],  $p = .60$ .
3. When IT system configuration is high, there is a significant positive relation between competitive counter reaction and customer value,  $b = .23$ , 95% CI [.0145, .4361],  $p < .05$ .

**Table 13: Conditional effects of competitive counter reaction on customer value**

IT system configuration	$b$	Sig.	LLCI	ULCI
-1.33	-.16	.14	-.3663	.0533
.00	.03	.60	-.0972	.1660
1.33	.23	.04	.0145	.4361

Based on the significance of four interaction effects between market orientation capabilities and IT system configuration and IT management, it can be stated that IT orientation significantly moderates the effect of market orientation on customer value in some areas. However, not all hypothesized effects are significant. Therefore, *hypothesis 3 is partially accepted*.

## **5. Conclusion and discussion**

In this chapter the aim is to provide a conclusion based on the results of the analyses. The research question and hypotheses are addressed, followed by the discussion in which the results of the study are interpreted. Furthermore, the results are given a place within the existing literature. Complementary, practical implications are addressed. To finalize, a critical reflection on the limitations of the study is given together with possible directions for future research.

### **5.1 Conclusion**

This research had the objective to identify the role of IT within the market orientation concept in its effect on customer value. The corresponding research question was: *What is the role of information technology in the effect of market orientation on customer value?* The effect of market orientation and IT orientation on customer value is researched in a configurational way by taking into account multiple orientations and capabilities. More specifically, the reinforcing effect of IT orientation and market orientation on customer value was central in this study.

Operationalizations for market orientation and IT orientation from respectively Matsuno et al. (2000) and Diesveld (2018) were taken as starting point for the items in a survey. Furthermore, items for generic firm characteristics and customer value were included in the survey. The survey was distributed and 114 responses have been gathered. The survey results were input for further quantitative analyses. Exploratory factor analysis is conducted in which all items for market orientation and IT orientation were included. These two concepts show overlap and the factor analysis showed which capabilities are shared and unique for both concepts. Eventually, after elimination of cross-loaders and items with factor loadings smaller than .50, 11 factors are found in the data: market intelligence generation (MIG), monitoring societal trends (MST), monitoring regulations (MR), market intelligence dissemination (MID), matching product/service lines with market needs (MPS), competitive counter reaction (CCR), social and mobile platform management (SMPM), IT management (ITM), search engine marketing (SEM), IT system configuration (ITSC) and online customer service (OCS). These factors were subject to a reliability analysis in which the internal consistency of items loading on the same factor is tested.

After the scales have been tested on construct validity in the factor analysis and tested on reliability, the hypotheses of this study were tested by conducting a multiple regression analysis. The results indicate that the total model including all independent variables, control variables and interaction terms, significantly predicts customer value. None of the control variables firm age, firm size and products vs. services has a significant effect. Furthermore, the

results indicate that one market orientation capability has a significant effect on customer value: matching products/services with market needs. The significant positive effect indicates that firms who better match their products and/or services with market needs achieve higher customer value. Since only one market orientation capability has a significant effect on customer value, *hypothesis 1 is partially accepted*. Complementary, five capabilities of IT orientation were included in the regression analysis. The regression coefficients reveal that one IT orientation capability has a significant effect on customer value: IT management. This implies that firms that have better IT management will achieve higher customer value. *Hypothesis 2 is partially accepted*, since not all capabilities of IT orientation have a significant effect on customer value.

Next to the direct effects of the two strategic orientations, it is hypothesized that two IT capabilities, IT management and IT system configuration, strengthen the effect of six market orientation capabilities on customer value. The results indicate that there are four significant moderation effects. First of all, the effect of monitoring societal trends on customer value is significantly moderated by IT management. For very low values of IT management there is a positive effect of monitoring societal trends on customer value. Thus, firms with very low focus on IT management experience a positive effect of monitoring societal trends on customer value. This result is the opposite of what is hypothesized in this study. Another significant moderation effect was found between IT management and matching products and services with market needs on customer value. At mean and high values of IT management the effect of matching products and services with market needs on customer value is significantly stronger. In other words, IT management reinforces the effect of matching products/services with market needs on customer value. This is in line with hypothesis 3. The third significant interaction effect is the effect between IT system configuration and market intelligence generation on customer value. The results show that for low IT system configuration values, there is a significant positive relation between market intelligence generation and customer value. This finding does not fit with hypothesis 3, since it is the opposite of what is hypothesized. The last significant moderation effect is found between IT system configuration and competitive counter reaction on customer value. The results indicate a significant positive moderation effect of IT system configuration and competitive counter reaction on customer value when IT system configuration is high. This means that firms that have a high level of IT system configuration experience a significant positive effect of competitive counter reaction on customer value. This is in line with hypothesis 3. Not all hypothesized effects are found and two significant interaction effects are found in opposite direction of what was hypothesized. No support is

found for the hypothesized moderation effects of IT management with market intelligence generation, monitoring regulations, market intelligence dissemination and competitive counter reaction. Also, no evidence is found for the hypothesized moderation effects of IT system configuration with monitoring societal trends, monitoring regulations, market intelligence dissemination and matching products/services with market needs. *Hypothesis 3 is partially accepted.*

Feeding back to the research question, IT has a reinforcing role for the market orientation concept in achieving higher customer value. This is mainly due to the IT management capability. Market orientation positively affects customer value since firms match their products and services with market needs. IT orientation positively predicts customer value by the IT management capability. Furthermore, IT management reinforces the effect of matching products and services with market needs on customer value. In other words, for firms with mean or high levels of IT management, the effect of matching products and services with market needs on customer value is significantly stronger. Furthermore, firms that focus on IT system configuration experience a significant effect of competitive counter reaction on customer value. Two other interaction effects are found that are the opposite of what was hypothesized. Firms with very low score on IT management experience a positive effect of monitoring societal trends on customer value. Also, firms with low IT system configuration values experience a significant positive relation between market intelligence generation and customer value.

## **5.2 Academic contribution**

As stated in the problem formulation of this study, technological developments and opportunities are challenging firms to create value from big data. Traditional ways of collecting and analyzing data may not be as effective as they used to be. Developments for instance are the explosion of data, increased interconnectivity between devices and social media. IT can become a facilitator and a complementary asset for firms in being market oriented and in their marketing practices by reinforcing the information generation and dissemination processes and creating value from data (Fowler et al., 2013). However, despite the fact that some scholars see an increasing role of IT throughout different departments of organizations (e.g., Buhl et al., 2012; Merali et al., 2012), very little research has been done into the role of IT in the effectiveness of market orientation. Hult and Ketchen (2001) state that market orientation affects firm performance positively, but that the effect should be considered together with other firm capabilities. Sarkar et al. (2016) complement this by stating that the fullest potential of

market orientation is only achieved in combination with other firm capabilities. Furthermore, scholars state that research has to be conducted on the effects of strategic orientations, market orientation in specific, in a configurational approach (Ketchen et al., 2007; Zhou et al., 2005). This gives a more comprehensive view (Deutscher et al., 2016; Hakala, 2011). The need for scholars to look beyond the main effects of strategic orientations comes from the reasoning that strategic actions do not operate in isolation. Researching the isolated effects of strategic orientations fails to capture simultaneous effects (Brik et al., 2011). Previous research mainly focused on the isolated link (e.g. Gnizy et al., 2014; Noble et al., 2002; Zhou et al., 2005). The full potential of a strategic orientation can be realized with other organizational elements or other strategic orientations (Sarkar et al., 2016; Ziggers & Henseler, 2016). Researching the reinforcing effect of market orientation and IT orientation therefore contributes to literature by providing insights on how the two orientations affect customer value together. This complements literature on market orientation, the marketing practice, information technology and strategic orientations in general. Specifically, this research provides insights in the interplay between market orientation and IT orientation.

First, the separate effects of both orientations on customer value are analyzed. The results of this study indicate that market orientation has a positive effect on customer value and that this is the result of matching the products or services you sell to the market needs. This is in line with previous research, which found that market oriented firms have greater understanding of expressed and latent customer needs and can match their offerings to those needs (Slater & Narver, 1999; Von Hippel et al., 1999). Being market oriented leads to great knowledge that facilitates firms in selecting the best resources to match the market conditions of the firm and to create high customer value (Kumar & Reinartz, 2016; Slater & Narver, 1995). No significant effects on customer value have been found for the other five market orientation capabilities: market intelligence generation (MIG), monitoring social trends (MST), monitoring regulations (MR), market intelligence dissemination (MID), and competitive counter reaction (CCR). This may be explained by the reasoning that not all capabilities directly lead to an increasing customer value or firm performance. Although all market orientation capabilities are characteristic for market orientation and essential in the concept, they do not all directly relate to customer value. Moreover, only the actions based on the generated and disseminated market intelligence directly relate to performance outcomes like customer value (Slater & Narver, 1994b). In other words, the market intelligence generation and dissemination capabilities are crucial features for market oriented firms, but have no direct link to customer value. On the other hand, responsiveness based on the market intelligence, like matching your products with

market needs, has a direct link to customer value and firm performance (Kohli et al., 1993; Matsuno et al., 2000). Nonetheless, in this study effects of all market orientation capabilities on customer value are hypothesized to see if and how IT reinforces market orientation.

Another finding regarding the market orientation scale and its effects are the differences in the conceptualization of the scale between this study and the scale by Matsuno et al. (2000). Matsuno et al. (2000) state that market intelligence generation comprises collecting and evaluating information concerning seven fields: customers, competitors, general macro-economics, regulatory bodies, suppliers, end users and societal trends. The findings of this study indicate that only four of these information fields are characteristic for the market orientation scale: customers, competitors, societal trends and regulations. Also, only information collection and evaluation concerning customers and competitors correlate, while information collection and evaluation concerning societal trends and regulations are standalone factors. Further, Matsuno et al. (2000) found six activities that together represent the market intelligence dissemination capability. The results of this study indicate that only three of them are essential in market orientation: (1) meetings to discuss market developments and trends; (2) meetings to update knowledge of laws and regulations; and (3) inter-functional information sharing about technological developments for product development. Lastly, responsiveness based on market intelligence in the scale of Matsuno et al. (2000) consists of eight activities. In this study, the results indicate that only three activities regarding responses on market intelligence should be included in the market orientation concept. Noticing changes in product or service needs and depending product lines on market needs together represent the capability matching products/services with market needs. Further, the capability competitive counter reaction is a standalone factor. Overall it can be stated that the results of this study reveal a more narrow market orientation scale with a focus on customers and competitors. This is more in line with work of Narver and Slater (1990), who put emphasis on customers and competitors in the market orientation concept. The scale of Matsuno et al. (2000) on the other hand takes into account a broader spectrum of stakeholders.

Furthermore, the separate direct effects of five IT orientation capabilities on customer value are measured: social and mobile platform management (SMPM), IT management (ITM), search engine marketing (SEM), IT system configuration (ITSC) and online customer service (OCS). IT orientation leads to higher customer value through the capability IT management. Firms with a focus on IT management tailor IT resources to the demands of different functions in a firm. Also, they manage the overall IT capacity that is required in the firm. Lastly, IT management implies that firms identify the value and threats of their IT resources. Together



these three activities assure that firms achieve business goals in an effective and efficient way (Klosterboer, 2011; Wilkin & Chenhall, 2010). The effect of IT management on customer value might be explained by the reasoning that firms with better IT management can effectively and efficiently acquire information of customers in each department at the right capacity. Firms operate better in general with better IT management since different departments require different IT systems and this has to be managed (De Haes & Van Grembergen, 2008; Lunardi et al., 2014). Moreover, IT management assures that firms can achieve objectives in an efficient and effective way (Klosterboer, 2011). Firms can offer products and services effectively and in timely manner, but also provide service at the right time. The IT management capability therefore positively contributes to customer value.

Reinforcing effects between the two orientations are also found. IT management and IT system configuration were hypothesized to reinforce the effects of market orientation capabilities on customer value. Only two hypothesized reinforcing effects are found. First, a significant moderation effect was found between IT management and matching products and services with market needs on customer value. At mean and high levels of IT management, the effect of matching products and services with market needs on customer value is significantly stronger. In other words, IT management reinforces the effect of matching products/services with market needs on customer value. Responding to customer needs by matching products and services, which is a central mechanism of how market orientation leads to higher customer value (e.g. Kumar & Reinartz, 2016; Slater & Narver, 1995; Slater & Narver, 1999; Von Hippel et al., 1999), is more effective for firms with better IT management. Firms with better IT management have the appropriate and required IT resources in each department to collect and use data on for instance customers (Klosterboer, 2011; Mithas et al., 2011; Wilkin & Chenhall, 2010). This has a beneficial effect on the relation between matching products and services with market needs and customer value. Another significant moderation effect is found between IT system configuration and competitive counter reaction on customer value. The results indicate a significant positive moderation effect of IT system configuration and competitive counter reaction on customer value when IT system configuration is high. This means that firms that focus on creating a knowledge base and integrate information systems within their firm, and thus have a high level of IT system configuration, experience a significant positive effect of competitive counter reaction on customer value. This might be explained by the reasoning that those firms have a knowledge base in which information from previous experiences are stored, which helps them in responding to competitor moves. Furthermore, configured and integrated systems allow for better information sharing integrated (Galliers & Leidner, 2014; Korfhage,

2008). This also makes it possible for firms to effectively and efficiently respond to competitor moves, which leads to higher customer value.

Next to these two hypothesized effects, two other significant moderation effects are found. The effect of monitoring societal trends on customer value is significantly moderated by IT management in the way that for very low values of IT management there is a positive effect of monitoring societal trends on customer value. Furthermore, the effect of IT system configuration and market intelligence generation on customer value is significant in the way that for low levels of IT system configuration, there is a significant positive relation between market intelligence generation and customer value. These two effects are the opposite of what is hypothesized and do not fit with previous findings. These findings might be explained by the argumentation that monitoring societal trends and market intelligence generation do not directly link to customer value. Moreover, they are essential for the market orientation concept and can be seen as antecedents of responses to market intelligence. It may not be logical to look at the direct effects of these antecedents on customer value and this could possibly result in illogical findings. Future research could address the two effects to either substantiate the findings or substantiate the assumption that the effects are illogical.

To conclude, market orientation and IT orientation share underlying ideas. Whereas both orientations focus on intelligence generated from data, IT orientation puts more emphasis on the management side of collecting, distributing and analyzing data. Market orientation focuses more on actions based on market intelligence. The significance of market orientation and IT orientation and the interplay between them is underscored, implying that firms that utilize both orientations can achieve synergies in increasing customer value. They can be complementary strategic assets in achieving higher customer value. The findings give insights in the importance of capability deployment.

### **5.3 Managerial contribution**

Customers are unique and have personalized preferences. They want to be identified as unique as well. Firms should know their markets and customers better than ever before in order to serve the needs and wants of their customers and other stakeholders. Being market oriented however is seen as one of the main challenges of marketers and firms nowadays (Leeflang et al., 2014). Information abundance in which big data is the norm lead to problems for firms and managers need to know how to cope with this (Day, 2011; De Mauro et al., 2016; Stankovic, 2014). Generating and leveraging customer insights has become very difficult (Kumar et al., 2013; Leeflang et al., 2014). The importance of using IT seems to become crucial in being market

oriented. Research on this role in the effectiveness of market orientation however lacks and managers do not have knowledge on which IT capabilities are required in order to improve the effectiveness of being market oriented.

This research contributes to managers by providing insights in how market orientation and IT orientation are related. The findings of this research indicate that matching products and services with market needs leads to higher customer value. Furthermore, firms and managers should manage their IT systems by tailoring the IT resources to the requirements of different departments and managing the needed IT capacity. Furthermore, they should identify the value and threats of their IT infrastructure. IT management has a strong positive effect on achieving higher customer value. Further, since the effectiveness of being market oriented is expected to become smaller, an important finding of this study is that IT management reinforces the relation between market orientation and customer value. Responding to customer needs by matching products and services is more effective for firms with better IT management. Firms therefore need to focus on the IT management capability and activities, as well as matching their products and services to market needs, in order to achieve higher customer value. Also, there is a positive synergetic effect of IT system configuration and competitive counter reaction on customer value. When firms put emphasis on creating a knowledge base and integrating their information systems, reactions to competitor moves are expected to lead to higher customer value.

The findings of this study provide managers with knowledge in how they can and should use IT in order to increase customer value by being market oriented. In this way firms can fully utilize their market focus by mutually focusing on IT and being market oriented to improve customer value. Utilizing both market orientation and IT orientation leads to synergetic positive effects on customer value.

#### **5.4 Research limitations**

Scientific research always has certain limitations. To start, data is collected from respondents in a wide range of industries. Customer value in these industries may be perceived differently. A control variable regarding industry type could indicate industry differences. However, in this study there were limited resources and access to respondents and only 114 responses were gathered. Controlling for different industry types was not possible since categorizing responses based on industry would not give valid results because firms from over 20 industries participated. It was not the objective of this study to compare between industries, but the validity would be increased by controlling for it (Dess et al., 1990).

Secondly, there is a possibility that this study is subject to common method variance to

some degree, because the same method (survey) with the same 7-point Likert scale is used to measure all variables. To reduce or even eliminate common method variance, evaluation apprehension is reduced, anonymity for respondents is assured, reversed items are included in the survey and Harman's single factor test is executed. However, it still is possible that the study to some degree is subject to CMV. Some scholars state that Harman's single factor test is used because of its simplicity and that it does not provide evidence that measures are free of common method variance (Podsakoff et al., 2003).

Thirdly, in this study customer value is measured by the perception of firms. In other words, respondents indicate the level of customer value their firm delivers. However, the most accurate way to measure customer value is by the assessment of customers themselves. Though the results are more reliable in that scenario, this makes data collection more difficult since responses from firms and their customers than have to be selected. In this study there may be a bias, since firms assess the customer value they deliver. This may differ from the actual customer value that customers themselves perceive. Due to data collection limitations, the choice has been made to let respondents assess the customer value their firm delivers, but validity could increase by taking into account the perception of customers.

Lastly, in this study the choice has been made to research the effects of all capabilities of market orientation on customer value, both direct and in interaction with the IT management and IT system configuration capabilities. This is done to examine the role of IT within the total market orientation concept in creating customer value. However, it may be more accurate to focus on the market orientation capabilities that imply actions based on market intelligence, since these are directly linked to customer value. The other market orientation capabilities are crucial in the market orientation concept, but do not directly link to customer value (Narver & Slater, 1990). Thus, linking all market orientation capabilities to customer value might not be logical and can result in unexpected findings, like the interaction effects between monitoring societal trends and IT management and market intelligence generation and IT system configuration on customer value.

## **5.5 Future research directions**

In this section some interesting future research directions are identified and discussed. Several of these directions are logically derived from the limitations of this study. However, new ideas for future research are also suggested. To start, future research should control for industry. Firms from different industries can in general perceive customer value differently. Controlling for industry would increase the validity of the results that are generated (Dess et al., 1990). This

would increase generalizability of the results.

Secondly, customer value can be assessed by the perceptions of customers in future research. This is expected to be more reliable and valid than the perception of firms regarding the customer value they deliver. Data from customers has to be collected as well as data from firms that deliver the products or services about which customer value is perceived. These datapoints have to be connected in order to make statements. Thus, future research could focus on the customer value as perceived by customers and integrate this data with market orientation and IT orientation items assessed by the firms. More accurate insights regarding customer value are expected to be the result.

Next to the suggestions that address the limitations of this study, there are some new interesting directions for research. For instance, a direction for future research could be to replicate this study in five or ten years and make it a longitudinal research over time. This is relevant since the digital environment is rapidly evolving and the findings from this study are expected to become even more relevant in the coming years. It is interesting to see whether the role of IT in achieving high customer value will change in the coming years, since technological developments will keep developing at fast pace.

Another interesting direction for future research is taking into consideration other, or more, firm performance outcomes. It for instance is interesting to research whether market orientation leads to better financial performance, and whether IT orientation reinforces this. Financial performance can either replace customer value as dependent variable, but it can also be added to the research. By conducting path analysis the effect of market orientation, IT orientation and their interplay on financial performance through customer value can be researched. This would give insights in the interplay of market orientation and IT orientation on the financial performance of a firm.

Further, future research could focus on broadening the IT orientation concept. More specifically, the two IT orientation capabilities with significant predicting power regarding customer value possibly have to be extended with more activities. IT management comprises three activities and IT system configuration two, however it is possible that the capabilities lack activities. Further research could focus on adding IT management activities and IT system configuration activities to the current conceptualization of both capabilities. This would result in a more comprehensive and complete conceptualization over time. This is essential in capturing the full impact of IT on customer value, both direct and indirect. This call has also been made by Diesveld (2018), who states that the IT orientation concept has to be developed over time.

Another future research direction could be examining the unexpected significant moderation effects of this study more in-depth. Significant interaction effects between monitoring societal trends and IT management and market intelligence generation and IT system configuration on customer value are found. However, the nature of these effects does not comply with previous findings and does not seem logical. This may be due to the reasoning that linking all capabilities of market orientation to customer value might not be logical and that only capabilities regarding actions based on market intelligence should be linked to customer value. This reasoning implies that other market orientation capabilities are crucial to the concept but do not link directly to customer value, which make the two significant interaction effects somehow meaningless. However, this is an assumption and has to be substantiated by evidence. Future research could therefore again research the unexpected significant interaction effects between monitoring societal trends and IT management and market intelligence generation and IT system configuration on customer value and see if these effects again will be found. If that is the case, in-depth research is needed to clarify the mechanism of these effects.

A last direction for future research is the conceptualization of market orientation and IT orientation. The concept market orientation may lose its effectiveness when it is focused on traditional ways of generating and disseminating market intelligence. In this study this is addressed by looking at the interplay between market orientation and IT orientation, in which the latter focuses more on the technical and management side of IT. However, it can also be argued that the market orientation concept should be adjusted or extended by taking into consideration new ways of generating and disseminating market intelligence. This is another approach and focuses on adjusting the current operationalization of market orientation, instead of seeing market orientation and IT orientation as two separate strategic orientations. This differs from the approach in this study in which the interplay between two concepts are central. The market orientation concept may have to be adjusted to current technological business environments. Information technological aspects have to be taken into account due to developments in data access and possibilities which business environments are subject to.

## 6. Bibliography

- Aaker, D. A. (1989). Managing assets and skills: The key to a sustainable competitive advantage. *California management review*, 31(2), 91-106.
- Aiken, L. S., West, S. G., & Reno, R. R. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.
- Amit, R., & Schoemaker, P. J. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14(1), 33-46.
- Andreasen, A. R., Kotler, P., & Parker, D. (2003). Strategic marketing for nonprofit organizations (pp. 44-53). Upper Saddle River, NJ: Prentice Hall.
- Arora, B., & Rahman, Z. (2016). Information technology investment strategies: a review and synthesis of the literature. *Technology Analysis & Strategic Management*, 28(9), 1073-1094.
- 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.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, 17(1), 99-120.
- Barreto, I. (2010). Dynamic capabilities: A review of past research and an agenda for the future. *Journal of management*, 36(1), 256-280.
- Bersoff, D. N. (2003). *Ethical conflicts in psychology*. American Psychological Association.
- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. V. (2013). Digital business strategy: toward a next generation of insights.
- 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.
- Bititci, U., Garengo, P., Dörfler, V., & Nudurupati, S. (2012). Performance measurement: challenges for tomorrow. *International journal of management reviews*, 14(3), 305-327.

- Borges, M., Hoppen, N., & Luce, F. B. (2009). Information technology impact on market orientation in e-business. *Journal of Business Research*, 62(9), 883-890.
- Brik, A. B., Rettab, B., & Mellahi, K. (2011). Market orientation, corporate social responsibility, and business performance. *Journal of Business Ethics*, 99(3), 307-324.
- 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.
- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological bulletin*, 56(2), 81.
- Cano, C. R., Carrillat, F. A., & Jaramillo, F. (2004). A meta-analysis of the relationship between market orientation and business performance: evidence from five continents. *International Journal of research in Marketing*, 21(2), 179-200.
- Carlson, K. D., & Wu, J. (2012). The illusion of statistical control: Control variable practice in management research. *Organizational Research Methods*, 15(3), 413-435.
- Carr, N. G. (2003). IT doesn't matter. *Educause Review*, 38, 24-38.
- 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. (2015). *Digital business and E-commerce management*. Pearson Education Limited.
- 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.



- Covin, J. G., & Wales, W. J. (2012). The measurement of entrepreneurial orientation. *Entrepreneurship theory and practice*, 36(4), 677-702.
- 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.
- Day, G. S. (2011). Closing the marketing capabilities gap. *Journal of marketing*, 75(4), 183-195.
- 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.
- Deshpandé, R., Farley, J. U., & Webster Jr, F. E. (1993). Corporate culture, customer orientation, and innovativeness in Japanese firms: a quadrad analysis. *The journal of Marketing*, 23-37.
- Dess, G. G., Ireland, R. D., & Hitt, M. A. (1990). Industry effects and strategic management research. *Journal of management*, 16(1), 7-27.
- 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.
- Dickson, P. R. (1992). Toward a general theory of competitive rationality. *The Journal of Marketing*, 69-83.
- Diener, E., & Crandall, R. (1978). *Ethics in social and behavioral research*. Chicago Press.
- Dobni, C. B., & Luffman, G. (2003). Determining the scope and impact of market orientation profiles on strategy implementation and performance. *Strategic management journal*, 24(6), 577-585.

- Drnevich, P. L., & Croson, D. C. (2013). Information technology and business-level strategy: Toward an integrated theoretical perspective. *Mis Quarterly*, 37(2), 483-509.
- Drucker, P. F. (1973). *Management*. New York: Harper & Row.
- 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.
- Galliers, R. D., & Leidner, D. E. (2014). *Strategic information management: challenges and strategies in managing information systems*. Routledge.
- Gibson, C. F., & Nolan, R. L. (1974). Managing the four stages of EDP growth (pp. 76-87). *Harvard Business Review*.
- Gnizy, I., E. Baker, W., & Grinstein, A. (2014). Proactive learning culture: A dynamic capability and key success factor for SMEs entering foreign markets. *International marketing review*, 31(5), 477-505.

- 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(S2), 109-122.
- 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.
- Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling.
- Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2009). *Dynamic capabilities: Understanding strategic change in organizations*. John Wiley & Sons.
- Hoopes, D. G., Madsen, T. L., & Walker, G. (2003). Guest editors' introduction to the special issue: why is there a resource-based view? Toward a theory of competitive heterogeneity. *Strategic Management Journal*, 24(10), 889-902.
- Hoopes, D. G., & Madsen, T. L. (2008). A capability-based view of competitive heterogeneity. *Industrial and Corporate Change*, 17(3), 393-426.
- 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. (2001). Does market orientation matter?: A test of the relationship between positional advantage and performance. *Strategic management journal*, 22(9), 899-906.
- 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.
- Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: antecedents and consequences. *The Journal of marketing*, 53-70.
- Jaworski, B. J., & Kohli, A. K. (1996). Market orientation: review, refinement, and roadmap. *Journal of Market-Focused Management*, 1(2), 119-135.
- 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.
- Ketchen Jr, D. J., Hult, G. T. M., & Slater, S. F. (2007). Toward greater understanding of market orientation and the resource-based view. *Strategic management journal*, 28(9), 961-964.
- Kirca, A. H., Jayachandran, S., & Bearden, W. O. (2005). Market orientation: A meta-analytic review and assessment of its antecedents and impact on performance. *Journal of marketing*, 69(2), 24-41.
- Kline, P. (2013). *Handbook of psychological testing*. Routledge.
- Klosterboer, L. (2011). *ITIL capacity management*. Pearson Education.
- Kohli, A. K., & Jaworski, B. J. (1990). Market orientation: the construct, research propositions, and managerial implications. *The Journal of Marketing*, 1-18.
- 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.
- Kumar, V., & Reinartz, W. (2016). Creating enduring customer value. *Journal of Marketing*, 80(6), 36-68.
- Lam, S. Y., Shankar, V., Erramilli, M. K., & Murthy, B. (2004). Customer value, satisfaction, loyalty, and switching costs: an illustration from a business-to-business service context. *Journal of the academy of marketing science*, 32(3), 293-311.
- 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.
- Leeflang, P. S., Verhoef, P. C., Dahlström, P., & Freundt, T. (2014). Challenges and solutions for marketing in a digital era. *European management journal*, 32(1), 1-12.
- 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.
- 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. (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.

- Matthews, J. R. (2011). Assessing organizational effectiveness: the role of performance measures. *The Library Quarterly*, 81(1), 83-110.
- McAfee, A., & Brynjolfsson, E. (2008). Investing in the IT that makes a competitive difference. *Harvard Business Review*, 86(7/8), 98.
- 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.
- Min, S., Song, S., & Keebler, J. S. (2002). An Internet-mediated market orientation (IMO): Building a theory. *Journal of Marketing Theory and Practice*, 10(2), 1-11.
- Mintzberg, H. (1987). *Crafting strategy*. Boston, MA, USA: Harvard Business School Press.
- Mithas, S., Ramasubbu, N., & Sambamurthy, V. (2011). How information management capability influences firm performance. *MIS quarterly*, 35(1), 237.
- 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.
- Morgan, N. A., Vorhies, D. W., & Mason, C. H. (2009). Market orientation, marketing capabilities, and firm performance. *Strategic Management Journal*, 30(8), 909-920.
- 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.
- Narver, J. C., & Slater, S. F. (1990). The effect of a market orientation on business profitability. *The Journal of marketing*, 20-35.
- Nasution, H. N., Mavondo, F. T., Matanda, M. J., & Ndubisi, N. O. (2011). Entrepreneurship: Its relationship with market orientation and learning orientation and as antecedents to innovation and customer value. *Industrial marketing management*, 40(3), 336-345.

- Newbert, S. L. (2007). Empirical research on the resource-based view of the firm: an assessment and suggestions for future research. *Strategic management journal*, 28(2), 121-146.
- 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.
- O'Sullivan, A., & Sheffrin, S. M. (2003). *Economics: Principles in action*.
- Onn, C. W., & Sorooshian, S. (2013). Mini literature analysis on information technology definition.
- 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.
- Peters, T. J., Waterman, R. H., & Jones, I. (1982). *In search of excellence: Lessons from America's best-run companies*.
- 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. (1980). *Competitive strategy: techniques for analyzing competitors and industries*. The FreePress, New York.
- Porter, M. E. (1985). *Competitive advantage: creating and sustaining superior performance*. New York: FreePress.
- Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard business review*, 86(1), 25-40.

- Priem, R. L., & Butler, J. E. (2001). Is the resource-based “view” a useful perspective for strategic management research?. *Academy of management review*, 26(1), 22-40.
- 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.
- 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.
- Richardson, H. A., Simmering, M. J., & Sturman, M. C. (2009). A tale of three perspectives: Examining post hoc statistical techniques for detection and correction of common method variance. *Organizational Research Methods*, 12(4), 762-800.
- 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.
- 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.
- Savitz, E. (2012), “The big value in big data: seeing customer buying patterns”, *Forbes*, 25 September, p. 36.
- 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.
- Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of management review*, 32(1), 273-292.
- 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. (1997). Developing a customer value-based theory of the firm. *Journal of the Academy of marketing Science*, 25(2), 162.
- Slater, S. F., & Narver, J. C. (1994a). Does competitive environment moderate the market orientation-performance relationship?. *The Journal of Marketing*, 46-55.
- Slater, S. F., & Narver, J. C. (1994b). Market orientation, customer value, and superior performance. *Business horizons*, 37(2), 22-29.
- Slater, S. F., & Narver, J. C. (1995). Market orientation and the learning organization. *The Journal of marketing*, 63-74.
- Slater, S. F., & Narver, J. C. (1999). Market-oriented is more than being customer-led. *Strategic management journal*, 1165-1168.
- Snijders, C., Matzat, U., & Reips, U. D. (2012). "Big Data": big gaps of knowledge in the field of internet science. *International Journal of Internet Science*, 7(1), 1-5.
- 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.
- Sundsøy, P., Bjelland, J., Iqbal, A. M., & de Montjoye, Y. A. (2014). Big data-driven marketing: how machine learning outperforms marketers' gut-feeling. In *International*

- Conference on Social Computing, Behavioral-Cultural Modeling, and Prediction (pp. 367-374). Springer, Cham.
- 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.
- 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.
- Tournois, L. (2013). Total market orientation, customer value, and market performance from a dual perspective. *Journal of Applied Business Research*, 29(4), 1157-1174.
- Venkatraman, N. U., & Ramanujam, V. (1987). Measurement of business economic performance: An examination of method convergence. *Journal of management*, 13(1), 109-122.
- Von Hippel, E., Thomke, S., & Sonnack, M. (1999). Creating breakthroughs at 3M. *Harvard business review*, 77, 47-57.
- Wales, W. J., Parida, V., & Patel, P. C. (2013). Too much of a good thing? Absorptive capacity, firm performance, and the moderating role of entrepreneurial orientation. *Strategic Management Journal*, 34, 622-633.
- Wang, E. T. G., Hu, H., & Hu, P. J. (2012) Examining the role of information technology in cultivating firms' dynamic marketing capabilities. *Information and management*, 50(6), 336-343.
- Ward, J., 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.
- Webster, F. E. (1988). The rediscovery of the marketing concept. *Business horizons*, 31(3), 29-39.
- 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.
- Williams, P., & Naumann, E. (2011). Customer satisfaction and business performance: a firm-level analysis. *Journal of services marketing*, 25(1), 20-32.
- Woodruff, R. B. (1997). Customer value: the next source for competitive advantage. *Journal of the academy of marketing science*, 25(2), 139.
- 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. (2016). The reinforcing effect of a firm's customer orientation and supply-base orientation on performance. *Industrial marketing management*, 52, 18-26.
- Zott, C. (2003). Dynamic capabilities and the emergence of intraindustry differential firm performance: insights from a simulation study. *Strategic management journal*, 24(2), 97-125.

## 7. Appendices

### Appendix B | Harman's single factor test

#### Total variance explained

Component	Initial eigenvalues		Cumulative in %
	Total	% of variance	
1	11,340	25,200	25,200
2	3,556	7,903	33,103
3	3,238	7,195	40,298
4	2,189	4,865	45,163
5	1,963	4,361	49,524
6	1,662	3,693	53,218
7	1,530	3,399	56,617
8	1,351	3,002	59,619
9	1,298	2,885	62,504
10	1,170	2,600	65,104
11	1,132	2,516	67,620
12	1,006	2,236	69,856
13	,981	2,180	72,036
14	,927	2,060	74,096
15	,840	1,868	75,964
16	,775	1,722	77,685
17	,761	1,691	79,376
18	,730	1,622	80,998
19	,683	1,517	82,515
20	,659	1,464	83,979
21	,564	1,254	85,233
22	,534	1,187	86,420
23	,508	1,129	87,548
24	,469	1,042	88,590
25	,442	,982	89,573
26	,421	,935	90,508

27	,409	,909	91,417
28	,370	,822	92,239
29	,361	,801	93,041
30	,351	,780	93,821
31	,331	,735	94,556
32	,273	,607	95,163
33	,269	,597	95,760
34	,263	,584	96,344
35	,226	,502	96,846
36	,207	,459	97,305
37	,198	,439	97,744
38	,185	,411	98,155
39	,166	,369	98,524
40	,152	,337	98,861
41	,139	,310	99,171
42	,119	,265	99,436
43	,105	,233	99,669
44	,081	,180	99,848
45	,068	,152	100,000

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Extraction Method: Principal Component Analysis.

## Appendix C1 | 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 <sup>a</sup>	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 with other functions (marketing, production, etc.).	Kohli et al. (1993); Matsuno et al. (2000)
		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 <sup>a</sup>	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 <sup>a</sup>	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 <sup>a</sup>	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 <sup>a</sup>	In our organization, even if we come up with a good marketing plan, we would	Kohli et al. (1993); Matsuno et al. (2000)

			probably not be able to implement that quickly.	
		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 <sup>a</sup>	Our organization tends to take more time to respond to a change in regulations than our competitors.	Matsuno et al. (2000)
<b>Variable</b>	<b>Dimension</b>	<b>Item number</b>	<b>Item / Indicator</b>	<b>Source</b>
IT orientation	Business intelligence	V23	Our organization frequently collects and evaluates information concerning employees.	Diesveld (2018)
		V24	Our organization collects large amounts of data from various sources (e.g., from customers, suppliers, employees, etc.).	Diesveld (2018)
		V25	Our organization analyses the collected data to find customer preferences, patterns, trends and other useful information to improve our business decisions and processes.	Diesveld (2018)
		V26	Our organization distributes information across departments so that this is available in every department.	Diesveld (2018)
	IT system configuration	V27	Our organization stores the generated information in a knowledge base.	Diesveld (2018)
		V28	Our organization protects information to ensure that it is only accessible to our company.	Diesveld (2018)
		V29	Our organization configures and integrates the information systems so	Diesveld (2018)



			that data and information can be easily exchanged.	
		V30	Our organization integrates our database with others in our supply chain.	Diesveld (2018)
		V31	Our organization streamlines communication by connecting various communication tools and platforms.	Diesveld (2018)
		V32	Our organization automates routine processes with software applications.	Diesveld (2018)
	IT management	V33	Our organization is looking for a suitable IT establishment for the future, taking into account our strategy and new available technologies.	Diesveld (2018)
		V34	Our organization tailors the available IT resources to the needs of the various functions in our company.	Diesveld (2018)
		V35	Our organization ensures that the capacity of the IT establishment is able to realize the objectives in an effective and timely manner.	Diesveld (2018)
		V36	Our organization identifies and analyses the value and threats of our IT resources.	Diesveld (2018)
	Digital marketing	V37	In our organization the marketing efforts are personalized by adapting these to the preferences and wishes of individual consumers.	Diesveld (2018)
		V38	Our organization uses social media platforms to promote our products and services.	Diesveld (2018)
		V39	Our organization uses marketing aimed at smartphones, tablets and other mobile devices to promote our products and services.	Diesveld (2018)

		V40	Our organization uses e-mail to promote our products and services.	Diesveld (2018)
		V41	Our organization uses search engine optimization (SEO) to analyse and use the most searched keywords on search engine pages.	Diesveld (2018)
		V42	Our organization places advertisements on search engine pages for promoting our products and services.	Diesveld (2018)
		V43	Our organization ensures that customers can easily and quickly make purchases through our online sales channels.	Diesveld (2018)
	Electronic customer relationship management (e-CRM)	V44	Our organization builds and uses a customer database in which customer information is stored.	Diesveld (2018)
		V45	Our organization offers direct online customer service by responding to customer requests and inquiries (for example through a chat function).	Diesveld (2018)
		V46	Our organization socializes with our online community by communicating on online platforms (e.g., social media).	Diesveld (2018)
		V47	Our organization offers customers support after they have made a purchase.	Diesveld (2018)
		V48	In our organization we measure our customer satisfaction.	Diesveld (2018)
<b>Variable</b>	<b>Dimension</b>	<b>Item number</b>	<b>Item / Indicator</b>	<b>Scale</b>
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
<b>Variable</b>	<b>Dimension</b>	<b>Item number</b>	<b>Item / Indicator</b>	<b>Scale</b>
Firm size	Number of employees	V56	What is the number of employees in your firm?	Open ended question
	Turnover	V57	What is the annual turnover of your firm? (in euros)	Open ended question
Firm age	Age	V58	In which year was your firm founded?	Open ended question
Respondent qualification	Department	V59	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	V60	What is your position title in your firm?	Open ended question
Industry	Industry type	V61	In which industry is your firm operating?	Open ended question
Production	Products or services	V62	Does your firm sell products or services?	Products; services

Conducting self or outsourcing	Market / business intelligence	V63	Is your firm responsible for collecting, analysing and disseminating market information or do you outsource this?	Conducting self; outsourcing
	IT system configuration	V64	Is your firm responsible for configuring IT systems or do you outsource this?	Conducting self; outsourcing
	IT management	V65	Is your firm responsible for managing IT or do you outsource this?	Conducting self; outsourcing
	Marketing	V66	Is your firm responsible for your marketing or do you outsource this?	Conducting self; outsourcing
	E-CRM	V67	Is your firm responsible for maintaining customer relations or do you outsource this?	Conducting self; outsourcing

a. Reverse items.

## Appendix C2 | Operationalization table (Dutch)

The study is conducted in The Netherlands and therefore the survey was in Dutch. Therefore, the operationalization table is given in Dutch as well. This also makes it possible to compare the original items of Matsuno et al. (2000) with their translated counterparts to assure that the essence of the original items is captured.

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)
		<i>Original item from Matsuno et al. (2000)</i>	<i>We periodically review the likely effect of changes in our business environment (e.g., regulation) on customers.</i>	
		V2	Onze organisatie verzamelt en evalueert informatie met betrekking tot concurrenten.	Kohli et al. (1993); Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>In our business unit, intelligence on our competitors is generated independently by several departments.</i>	
		V3	Onze organisatie verzamelt en evalueert informatie met betrekking tot economische ontwikkelingen.	Kohli et al. (1993); Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>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).</i>	
		V4	Onze organisatie verzamelt en evalueert informatie met betrekking tot regulerende instanties.	Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>In this business unit, we maintain contacts with officials of government and regulatory bodies (e.g., Department of Agriculture, FDA, FTC, Congress) in</i>	

			<i>order to collect and evaluate pertinent information.</i>	
		V5	Onze organisatie verzamelt en evalueert informatie met betrekking tot leveranciers.	Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>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).</i>	
		V6	Onze organisatie verzamelt en evalueert informatie met betrekking tot maatschappelijke trends.	Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>In this business unit, we collect and evaluate information concerning general social trends (e.g., environmental consciousness, emerging lifestyles) that might affect our business.</i>	
		V7	Onze organisatie verzamelt en evalueert informatie met betrekking tot eindgebruikers.	Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>We poll end users at least once a year to assess the quality of our products and services.</i>	
		V8 <sup>a</sup>	In onze organisatie verzamelen maar een paar mensen informatie over concurrenten.	Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>In our business unit, only a few people are collecting competitor information.</i>	
	Intelligentie verspreiding	V9	In onze organisatie wordt aandacht besteedt aan het bespreken van de toekomstige behoeften van klanten met	Kohli et al. (1993); Matsuno et al. (2000)

			andere functies (marketing, productie, etc.).	
		<i>Original item from Matsuno et al. (2000)</i>	<i>Marketing personnel in our business unit spend time discussing customers' future needs with other functional departments.</i>	
		V10	In onze organisatie verspreiden we documenten met informatie over onze klanten.	Kohli et al. (1993); Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>Our business unit periodically circulates documents (e.g., reports, newsletters) that provide information on our customers.</i>	
		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)
		<i>Original item from Matsuno et al. (2000)</i>	<i>We have cross-functional meetings very often to discuss market trends and developments (e.g., customers, competition, suppliers).</i>	
		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)
		<i>Original item from Matsuno et al. (2000)</i>	<i>We regularly have interdepartmental meetings to update our knowledge of regulatory requirements.</i>	
		V13	In onze organisatie delen mensen informatie over technologische ontwikkelingen voor nieuwe producten met andere afdelingen.	Matsuno et al. (2000)

		<i>Original item from Matsuno et al. (2000)</i>	<i>Technical people in this business unit spend a lot of time sharing information about technology for new products with other departments.</i>	
		V14	In onze organisatie verspreidt marktinformatie zich snel over alle lagen van de organisatie.	Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>Market information spreads quickly through all levels in this business unit.</i>	
Responsiviteit		V15 <sup>a</sup>	Onze organisatie negeert om de een of andere reden wijzigingen in de product- of servicebehoefte van onze klanten.	Kohli et al. (1993); Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>For one reason or another, we tend to ignore changes in our customers' product or service needs.</i>	
		V16 <sup>a</sup>	In onze organisatie zijn de productlijnen die we verkopen meer afhankelijk van onze eigen bedrijfspolicy dan echte marktbehoefte.	Kohli et al. (1993); Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>The product lines we sell depend more on internal politics than real market needs.</i>	
		V17 <sup>a</sup>	In onze organisatie zijn we niet snel om zakelijke relaties aan te gaan met nieuwe leveranciers, ook al denken we dat ze beter zijn dan bestaande leveranciers.	Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>We are slow to start business with new suppliers even though we think they are better than existing ones.</i>	
		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)
		<i>Original item from Matsuno et al. (2000)</i>	<i>If a major competitor were to launch an intensive campaign targeted at our customers, we would implement a response immediately.</i>	
		V19	In onze organisatie zijn de activiteiten van de verschillende afdelingen goed op elkaar afgestemd.	Kohli et al. (1993); Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>The activities of the different departments in this business unit are well coordinated.</i>	
		V20 <sup>a</sup>	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)
		<i>Original item from Matsuno et al. (2000)</i>	<i>Even if we came up with a great marketing plan, we probably would not be able to implement it in a timely fashion.</i>	
		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)
		<i>Original item from Matsuno et al. (2000)</i>	<i>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.</i>	

		V22 <sup>a</sup>	Onze organisatie neemt meer tijd om te reageren op een verandering in de regelgeving dan onze concurrenten.	Matsuno et al. (2000)
		<i>Original item from Matsuno et al. (2000)</i>	<i>We tend to take longer than our competitors to respond to a change in regulatory policy.</i>	
<b>Variable</b>	<b>Dimension</b>	<b>Item number</b>	<b>Item / Indicator</b>	<b>Source</b>
IT oriëntatie	Business intelligentie	V23	Onze organisatie verzamelt en evalueert informatie met betrekking tot werknemers.	Diesveld (2018)
		V24	Onze organisatie verzamelt grote hoeveelheden gegevens van verschillende bronnen (van bijvoorbeeld klanten, leveranciers, werknemers, etc.).	Diesveld (2018)
		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.	Diesveld (2018)
		V26	Onze organisatie verspreidt informatie over afdelingen zodat dit in elke afdeling beschikbaar is.	Diesveld (2018)
	IT systeem configuratie	V27	Onze organisatie slaat de gegenereerde informatie op in een kennisbank.	Diesveld (2018)
		V28	Onze organisatie beveiligt informatie om ervoor te zorgen dat het uitsluitend toegankelijk is voor ons bedrijf.	Diesveld (2018)
		V29	Onze organisatie configureert en integreert de informatiesystemen zodat gegevens en informatie eenvoudig kunnen worden uitgewisseld.	Diesveld (2018)

		V30	Onze organisatie integreert onze database met anderen in onze supply chain.	Diesveld (2018)
		V31	Onze organisatie stroomlijnt communicatie door verschillende communicatiemiddelen en platforms met elkaar te verbinden.	Diesveld (2018)
		V32	Onze organisatie automatiseert routinematige processen met software applicaties.	Diesveld (2018)
	IT management	V33	Onze organisatie zoekt een geschikte IT inrichting voor de toekomst, rekening houdend met onze strategie en beschikbare technologieën.	Diesveld (2018)
		V34	Onze organisatie stemt de beschikbare IT middelen af op de behoeften van de verschillende functies in ons bedrijf.	Diesveld (2018)
		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.	Diesveld (2018)
		V36	Onze organisatie identificeert en analyseert de waarde en bedreigingen van onze IT middelen.	Diesveld (2018)
	Digitale marketing	V37	In onze organisatie zijn de marketinginspanningen gepersonaliseerd door deze aan te passen aan de voorkeuren en wensen van individuele consumenten.	Diesveld (2018)
		V38	Onze organisatie gebruikt sociale mediaplatforms voor het promoten van onze producten en diensten.	Diesveld (2018)

		V39	Onze organisatie gebruikt marketing gericht op smartphones, tablets en andere mobiele apparaten voor het promoten van onze producten en diensten.	Diesveld (2018)
		V40	Onze organisatie gebruikt e-mail voor het promoten van onze producten en diensten.	Diesveld (2018)
		V41	Onze organisatie gebruikt search engine optimization (SEO) voor het analyseren en gebruiken van de meest gezochte zoekwoorden op pagina's van zoekmachines.	Diesveld (2018)
		V42	Onze organisatie plaatst advertenties op search engine pagina's voor het promoten van onze producten en diensten.	Diesveld (2018)
		V43	Onze organisatie zorgt ervoor dat klanten gemakkelijk en snel aankopen kunnen doen via onze online verkoopkanalen.	Diesveld (2018)
	Electronisch customer relationship management (e-CRM)	V44	Onze organisatie bouwt en gebruikt een klantendatabase waarin klantinformatie wordt opgeslagen.	Diesveld (2018)
		V45	Onze organisatie biedt directe online klantenservice door te reageren op verzoeken en vragen van klanten (bijvoorbeeld door een chat-functie).	Diesveld (2018)
		V46	Onze organisatie socialiseert met onze online community door te communiceren op online platforms (bijvoorbeeld sociale media).	Diesveld (2018)

		V47	Onze organisatie biedt klanten ondersteuning nadat ze een aankoop hebben gedaan.	Diesveld (2018)
		V48	In onze organisatie meten we onze klanttevredenheid.	Diesveld (2018)
<b>Variable</b>	<b>Dimension</b>	<b>Item number</b>	<b>Item / Indicator</b>	<b>Scale</b>
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
	<b>Variable</b>	<b>Dimension</b>	<b>Item number</b>	<b>Item / Indicator</b>
Organisatie-grootte	Aantal werknemers	V56	Wat is het aantal werknemers in uw bedrijf?	Open vraag

	Omzet	V57	Wat is de jaaromzet van uw bedrijf? (in euro)	Open vraag
Organisatie-leeftijd	Leeftijd	V58	Hoeveel jaar bestaat uw bedrijf?	Open vraag
Respondent kwalificatie	Afdeling	V59	Op welke afdeling werkt u in uw bedrijf?	Productieafdeling; marketingafdeling; financiële afdeling; sales afdeling; inkoopafdeling; human resources afdeling; CEO of eigenaar; anders
	Positie titel	V60	Wat is uw functie in uw bedrijf?	Open vraag
Industrie	Industrie type	V61	In welke branche is uw bedrijf actief?	Open vraag
Productie	Producten of services	V62	Verkoopt uw bedrijf producten of diensten?	Producten; services
Zelf doen of uitbesteden	Markt / business intelligentie	V63	Bent u zelf verantwoordelijk voor het verzamelen, analyseren en verspreiden van markt informatie of besteedt u dit uit?	Zelf uitvoeren; uitbesteden
	IT systeem configuratie	V64	Bent u zelf verantwoordelijk voor het configureren van IT systemen of besteedt u dit uit?	Zelf uitvoeren; uitbesteden
	IT management	V65	Bent u zelf verantwoordelijk voor het managen van IT of besteedt u dit uit?	Zelf uitvoeren; uitbesteden
	Digitale marketing	V66	Bent u zelf verantwoordelijk voor uw marketing of besteedt u dit uit?	Zelf uitvoeren; uitbesteden
	E-CRM	V67	Bent u zelf verantwoordelijk voor het onderhouden van klantrelaties of besteedt u dit uit?	Zelf uitvoeren; uitbesteden

a. Reverse items.

## Appendix D | Factor analysis output

### KMO measure and Bartlett's test of sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.783
Bartlett's Test of Sphericity	Approx. Chi-Square	2791.99
	df	990
	Sig.	.000

### Communalities before respecification

	Initial	Extraction
Collect and evaluate information: customers	.63	.58
Collect and evaluate information: competitors	.64	.63
Collect and evaluate information: economics	.71	.70
Collect and evaluate information: regulations	.71	.76
Collect and evaluate information: suppliers	.38	.33
Collect and evaluate information: societal trends	.69	.79
Collect and evaluate information: end-users	.64	.62
Collect and evaluate information: employees	.62	.44
Data analytics	.72	.71
Interfunctional information sharing: future needs	.69	.59
Documents disseminating	.50	.56
Interfunctional meetings: market trends	.67	.71
Interfunctional discussions: regulations	.77	.75
Interfunctional information sharing: product development	.69	.64
Fast information sharing in organization	.64	.58
Responding to changes in customer needs	.46	.43
Matching product lines with market needs	.60	.57
Respond to business relations	.46	.40
Align activities of departments	.70	.69
Respond to competitor campaign	.59	.45
Implementing marketing plan	.66	.70
Response to interest group accusation	.50	.38
Respond to change in regulation	.45	.35
Storing information	.60	.51
Securing information	.58	.54
Integrating information systems	.74	.77

Supply chain database integration	.45	.28
Streamlining communication	.72	.57
IT process automation	.70	.60
Scanning future IT establishment	.54	.48
Managing IT alignment	.78	.75
Managing IT capacity	.80	.79
Analyzing IT resources value	.80	.70
Data-driven marketing	.45	.21
Social media marketing	.72	.69
Mobile marketing	.79	.75
Email marketing	.68	.49
Search engine optimization (SEO)	.81	.80
Search engine advertising (SEA)	.70	.66
Sales management	.58	.45
Customer database building	.65	.51
Direct customer service	.69	.83
Interaction with the online community	.75	.77
After-sales support	.58	.44
Customer satisfaction measurement	.60	.47

Extraction Method: Principal Axis Factoring.

### Total variance explained and eigenvalues before respecification

Factor	Initial eigenvalues		
	Total	% of Variance	Cumulative %
1	11.340	25.200	25.200
2	3.556	7.903	33.103
3	3.238	7.195	40.298
4	2.189	4.865	45.163
5	1.963	4.361	49.524
6	1.662	3.693	53.218
7	1.530	3.399	56.617
8	1.351	3.002	59.619
9	1.298	2.885	62.504
10	1.170	2.600	65.104
11	1.132	2.516	67.620
12	1.006	2.236	69.856
13	.981	2.180	72.036
14	.927	2.060	74.096
15	.840	1.868	75.964



16	.775	1.722	77.685
17	.761	1.691	79.376
18	.730	1.622	80.998
19	.683	1.517	82.515
20	.659	1.464	83.979
21	.564	1.254	85.233
22	.534	1.187	86.420
23	.508	1.129	87.548
24	.469	1.042	88.590
25	.442	.982	89.573
26	.421	.935	90.508
27	.409	.909	91.417
28	.370	.822	92.239
29	.361	.801	93.041
30	.351	.780	93.821
31	.331	.735	94.556
32	.273	.607	95.163
33	.269	.597	95.760
34	.263	.584	96.344
35	.226	.502	96.846
36	.207	.459	97.305
37	.198	.439	97.744
38	.185	.411	98.155
39	.166	.369	98.524
40	.152	.337	98.861
41	.139	.310	99.171
42	.119	.265	99.436
43	.105	.233	99.669
44	.081	.180	99.848
45	.068	.152	100.000

Extraction Method: Principal Axis Factoring.

**Rotated factor matrix (before item elimination)**

	Factor											
	1	2	3	4	5	6	7	8	9	10	11	12
Collect and evaluate information: customers	-,022	,206	,576	-,001	,192	,112	,138	,092	,064	,036	,337	-,109
Collect and evaluate information: competitors	,037	,058	,740	,079	,240	,007	-,005	-,003	,069	,075	,038	-,039

Collect and evaluate information: economics	,120	,097	,427	,240	,648	-,029	,022	-,035	-,037	-,010	-,111	-,034
Collect and evaluate information: regulations	,121	-,077	,232	,251	,618	-,049	-,012	,086	-,195	,307	,002	-,316
Collect and evaluate information: suppliers	,082	-,105	,241	-,001	,296	,132	,067	,349	-,089	-,002	,073	-,098
Collect and evaluate information: societal trends	,043	,091	,042	,042	,842	,152	,066	,031	-,012	,066	,007	,201
Collect and evaluate information: end-users	,151	,180	,368	,106	,447	,180	-,041	,240	-,045	-,271	,201	,105
Collect and evaluate information: employees	,180	,057	,111	,207	,488	-,132	,210	,104	,105	-,087	,162	-,037
Data analytics	,162	,073	,653	,223	,142	,181	,249	,177	-,061	-,034	,090	,208
Interfunctional information sharing: future needs	,242	,076	,431	,480	,166	,231	-,035	-,069	,049	-,094	,145	,007
Documents disseminating Interfunctional meetings: market trends	,063	-,067	,216	,275	,061	,074	,089	-,013	,097	,061	,621	,150
Interfunctional discussions: regulations	,060	,147	,075	,794	,147	,105	,010	-,055	,005	,020	,126	,056
Interfunctional information sharing: product development	,263	,124	,078	,737	,132	,022	,074	,237	-,005	,131	,050	-,145
Fast information sharing in organization	,196	-,013	,224	,727	,109	,006	,077	-,005	,001	-,042	,027	,071
Responding to changes in customer needs	,198	,092	,476	,356	,000	,203	,018	,177	,285	,123	,054	,125
Matching product lines with market needs	,114	,017	,092	,151	,074	,611	,047	,000	-,041	,093	,019	,040
Respond to business relations	,079	,120	,161	,082	-,063	,681	,102	,123	-,046	-,096	,109	-,072
Align activities of departments	,154	,147	,227	-,134	,042	,387	-,221	,113	,177	,104	-,149	-,093
Respond to competitor campaign	,292	,133	,050	,458	,063	,252	,134	-,004	,506	,115	,101	,115
Implementing marketing plan	,079	,181	,462	,281	-,009	,153	,081	-,024	,167	,119	-,129	-,195
Response to interest group accusation	,219	,232	,216	,200	,091	,354	-,025	,054	,441	,272	,316	-,094
Respond to change in regulation	,211	,217	,026	,331	,114	,161	,067	,158	-,080	,319	,075	,000
Storing information	,115	,023	,107	-,067	-,137	-,279	-,062	-,044	,457	-,088	,040	-,016
	,351	,265	,229	,060	,069	,114	,092	,042	,030	,466	,097	,088

Securing information	,626	,134	,128	,086	,052	-,001	-,025	,017	-,262	,045	,171	-,079
Integrating information systems	,675	,278	,037	,078	,014	,003	,022	-,044	,009	,347	,063	,321
Supply chain database integration	,125	,259	-,014	,069	,246	-,053	,034	,076	,011	,077	,126	,320
Streamlining communication	,552	,404	,074	,133	,104	-,014	-,010	,099	,051	,177	,021	,155
IT process automation	,636	,215	,084	,123	,161	-,081	,061	,210	,042	,225	-,036	,002
Scanning future IT establishment	,464	,043	-,002	-,017	,039	,154	-,073	-,242	,002	,019	-,138	-,396
Managing IT alignment	,768	,029	,062	,133	,125	,179	,014	-,060	,243	-,163	-,007	-,054
Managing IT capacity	,806	-,063	,039	,126	,090	,145	,042	,069	,262	-,130	-,010	,012
Analyzing IT resources value	,754	,028	,101	,266	,030	,099	,052	,145	,073	,104	,007	-,003
Data-driven marketing	,068	,370	,165	,104	,139	,056	,030	,020	,020	,079	-,059	,071
Social media marketing	,033	,525	,216	,159	,122	-,001	,555	,003	-,095	,094	,007	-,038
Mobile marketing	-,015	,552	,142	,028	,087	,096	,625	,125	,023	,029	,016	,082
Email marketing	-,091	,633	,146	-,015	-,009	,127	,007	-,101	,077	,120	,144	,021
Search engine optimization (SEO)	,230	,831	-,029	,095	-,030	,028	,173	,029	,117	-,037	-,021	-,030
Search engine advertising (SEA)	,193	,766	,002	,051	,005	,038	,147	,013	-,104	-,021	-,062	-,013
Sales management	,119	,570	,083	,039	,030	-,024	,021	,319	,079	,016	-,017	,033
Customer database building	,298	,297	,370	,088	-,035	,138	,223	-,006	-,066	,160	,147	,263
Direct customer service	,151	,369	,074	,087	,137	,183	,208	,711	,031	,088	-,055	,222
Interaction with the online community	,070	,467	,093	,085	,189	,123	,638	,232	,039	,041	,144	,041
After-sales support	,346	,256	,336	,155	,033	,140	-,098	,199	-,118	-,097	,174	,022
Customer satisfaction measurement	,338	,338	,140	,143	-,005	,123	,213	,270	-,180	,025	-,024	-,205

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Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 18 iterations.

### Elimination of items for convergent and discriminant validity

Item	Factor loading (elimination for convergent validity)
Supply chain database integration	.32
Collect and evaluate information: suppliers	.31
Response to interest group accusation	.33
Data-driven marketing	.34
Customer database building	.36
After-sales support	.36
Customer satisfaction measurement	.38
Implementing marketing plan	.40
Documents disseminating	.38
Fast information sharing in organization	.41
Respond to business relations	.41
Collect and evaluate information: end-users	.45
Align activities of departments	.46
Respond to change in regulation	-.39
Collect and evaluate information: employees	.47
Streamlining communication	.47
Item	Cross-loader (elimination for discriminant validity)
Interfunctional information sharing: future needs	.523 and .425
Item	Factor loading (elimination for convergent validity)
Scanning future IT establishment	.50
Item	Cross-loader (elimination for discriminant validity)
Sales management	.571 and .463
Collect and evaluate information: economics	.539 and .438
Securing information	.578 and .477
IT process automation	.530 and .383

### Rotated factor matrix after item elimination

	Factor											
	1	2	3	4	5	6	7	8	9	10	11	12
Collect and evaluate information regarding customers	,203	,008	,042	,141	,788	,003	,107	,046	,110	,029	-,067	-,007
Collect and evaluate information regarding competitors	,057	,033	,117	-,015	,654	,117	,040	,103	,115	-,014	,274	-,011
Collect and evaluate information regarding regulating bodies	,027	,051	,259	-,084	,239	,096	-,042	,339	,794	,021	,102	,009
Collect and evaluate information regarding societal trends	,132	,089	,095	,032	,173	,045	,061	,799	,219	,104	-,075	-,005
Data analysis	,269	,155	,271	-,065	,560	,105	,141	,145	-,069	,239	,208	,002
Meetings to discuss market developments and trends	,069	,038	,821	,104	,078	,053	,109	,104	,016	-,004	,042	-,048
Meetings to update knowledge of laws and regulations	,126	,228	,723	,102	,027	,106	,064	-,034	,313	,171	,118	-,005
Inter-functional info sharing about technological developments for product development	,079	,189	,745	-,043	,155	,058	,054	,035	,019	-,003	,064	,056
Adjusting to changing product or service needs of customers	,018	,079	,107	,007	,058	,130	,660	,141	-,017	,008	,102	,098
Basing product lines on market needs instead of own business policy	,156	,125	,071	,088	,122	-,040	,708	-,094	-,001	,116	,036	-,121
Taking action when a competitor launches a campaign aimed at our customers	,092	,088	,206	,144	,300	,035	,201	-,104	,096	,021	,667	-,008
Storing information	,172	,149	,080	,177	,210	,618	,106	,028	,156	,054	,040	-,070
Integrating information systems	,105	,392	,117	,180	-,032	,760	,014	,057	-,064	,081	,025	,054

Managing IT alignment	,008	,870	,147	,093	,031	,106	,092	,078	,012	-,016	,077	-,216
Managing IT capacity	-,008	,858	,112	-,010	,020	,149	,091	,073	,002	,082	,051	,114
Identification of IT resources value and threats	,029	,678	,289	,038	,137	,381	,132	-,097	,127	,110	-,080	,215
Social media marketing	,733	-,041	,157	,257	,180	,118	,019	,067	,050	,032	,165	,031
Mobile marketing	,822	-,008	,044	,294	,161	,103	,101	,015	-,035	,096	-,051	-,045
Email marketing	,185	-,110	,029	,576	,200	,133	,097	,030	-,057	-,018	,054	-,253
Search engine optimization	,381	,185	,089	,859	-,021	,091	,013	,015	-,049	,097	,053	,224
Search engine advertising	,381	,086	,043	,641	-,042	,175	,030	-,011	,035	,115	,052	-,001
Direct customer service	,358	,117	,086	,145	,093	,125	,140	,122	,031	,750	,016	,008
Interaction with online community	,685	,055	,105	,252	,155	,051	,134	,117	,053	,287	,013	-,012

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Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 14 iterations.

## Appendix E | Reliability analysis: Cronbach's Alpha values

### Market intelligence generation

Cronbach's Alpha	N of Items
.76	3

Item	Cronbach's Alpha if Item Deleted
Collect and evaluate information regarding customers	.67
Collect and evaluate information regarding competitors	.68
Data analysis	.69

### Market intelligence dissemination

Cronbach's Alpha	N of Items
.84	3

Item	Cronbach's Alpha if Item Deleted
Meetings to discuss market developments and trends	.75
Meetings to update knowledge of laws and regulations	.79
Inter-functional info sharing about technological developments for product development	.78

### Matching products/services with market needs

Cronbach's Alpha	N of Items
.63	2

Item	Cronbach's Alpha if Item Deleted
Adjusting to changing product or service needs of customers	-

Basing product lines on market needs instead of own business policy

-

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### **Social and mobile platform management**

Cronbach's Alpha	N of Items
.87	3

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

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### **IT management**

Cronbach's Alpha	N of Items
.88	3

---

Item	Cronbach's Alpha if Item Deleted
Managing IT alignment	.83
Managing IT capacity	.77
Identification of IT resources value and threats	.87

---

### **Digital marketing → search engine marketing**

Cronbach's Alpha	N of Items
.80	3

---

Item	Cronbach's Alpha if Item Deleted
Email marketing	.86

---



Search engine optimization	.61
Search engine advertising	.66

---

After deletion of *Email marketing*

Cronbach's Alpha	N of Items
.86	2

---

**IT system configuration**

Cronbach's Alpha	N of Items
.72	2

---

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

---

**Customer value**

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

## Appendix F | Regression analysis output

### Model Summary<sup>a</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
						F Change	df1	df2	
1	.74 <sup>a</sup>	.54	.40	.94440	.54	3.75	27	86	.00

a. Predictors: (Constant), Firm\_age, ProductenVsServices, Medium\_firms, Large\_firms, MI\_generation, Matching\_productsservices\_and\_market\_needs, Mon\_societal\_trends, MI\_dissemination, Competitive\_counter\_reaction, Mon\_regulations, Search\_engine\_marketing, IT\_management, Online\_customer\_service, IT\_system\_configuration, Social\_mobile\_platform\_management, ITSC\_MR, ITSC\_CCR, ITM\_MPS, ITM\_MST, ITM\_MId, ITM\_MIg, ITSC\_MId, ITSC\_MPS, ITM\_CCR, ITSC\_MST, ITM\_MR, ITSC\_MIg

### ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	90.22	27	3.34	3.75	.00 <sup>b</sup>
	Residual	76.70	86	0.89		
	Total	166.92	113			

a. Dependent Variable: DV\_\_Customer\_value

b. Predictors: (Constant), Firm\_age, ProductenVsServices, Medium\_firms, Large\_firms, MI\_generation, Matching\_productsservices\_and\_market\_needs, Mon\_societal\_trends, MI\_dissemination, Competitive\_counter\_reaction, Mon\_regulations, Search\_engine\_marketing, IT\_management, Online\_customer\_service, IT\_system\_configuration, Social\_mobile\_platform\_management, ITSC\_MR, ITSC\_CCR, ITM\_MPS, ITM\_MST, ITM\_MId, ITM\_MIg, ITSC\_MId, ITSC\_MPS, ITM\_CCR, ITSC\_MST, ITM\_MR, ITSC\_MIg

### Coefficients<sup>a</sup>

Model	Variable	B	Std. error	Beta ( $\beta$ )	t	Sig.
1	(Constant)	,593	,670		,885	,379
	ProductenVsServices	,210	,218	,087	,963	,338
	Medium_firms	-,176	,271	-,069	-,651	,517
	Large_firms	-,117	,314	-,047	-,372	,711
	Firm_age	,002	,002	,079	,848	,399
	MI_generation	,129	,098	,138	1,319	,191

Mon_societal_trends	,016	,075	,021	,217	,829
Mon_regulations	,009	,081	,012	,110	,913
MI_dissemination	,062	,079	,074	,782	,437
Matching_products_services_and_market_needs	,196	,087	,201	2,253	,027
Competitive_counter_reaction	,034	,066	,049	,520	,604
Social_mobile_platform_management	,047	,085	,066	,549	,585
IT_management	,413	,109	,398	3,794	,000
Search_engine_marketing	-,091	,069	-,147	-1,331	,187
IT_system_configuration	-,023	,098	-,025	-,231	,818
Online_customer_service	-,034	,052	-,064	-,643	,522
ITM_MIg	,079	,107	,104	,738	,463
ITM_MST	-,172	,085	-,282	-2,032	,045
ITM_MR	,049	,082	,078	,598	,551
ITM_MId	,100	,093	,116	1,068	,289
ITM_MPS	,298	,091	,334	3,268	,002
ITM_CCR	-,070	,071	-,110	-,983	,328
ITSC_MIg	-,215	,086	-,341	-2,502	,014
ITSC_MST	,087	,076	,144	1,142	,257
ITSC_MR	-,003	,072	-,005	-,043	,966
ITSC_MId	-,071	,072	-,111	-,989	,326
ITSC_MPS	-,013	,089	-,016	-,146	,884
ITSC_CCR	,144	,062	,270	2,313	,023

a. Dependent Variable: DV\_\_Customer\_value

### Significant moderation effects on customer value

*IT management and monitoring societal trends*

Test(s) of highest order unconditional interaction(s):

R2-chng	F	df1	df2	p	
X*W	,0221	4,1278	1,0000	86,0000	,0453

-----

Focal predict: Mon\_soci (X)

Mod var: IT\_manag (W)

Conditional effects of the focal predictor at values of the moderator(s):

IT_manag	Effect	se	t	p	LLCI	ULCI
-1,1719	,2179	,1250	1,7436	,0848	-,0305	,4663

,0000 ,0163 ,0753 ,2170 ,8287 -,1334 ,1661  
 1,1719 -,1852 ,1241 -1,4918 ,1394 -,4320 ,0616

Moderator value(s) defining Johnson-Neyman significance region(s):

Value % below % above  
 -2,5925 1,7544 98,2456

Conditional effect of focal predictor at values of the moderator:

IT_manag	Effect	se	t	p	LLCI	ULCI
-3,5877	,6334	,3134	2,0210	,0464	,0103	1,2564
-3,3211	,5875	,2915	2,0152	,0470	,0079	1,1670
-3,0544	,5416	,2698	2,0076	,0478	,0053	1,0780
-2,7877	,4958	,2482	1,9975	,0489	,0024	,9892
-2,5925	,4622	,2325	1,9879	,0500	,0000	,9244
-2,5211	,4499	,2268	1,9838	,0505	-,0009	,9008
-2,2544	,4041	,2056	1,9649	,0527	-,0047	,8128
-1,9877	,3582	,1848	1,9381	,0559	-,0092	,7256
-1,7211	,3123	,1645	1,8991	,0609	-,0146	,6393
-1,4544	,2665	,1448	1,8407	,0691	-,0213	,5542
-1,1877	,2206	,1260	1,7504	,0836	-,0299	,4712
-,9211	,1747	,1088	1,6065	,1118	-,0415	,3910
-,6544	,1289	,0938	1,3741	,1730	-,0576	,3154
-,3877	,0830	,0824	1,0080	,3163	-,0807	,2468
-,1211	,0372	,0761	,4885	,6265	-,1141	,1884
,1456	-,0087	,0762	-,1141	,9094	-,1603	,1429
,4123	-,0546	,0828	-,6589	,5117	-,2192	,1100
,6789	-,1004	,0944	-1,0634	,2906	-,2881	,0873
,9456	-,1463	,1095	-1,3355	,1852	-,3640	,0715
1,2123	-,1921	,1269	-1,5144	,1336	-,4444	,0601

1,4789	-,2380	,1457	-1,6340	,1059	-,5276	,0516
1,7456	-,2839	,1654	-1,7163	,0897	-,6127	,0449

*IT management and matching products and services with market needs*

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	,0571	10,6825	1,0000	86,0000	,0016

-----

Focal predict: Matching (X)

Mod var: IT\_manag (W)

Conditional effects of the focal predictor at values of the moderator(s):

IT_manag	Effect	se	t	p	LLCI	ULCI
-1,1719	-,1524	,1490	-1,0230	,3092	-,4487	,1438
,0000	,1963	,0871	2,2531	,0268	,0231	,3694
1,1719	,5450	,1254	4,3445	,0000	,2956	,7943

Moderator value(s) defining Johnson-Neyman significance region(s):

Value	% below	% above
-2,2204	7,8947	92,1053
-,0689	39,4737	60,5263

Conditional effect of focal predictor at values of the moderator:

IT_manag	Effect	se	t	p	LLCI	ULCI
-3,5877	-,8713	,3524	-2,4725	,0154	-1,5719	-,1708
-3,3211	-,7920	,3289	-2,4079	,0182	-1,4458	-,1381
-3,0544	-,7126	,3055	-2,3324	,0220	-1,3200	-,1052
-2,7877	-,6333	,2823	-2,2431	,0275	-1,1945	-,0720
-2,5211	-,5539	,2593	-2,1363	,0355	-1,0694	-,0385
-2,2544	-,4746	,2365	-2,0065	,0479	-,9447	-,0044

-2,2204	-,4644	,2336	-1,9879	,0500	-,9289	,0000
-1,9877	-,3952	,2141	-1,8462	,0683	-,8208	,0303
-1,7211	-,3159	,1921	-1,6445	,1037	-,6977	,0660
-1,4544	-,2365	,1707	-1,3856	,1695	-,5758	,1028
-1,1877	-,1572	,1502	-1,0464	,2983	-,4558	,1414
-,9211	-,0778	,1310	-,5940	,5541	-,3382	,1826
-,6544	,0015	,1138	,0135	,9893	-,2246	,2277
-,3877	,0809	,0995	,8128	,4186	-,1170	,2787
-,1211	,1602	,0897	1,7867	,0775	-,0181	,3385
-,0689	,1758	,0884	1,9879	,0500	,0000	,3515
,1456	,2396	,0858	2,7924	,0064	,0690	,4101
,4123	,3189	,0886	3,5979	,0005	,1427	,4952
,6789	,3983	,0976	4,0791	,0001	,2042	,5924
,9456	,4776	,1113	4,2914	,0000	,2564	,6989
1,2123	,5570	,1281	4,3465	,0000	,3022	,8117
1,4789	,6363	,1471	4,3264	,0000	,3439	,9287
1,7456	,7157	,1674	4,2752	,0000	,3829	1,0485

*IT system configuration and market intelligence generation*

Test(s) of highest order unconditional interaction(s):

R2-chng	F	df1	df2	p	
X*W	,0335	6,2608	1,0000	86,0000	,0142

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Focal predict: MI\_gener (X)

Mod var: IT\_syste (W)

Conditional effects of the focal predictor at values of the moderator(s):

IT_syste	Effect	se	t	p	LLCI	ULCI
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-1,3258	,4142	,1451	2,8545	,0054	,1257	,7027
,0000	,1294	,0980	1,3194	,1905	-,0655	,3242
1,3258	-,1555	,1552	-1,0019	,3192	-,4640	,1530

Moderator value(s) defining Johnson-Neyman significance region(s):

Value	% below	% above
-,3239	35,0877	64,9123

Conditional effect of focal predictor at values of the moderator:

IT_syste	Effect	se	t	p	LLCI	ULCI
-3,2500	,8276	,2894	2,8594	,0053	,2522	1,4030
-2,9750	,7685	,2673	2,8748	,0051	,2371	1,2999
-2,7000	,7094	,2455	2,8897	,0049	,2214	1,1975
-2,4250	,6504	,2240	2,9028	,0047	,2050	1,0957
-2,1500	,5913	,2031	2,9118	,0046	,1876	,9949
-1,8750	,5322	,1827	2,9125	,0046	,1689	,8954
-1,6000	,4731	,1633	2,8977	,0048	,1485	,7977
-1,3250	,4140	,1451	2,8543	,0054	,1257	,7024
-1,0500	,3549	,1286	2,7599	,0071	,0993	,6106
-,7750	,2959	,1147	2,5796	,0116	,0679	,5239
-,5000	,2368	,1043	2,2697	,0257	,0294	,4442
-,3239	,1989	,1001	1,9879	,0500	,0000	,3979
-,2250	,1777	,0986	1,8017	,0751	-,0184	,3738
,0500	,1186	,0984	1,2051	,2315	-,0770	,3143
,3250	,0595	,1037	,5738	,5676	-,1467	,2658
,6000	,0004	,1138	,0039	,9969	-,2258	,2267
,8750	-,0586	,1275	-,4599	,6468	-,3121	,1948
1,1500	-,1177	,1438	-,8187	,4152	-,4036	,1681
1,4250	-,1768	,1619	-1,0920	,2779	-,4986	,1450

1,7000	-,2359	,1813	-1,3012	,1967	-,5962	,1245
1,9750	-,2950	,2016	-1,4634	,1470	-,6956	,1057
2,2500	-,3540	,2225	-1,5912	,1152	-,7964	,0883

*IT system configuration and competitive counter reaction*

Test(s) of highest order unconditional interaction(s):

R2-chng	F	df1	df2	p	
X*W	,0286	5,3513	1,0000	86,0000	,0231

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Focal predict: Competit (X)

Mod var: IT\_syste (W)

Conditional effects of the focal predictor at values of the moderator(s):

IT_syste	Effect	se	t	p	LLCI	ULCI
-1,3258	-,1565	,1055	-1,4828	,1418	-,3663	,0533
,0000	,0344	,0662	,5199	,6044	-,0972	,1660
1,3258	,2253	,1060	2,1250	,0365	,0145	,4361

Moderator value(s) defining Johnson-Neyman significance region(s):

Value	% below	% above
-2,8448	1,7544	98,2456
1,0455	78,0702	21,9298

Conditional effect of focal predictor at values of the moderator:

IT_syste	Effect	se	t	p	LLCI	ULCI
-3,2500	-,4336	,2126	-2,0398	,0444	-,8561	-,0110
-2,9750	-,3940	,1964	-2,0064	,0480	-,7843	-,0036
-2,8448	-,3752	,1888	-1,9879	,0500	-,7505	,0000
-2,7000	-,3544	,1803	-1,9651	,0526	-,7129	,0041
-2,4250	-,3148	,1645	-1,9131	,0591	-,6419	,0123



-2,1500	-,2752	,1490	-1,8466	,0683	-,5714	,0211
-1,8750	-,2356	,1339	-1,7594	,0821	-,5018	,0306
-1,6000	-,1960	,1193	-1,6425	,1041	-,4332	,0412
-1,3250	-,1564	,1055	-1,4822	,1419	-,3661	,0534
-1,0500	-,1168	,0928	-1,2585	,2116	-,3013	,0677
-,7750	-,0772	,0817	-,9445	,3475	-,2396	,0853
-,5000	-,0376	,0730	-,5148	,6080	-,1827	,1075
-,2250	,0020	,0676	,0298	,9763	-,1323	,1364
,0500	,0416	,0663	,6279	,5317	-,0901	,1734
,3250	,0812	,0693	1,1719	,2445	-,0566	,2190
,6000	,1208	,0762	1,5865	,1163	-,0306	,2722
,8750	,1604	,0859	1,8671	,0653	-,0104	,3312
1,0455	,1850	,0930	1,9879	,0500	,0000	,3699
1,1500	,2000	,0977	2,0467	,0437	,0057	,3943
1,4250	,2396	,1109	2,1601	,0335	,0191	,4601
1,7000	,2792	,1251	2,2322	,0282	,0306	,5279
1,9750	,3188	,1399	2,2788	,0252	,0407	,5969
2,2500	,3584	,1552	2,3094	,0233	,0499	,6669

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