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The effect of strategic orientation on the commercial exploitation of digitalisation

A study on digitalisation in Norwegian companies

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Master thesis

NORWEGIAN SCHOOL OF ECONOMICS

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ABSTRACT

Digitalisation is a heavily debated topic within the business community. However, there is little empirical research on digitalisation, and accordingly practitioners define best practice. This thesis seeks to theorise strategies employed by firms in order to increase commercial exploitation of digitalisation. It investigates how the classic theoretical framework of strategic orientations influences the more diffuse theory of the concept of digitalisation. The measurement of commercial exploitation of digitalisation consists of two distinct components: digitalisation to increase revenue (i.e. digital transformation), and digitalisation to cut costs (i.e. digitisation). The results are based on a quantitative survey with respondents from medium and large Norwegian companies across service- and manufactoring industries. The thesis reveals that market oriented- and technological oriented businesses are more committed to utilise digital technology to increase their revenue. Market orientation has the strongest effect. We find no evidence to support that strategic orientation has any significant impact on companies' ability to reduce costs by applying digital technology. There was found no support of any effect from combining strategic orientations in order to increase commercial exploitation of digitalisation. Neither organisational collaboration nor communication across company departments shows any significant effect on commercial exploitation of digitalisation. Additionally, the thesis demonstrates that digital transformation leads to both a competitive advantage and increased profitability across industries. However, there is no correspondence between digitisation and these measurements of performance.

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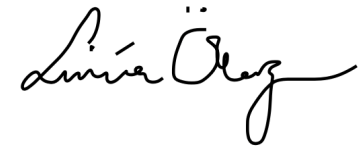

Anna Eitrem Linnéa Öberg

1. INTRODUCTION

The digital revolution is a double-edged sword (Schwab, 2015). Whereas it facilitates business model innovation and streamlining for the companies who know how to exploit its possibilities, it may lead to a sudden death for the ones who do not (Westerman, Bonnet & McAfee, 2014). The digital transformation of the current business landscape is historic in of size, speed and scope, evolving at an exponential rather than a linear pace. The revolution is taking place across all industries and indicates great uncertainty and risk to established firms. Digital technology intensifies competition by causing lower entrance costs, and facilitates the emergence of disrupting business models (Iansiti & Kahani, 2014). Success in the digital age is not about possessing the largest accumulation of technology, but knowing how to utilise it in order to exploit new business opportunities (Sannes & Andersen, 2017). The companies who systematically explore digital technology will over time increase their competitive power and innovation capacity (Mithas, Tafti & Mitchell, 2013). The aforementioned processes are known as digitalisation (Gartner, 2018a). An extensive survey from 2016 stated that Norwegian companies are lagging far behind American and Asian firms in their digitalisation efforts (Sannes & Andersen, 2016). Although 80 percent of Nordic management boards believed that digitalisation would have a strong impact on their company, only 50 percent believed that their board had the skills to support management in digital topics or that their company had a clear digital strategy (Boston Consulting Group, 2016).

According to Ragnvald Sannes and Espen Andersen (2016) at BI Norwegian Business school, there are three factors that may explain the poor state of Norwegian digitalisation efforts. Firstly, Norwegian CEOs generally show disinterest in digitalisation processes by leaving all technology decisions to their CTOs. This leads to a narrow digital strategy, where investments in digitalisation are focused on cutting costs and maintaining old IT systems, rather than on increasing sales and developing new areas of business. In comparison, American and Asian CTOs carry a broader perspective on digitalisation, with a much larger emphasis on digital innovation and increasing revenue. Secondly, Norwegian management teams spend substantially less time discussing digital strategies than their American and Asian counterparts. Thirdly, Norwegian corporations are good at incremental digital development, but struggle with radical digital innovation.

The ambition of this thesis is to theorise a topic that is heavily debated within business, while empirical evidence is scarce. Every theoretical discipline in the administrative science contributes in some way to helping managers make organisations more effective (Robbins & Barnwell, 2006). By investigating how the traditional framework of strategic orientation influences digitalisation processes in Norwegian companies, the thesis aims to provide useful insight to Norwegian managers. The results are based on a quantitative research design and an extensive literature review. In order to better understand what leads some companies to be more successful than others in their digitalisation efforts, the thesis seeks to investigate whether there are certain combinations of strategic orientations that lead to greater commercial exploitation of digitalisation. Accordingly, the research questions are as follows:

RQ1: In which way and to what extent does the different strategic orientations influence the commercial exploitation of digitalisation?

RQ2: In which way and to what extent does a combination of various strategic orientations influence the commercial exploitation of digitalisation?

RQ3: In which way and to what extent is the commercial exploitation of digitalisation moderated by the interfunctional coordination of strategic orientations?

2. THEORETICAL FRAMEWORK

This chapter presents the literature review, which shapes the theoretical framework of this thesis. Firstly, the popularised but imprecise concept ‘digitalisation’ will be defined and clarified together with its associated terminology. Secondly, we will present theory of how companies may be successful in increasing their performance through obtaining a competitive advantage. Thirdly, both institutional theory and organisational theory will be outlined, as well as the theoretical framework of strategic orientation and interfunctional coordination.

2.1 DIGITALISATION

Concepts such as ‘digitisation’, ‘digitalisation’, and ‘digital transformation’ have been frequently mentioned in the mainstream media for years. However, the meaning of these three terms, and the settings they are applied in, often varies. According to the IT glossary of the technology consultancy giant Gartner (2018b), ‘digitisation’ simply means: ‘The process of changing from analogue to digital form’. In essence, digitisation is about standardising processes of business that were previously executed by individuals. Digitisation is often associated with cutting costs, achieving operational excellence and predictability, and is an essential undertaking in many companies which allows scaling and implementing of disciplined and standardised processes (Ross, 2017). Confusingly, some scholars describe ‘digitalisation’ with the exact same wording as digitisation (Zott & Amit, 2017). However, Gartner (2018a) defines digitalisation as ‘the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business’. This definition is also in line with Andersen and Sannes (2017), who characterise digitalisation as ‘The process where IT is transformed from being a support system to become a part of the company’s DNA’. To make the confusion of the terminology even more pronounced, Singh and Hess (2017) label Andersen and Sannes’ definition of digitalisation as ‘digital transformation’. They also add that digital transformation implies the ‘utilisation of new technologies to cause remarkable business improvements such as enhancing customer experience, streamlining operations and reinventing or creating new business models’. This transformation will typically involve a company-wide digital strategy, holistically addressing all the opportunities and risks derived from new technology. This entails rethinking the company’s value proposition, and not only

its operations. For most organisations, a digital transformation includes having to upgrade existing IT-infrastructure to create technological, business and organisational flexibility (Westerman et al., 2014).

According to the above-mentioned definitions, one may conclude that the terms digitisation, digitalisation and digital transformation all describe the transformative process where something is made digital. However, where digitisation is mainly a process of efficiency and automatisation, digitalisation and digital transformation involve business model reconfiguration and innovation in order to create new revenue streams. We argue that digitalisation is a collective term for both of Gartner's definitions of digitisation and digitalisation. This is the definition of digitalisation that will be applied in this thesis. However, in the discussion of why firms digitalise, the terms 'digitisation' and 'digital transformation' will be used independently to reflect two separate phases of digitalisation in Norwegian companies.

TABLE 1

DIGITALISATION

DIGITAL TRANSFORMATION	DIGITISATION
Business model reconfiguration and innovation in order to create new revenue streams through the use of digital technology.	Streamlining and automatisation in order to reduce costs through the use of digital technology.

Table 1: The two components of digitalisation. Sources: Ross, 2017; Gartner, 2018.

2.2 THE DIGITAL ORGANISATION

In order for a company to become a digital organisation, it needs to develop a digital strategy (Andersen & Sannes, 2017). The relationship between strategy and digitalisation is presented in Figure 1.

FIGURE 1

DIGITALISATION AND STRATEGY

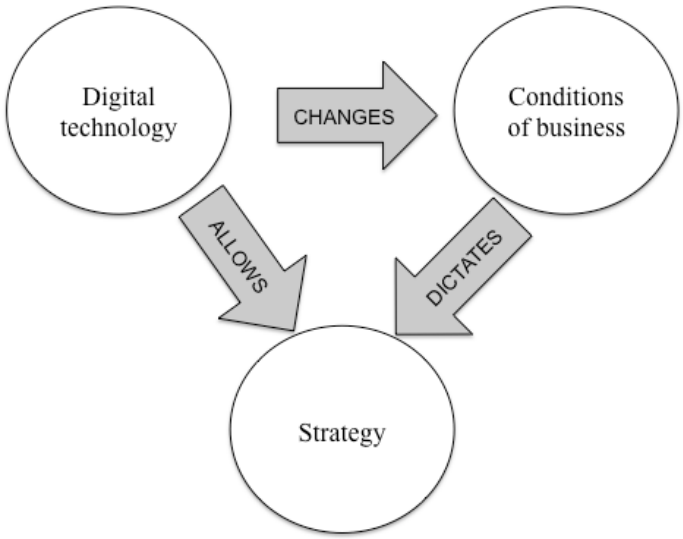

Figure 1: The connection between digitalisation and technology (Andersen & Sannes, 2017).

The figure presents how digital technology transforms the terms and conditions of business: Costs are changed, new opportunities arise and new competitors appear. New market conditions force industries to change their strategies in order to survive and evolve. In order to have a digital strategy, the 'change' arrow in the model is the most important. Companies need to understand the connection between changes in technology and changes in the terms and conditions of business. By doing so, they will be able to change their strategy before they are forced to. This understanding is not easy, especially when the company is still able to earn money on what they did before. There are few businesses that manage to complete this transition (Andersen & Sannes, 2017). Technology has always been tightly connected to

this challenge, as well as the ability to protect the future against the past – you have to invest in new platforms although you earn money on the old ones, and in this sense out-compete yourself. This strategy was first introduced as 'Skate to where the money will be' (Christensen, Raynor & Verlinden, 2001).

According to Andersen and Sannes (2017), digital companies have several characteristics: (1) Technology and business is one: In a digital organisation there is no divide between technology and business. Technology *is* the business, and the other way around. (2) Technology is primarily a tool for innovation: Many companies consider informational technology as an administrative cost. In a digital company, technology is considered as an investment in innovation, and business systems are measured by the degree to which they offer continuously and instant innovations for performance and functionality (Ross, Weill, & Robertson, 2006). (3) Decisions are based on experiments and data, not intuition: In a digital company one continuously experiments and comes up with ideas for improvements, implements these and tests them on a part of the business to see if it works better than existing services. The decision of which solutions to choose is made based on the results of these experiments, not on one or several leaders experience of what sounds reasonable. (4) New offers start simple, develop consecutively and solve the basic problems first: It is next to impossible to plan which types of advanced business systems one needs in a competition situation with continuously and rapid change, followed by spending several months on documenting and posting it for tender. Instead, one needs to create something that solves the most pressing issues quickly, and then scale that system if it works. (5) The organisation needs to adapt to technological systems and customer's needs: When everything can be communicated, saved and calculated, one needs to be able to think differently about how one relates to customers and employees. In many cases this indicates that companies need to change some of the assumptions they have about what a customer is, and what an employee is. For example, a lot of leaders today are convinced that all of their customers and employees are: a) only a customer or an employee, and b) give the company a hundred per cent of their digital attention. In the real world, people have a lot of roles and relations that the company might take advantage of. A modern employee or customer has his or her own personal information infrastructure. To force customers and employees into rigid structures, or worse, force them to adapt to old organisational structures is not expedient.

2.3 COMMERCIAL EXPLOITATION

2.3.1 Defining strategy

In order to study the impact of organisational structures, it is necessary to define the term 'strategy'. According to Chandler (1962), strategy is 'the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals' (cited in Robbins & Barnwell, 2006, p.147). In other words, strategy is the company's principles on how to achieve high levels of performance in the markets in which it operates. Strategic decisions within a company define its purpose and direction (Robbins & Barnwell, 2006).

2.3.2 Company performance and competitive advantage

Previous research has operationalized company performance with measures such as growth in sales, success of new products and return on assets (Narver & Slater, 1990). Others define it as market share and overall performance of the company (Jaworski & Kohli, 1993). According to Walker and Ruekert (1987, p. 30), 'a company's performance represents the success of a company's offerings in relation to those of competitors, measured in sales, growth or changes in market share'.

A company possesses a competitive advantage when it manages to create greater economic value than its competitors (Barney, 2014). Economic value is defined as the difference between perceived value gained by customers buying the products and services, and the cost of these products and services. Hence, the size of one company's competitive advantage is the difference between the value created by the company and the value created by its competitors (Barney, 2014). According to Porter (cited in Robbins & Barnwell, 2006, p. 162), having a competitive advantage is the fundamental basis of above-average performance in the long run. A firm can enjoy two types of competitive advantages, either based on differentiation or costs. The company's core activities, combined with their efforts to gain a competitive advantage lead to three generic strategies to achieve high performance in an industry: differentiation, cost leadership and focus. The choice of strategy is based on the organisations strengths and competitors weaknesses.

FIGURE 2

SOURCE OF COMPETITIVE ADVANTAGE

	Differentiation	**Costs**
Broad marked	Differentiation leadership	Cost leadership
Narrow marked	Differentiation focus	Cost focus

Figure 2: Porter's framework for gaining and sustaining a competitive advantage. This thesis focuses on businesses with generally a broad market, as we aim to generalise our results for medium to large Norwegian companies. 'Differentiation leadership' and 'cost leadership' are therefore outlined in grey.

2.3.3 Differentiation

A differentiation business strategy indicates that the company aims to gain a competitive advantage by standing out in its industry in ways which are valued by customers (Porter, cited in Robbins & Barnwell, 2006, p. 162). The company chooses attributes perceived as important by customers, and positions itself in a unique way, enabling them to charge a price premium. The differentiation can include emphasising high quality, innovative design, extraordinary service, and technological capability or brand image. The differentiation attribute must be different from those offered by competitors as well as significant enough to justify a price premium which exceeds the cost of the differentiation factor (Robbins & Barnwell, 2006). At the same time, a company applying a differentiation strategy cannot ignore the cost and must aim at having equal or similar cost levels relative to competitors. Differentiation is ultimately an expression of the creativity of a company, and is only limited by opportunities which can be created and by the ability and willingness of companies to take advantage of these (Barney, 2014). A company will perform above average in the industry and gain a sustainable competitive advantage if the strategy is rare and costly to imitate for competitors.

2.3.4 Cost Leadership

A cost leadership strategy indicates that a company aims at gaining advantages through reducing costs below all of its competitors (Barney, 2014). To be successful with such a strategy, the company needs to be the cost leader, and not just one of many low-cost offers. At the same time, the product or service offered must be seen as comparable to that offered by competitors. Hence, the company cannot ignore differentiation and needs to achieve equality or similarity in relation to competitors in bases of differentiation. Means to obtain such a competitive advantage are efficiency of operations, economies of scale, technological innovation, low-cost labour and preferential access to raw materials (Robbins & Barnwell, 2006). The cost leadership strategy needs to be rare and costly to both copy and substitute in order for it to generate a sustained competitive advantage for the company (Barney, 2014). A company that manages to achieve and sustain cost leadership, will perform above average in its industry seeing as it can charge prices near industry average or below.

2.3.5 A critique of Porter

In recent years, Porter's theoretical framework for competitive advantage has received criticism from several holds. Firstly, it has been criticised for being out-dated, and that the times when a company could gain a competitive advantage by pursuing a single-minded generic strategy are over (Miller, 1992). Specialisation may lead to inflexibility in the company, and this may lead to companies ignoring changes in customer needs. Wright, Knoll, Caddie and Pryingle (1990) purpose that both low-cost- and differentiation strategies can be adopted by a company at the same time. Amongst the reasoning for Porter's argument was the belief that a differentiation strategy implies promoting higher quality, involving higher costs for the company. However, higher quality often leads to increased demand, allowing the company to also apply a low-cost strategy due to higher market share and economies of scale through higher production volume. Furthermore, a company that only focuses on applying a low-cost strategy might be vulnerable to moves of competitors. This through having a profit margin squeeze, meaning that the company has limited ability to implement measures to improve product quality or increase spending on marketing activities. Another vulnerability may be that competitors might offer counter products at predatory prices due to having lower costs (Wright et al., 1990). Miller and Friesen (1986) further claim that companies who showed distinct competencies in areas of differentiation, cost leadership and focus outperformed others. In other words, a combination of Porter's two

distinct recipes to gain a competitive advantage might lead to increased company performance. Sannes and Andersen (2016) also support the critique of companies investing all in a single-minded strategy, especially today, when industries are being transformed at higher speed than ever before. They claim that a narrow focus on cost reduction might lead companies to miss out on competitive advantages, and that Norwegian companies are lagging behind due to having a single-minded strategy.

2.4 INSTITUTIONAL THEORY

Institutional theory is based on the notion that an organisation and its environment is primarily a social construction (Clegg, 1981). The theoretical framework integrates an organisation's past actions and the social and environmental pressures on it to explain organisational practices and the more resilient aspects of social structures (Robbins and Barnwell, 2006). Institutional theory proposes that organisations are influenced not only by their internal processes, but also by the need to adapt to the institutional pressures in the external environment. These pressures lead to institutionalised responses, which in term influence organisational actions and management decisions into becoming imitations of past experiences. The external institutionalised demands can be divided into two broad types. The first is technological and economic demands, which may be seen most clearly in the expectation that profit-seeking organisations show a profit, innovate and respond to change. Management must develop organisational structures to meet these demands. This type of demand may also emerge from government regulations and laws. The second institutional demand is social demands, which reward organisations for conforming to societal values, norms and expectations. These are basically cultural expectations. Additional social demands arise from the pressure to conform to the practices of other organisations - that is to mimic them. Managers are consistently studying other organisations and copying innovations they feel may be of use to them. This sometimes leads to organisations following the ideas of the latest fashion or trend in management thinking, often with inadequate consideration as to whether it would be of benefit to them. Although all organisations must respond to both economic and social demands, for many one group clearly dominates (DiMaggio & Powell, 1983). This adaption lies behind the emergence of similar types of organisations, known as isomorphism. Isomorphism means that organisations within a field take on similar forms to survive competitively in their environment.

2.5 ORGANISATIONAL THEORY

In contrast to the field of organisational behaviour, organisational theory is concerned not only with employee performance and attitudes, but also with the overall organisation's ability to achieve its goals and adapt to its environment (Robbins & Barnwell, 2006). Organisational theory includes the study of the structure and design of organisations. However, organisations consist of far more than organisational design. They develop personalities, which is also known as organisational culture. Organisational culture has been defined as 'the dominant values espoused by an organisation' (Robbins & Barnwell, 2006, p. 405). In every organisation there are patterns of beliefs, symbols, rituals, myths and practices that have evolved over time. These promote common understanding among members as to the purpose of the organisation and the way it's members are expected to behave. The purpose of an organisational culture is to enable the organisation to survive in the industry it operates in. The culture of an organisation is expressed through the values and behavioural norms of organisational members. Values can either be terminal or instrumental. *Terminal values* refer to the desired end-state or outcome that people try to attain. Examples of terminal values are achieving a certain type of quality or performance level. *Instrumental values* refer to desired modes of behaviour. Examples are the standards of conduct of organisational members, professional standards, attitude towards work, the nature of cooperation within an organisation, and values that influence certain patterns of communication.

Our discussion indicates that culture exists in two levels. The first level is the outward manifestations of the culture, which are observable and capable of some form of interpretation. For instance, we can identify the symbols of the organisation, the pattern of communications, the physical arrangement of workspaces and the ways in which power is expressed (Robbins & Barnwell, 2006). The second level of culture is composed of the deeply held values, beliefs, assumptions, attitudes and feelings that underline behaviour. Beliefs and assumptions at this level are difficult to identify and hence interpret and understand.

2.6 STRATEGIC ORIENTATION

A theoretical framework that seeks to categorise different types of business level strategies and organisational culture is the theory of strategic orientations. According to Narver and Slater (1990, p. 20), a company's strategic orientation 'reflects the strategic directions implemented by a firm to create the proper behaviours for the continuous superior performance of the business'. In this thesis, strategic orientation is defined as 'principles that direct and influence the activities of an organisation' (Hakala, 2011, p. 210), and 'reflects what set of actions the company believes will lead to superior performance' (Gatignon & Xuereb, 1997, p. 78). Furthermore, the company's strategic orientation manifests its culture and serves as a guideline to organisational practices and decisions related to resource allocation and pursuing opportunities (Deshpandé et al., 1993). The choice of strategic orientation is often based on the tangible and intangible resources the company possess (Narver & Slater, 1990). In practice, this implicates that the strategic orientation generally reflects the beliefs and mental models of the senior executives in the company (Hitt et al., 1997). An organisation may have a certain degree of an orientation rather than it being present or absent. Consequently, organisations will differ in the extent to which they possess the different orientations. Drawing on this, we will look closer into the following strategic orientations: Market orientation, technological orientation, entrepreneurial orientation and learning orientation.

2.6.1 Market orientation

Market orientation can be defined as the set of cross-functional processes and activities directed at satisfying customers through continuous needs-assessment (Deshpandé & Farley, 1998). This orientation is based on the assumption that companies gain and sustain their competitive advantage by effectively serving dominant stakeholders and constantly meeting the changing needs of the market (Narver & Slater, 1990). Market orientation is not limited to the marketing departments, but viewed as representative of an organisation wide customer and market centred culture. As every step of the customer value chain gives an opportunity for value creation for a company, all the different functions in a company may potentially contribute to the value creation (Barney, 2014, p.15). Narver and Slater (1990) suggest and describe three behavioural components of market orientation. These are: customer orientation, competitive orientation and interfunctional coordination.

By customer orientation, the authors imply the collection of relevant information from the market in order to understand the customer's needs and personality, and in this way continuously offering them increased value. Companies need to be aware of the customer's value chain, and its development from internal and external influences.

Competitive orientation is the ability and will to identify, analyse and respond to competitors actions as well as customers needs (Gatignon & Xuereb, 1997). It signifies that the company needs to use the information collected to understand short time strengths and weaknesses, as well as long term opportunities and challenges to both competitors, key customers and future potential customers (Porter, 1980). Both customer and competitive orientation include all activities involved in gathering information about the client and competitors, as well as communicating this information across the organisation.

The third component, interfunctional coordination is based on how well the information and mix of the two previous components are distributed and shared within the firm. This component is based on the notion that it takes more than the marketing department to create value for the customer. In recent years, scholars have defined interfunctional coordination as a construct distinct from market orientation. The reason for this is that it describes the collaborative effects amongst not only the different components of market orientation, but also the other different strategic orientations. Interfunctional coordination will be thoroughly defined and elaborated in in chapter 2.7, p. 21.

Many scholars have studied the effect of market orientation on various measures of company performance. According to Narver and Slater (1990), market orientation is an important determinant of profitability. Furthermore, Gatignon and Xuereb (1997) found that the component of competitor orientation is important for companies who seek to develop innovations in high-growth markets.

2.6.2 Technological orientation

A technologically oriented company can be defined as 'as a firm with the ability and will to acquire a substantial technological background and use it in the development of new products' (Gatignon & Xuereb, 1997, p. 80). In other words, a technological orientation refers to a company's openness to new ideas and propensity to adopt new technologies during product development (Hurley & Hult, 1998). A technological orientation can derive from a management team who 'focus energy at creating good products and improving them

over time' (Kotler, 1984, p. 17). A technological orientation is naturally a key attribute for technological companies, but may also appear in any industry, as long as the company has a strong managerial emphasis on IT and technology (Workman, 1993).

Unlike the customer-pull philosophy of a market orientation, a technological orientation reflects the philosophy of a 'technological push', stating that consumers are likely to prefer technologically superior products and services (Gatignon & Xuereb, 1997). Accordingly, a technological orientation is characterised by three aspects. These are the degree of commitment to R&D, acquisition of new technologies and the application of these.

Firstly, companies with a high degree of commitment to R&D will possess a culture, which harmonises its structures, systems and resources with technology, and highlights the company's propensity to use technology as a competitive advantage (Gatignon and Xuereb, 1997). Secondly, acquisition of new technologies, involves spending substantial resources on innovation. A company with such an orientation will have smaller emphasis on the actual innovation cost, at least when the innovation is introduced (Kelly, 1994). However, it also involves noticing promising technology and imitating and adopting it into company processes (Halac, 2015). Thirdly, application of technology refers to companies applying their technological knowledge to build new technological solutions in order to answer to customer needs. Using, advancing and transferring technologies are likely to lead a company to increase the speed of production, provide cost advantages and improve decision-making.

2.6.3 Entrepreneurial orientation

Entrepreneurial orientation is a widely accepted instrument for capturing a firm's propensity toward entrepreneurship (Rauch et al, 2009). According to Hult and Ketchen (2001, p. 901), an entrepreneurial orientation is an indicator of a company's wide tendency 'to engage in the pursuit of new market opportunities and the renewal of existing areas of operation'. Furthermore, a key factor for an entrepreneurial orientation is differentiation (Hughes et al., 2007). A company with great emphasis on this strategic orientation will try adapting to environmental changes and market trends before competitors, and by this weaken the ability of rivals to compete and respond to the company's actions in the future. The work by Miller (1983) and Covin and Slevin (1989) highlight three key components that can measure a company's entrepreneurial orientation. These are the degree of innovativeness, proactiveness and risk-taking. Innovativeness is defined as the propensity to participate in supporting new

ideas, creative processes and experimentation, which results in the development of new products, services or technologies (Lumpkin & Dess, 1996). Proactiveness refers to the extent to which a firm anticipates and acts on future needs by 'seeking new opportunities which may or may not be related to the present line of operations' (Venkatraman, 1989, p. 949). Proactivity involves pioneering behaviour, which is done to meet competition and face future contingencies (Gonzalez Benito et al, 2008). Finally, risk-taking is associated with the willingness of the firm to inject a higher level of resources in projects where the error cost can be very high (Wiklund & Shepherd, 2005) and 'the degree to which managers are willing to make large and risky resource commitments' (Miller & Friesen, 1978, p. 923). Companies with a high degree of entrepreneurial orientation take more risks than other companies when met with uncertainties (Khandwalla, 1997).

Lumpkin and Dess (1996) further suggest that autonomy and competitive aggressiveness are characteristics of an entrepreneurial orientation. Autonomy refers to independent actions aimed at bringing about new ventures, and competitive aggressiveness refers to a company's propensity to challenge its competitors to achieve entry or improve position in the marketplace (Lumpkin & Dess, 1996).

2.6.4 Learning orientation

Learning orientation can be measured as 'the degree to which a company is committed to systematically challenge its fundamental beliefs and practices' (Sinkula, Baker & Noordewier, 1997, p. 66). This strategic orientation is reflected by knowledge-questioning values. According to Dickson (1996), learning is an important resource that can give companies a competitive advantage, as it enables companies to continuously improve at a faster pace than competitors. A company with a strong degree of learning orientation is committed to learning, open-minded and has a shared vision (Sinkula et al., 1997). Being committed to learning entails that the company emphasise the need to comprehend the cause and effects of its own actions (Shaw & Perkins 1991). Such a focus is crucial to detect and correct the theories, which are being applied within the organisation. Moreover, as mental models and habits can limit our ways of thinking, open mindedness and the concept of 'unlearning' become important (Nystrom & Starbuck, 1984). Questioning long-held assumptions and beliefs means practicing unlearning to enable organisational change. Individuals in a company are less likely to share dominant logics and the desired outcomes

of the company if a shared vision is missing. Lacking a commonly understood organisational focus can also lower the motivation of employees to learn (Day, 1984).

A company with a learning orientation scans the external environment for better means to deliver value, and the orientation can be seen as the result of a proactive organisational behaviour (Baker & Sinkula 1999a). This orientation will influence the degree to which companies consider generative learning as a core competence (Slater & Narver, 1995). Such a company is further committed to an on-going, open-minded inquiry into the veracity of its external marketplace theories-in-use and internal operating procedures (Baker & Sinkula, 1999b). It encourages its employees to question how they operationalize their market-oriented behaviours (Day, 1984). But also how they interpret the informational output of these behaviours and how they integrate this information with other information (Baker & Sinkula, 1999b). A learning orientation approach hence recognises circumstances when customer information may be flawed or misleading, and is willing to question the assumption that a marked-oriented approach always leads to successful innovation. Having a learning orientation is associated with superior organisational performance as it leads firms to constantly question their operating philosophies, enabling them to create knowledge and in a better way respond to their environment. Baker and Sinkula (1999b) studied the relation between a learning orientation, market orientation and organisational performance (innovation-driven performance). They found that a strong learning orientation is the most important to maximise the effectiveness of innovation processes.

2.6.5 A combination of strategic orientations

Many scholars have studied the effect of a combination of strategic orientations on different measures of company performance. Firstly, it was found that in order to obtain a high degree of organisational performance, it is beneficial to apply a combination of market and learning orientation (Baker & Sinkula, 1999b). Moreover, according to Gatignon and Xuereb (1997), companies should be customer-oriented and technologically oriented in markets where the level of demand is uncertain. González-Benito et al. (2009) also support this combination, and found that a combination of entrepreneurial orientation and market orientation leads to a positive contribution on performance. Another study stresses the focus on having a balanced culture, combining both a market orientation and technological orientation in order to maximise the benefits of strategic outcomes (Srivastava, Yoo & Frankwick, 2013).

2.7 INTERFUNCTIONAL COORDINATION

Interfunctional coordination can be defined as: ‘the coordinated integration of the firm's resources in creating superior value for customers and the resulting synergistic effects of such coordination are closely tied to the orientations of the firm’ (Narver & Slater, 1990 p. 22). Interfunctional coordination refers to the specific aspects of the organisational structure that facilitate communication amongst the organisation's different functions (Gatignon & Xuereb, 1997). Although the term has been considered as part of the market orientation concept (Narver & Slater, 1990), we follow the organisational behaviour literature that defines this construct as an influential aspect of the organisational structure (Thompson 1967). This construct is conceptually distinct from the strategic orientation of the firm, which reflects broad strategic choices. It is the mechanism that enables the four necessary strategic orientations to work jointly.

The interfunctional coordination of a company’s departments involves a combination of interfunctional communication and cross-functional cooperation (Pinto and Pinto, 1990). Interfunctional communication can be defined as patterns of communication within the organisation. Such behaviour can furthermore be described as cross-functional communication, or interaction, which is defined as ‘the vehicle through which personnel from multiple functional areas share information that is critical to the successful implementation of projects through exchanges of information amongst departments’ (Pinto & Pinto, 1990, p. 201). These exchanges may take place during meetings, conferences and through reports. Communicating between functions in an organisation is important to build and maintain a productive interface between units. Cooperation can be defined as the concept of ‘a joint behaviour toward some goal of common interest’ (Pinto & Pinto, 1990, p. 204). Moreover, cross-functional cooperation is defined as ‘the quality of task and interpersonal relations when different functional areas work together to accomplish organisational tasks’ (Pinto & Pinto, 1990, p. 204). The need for such cooperation stems from the necessity to link interdependent functions together in order to reach the overall goals of the organisation (Pinto & Pinto, 1990).

Interfunctional coordination (level of coordination and communication) is a prerequisite if a progressive company is to constantly adapt it’s offering to suit expressed or latent needs of existing or potential customers (Balodi, 2014). It enables firms to pick up warning or

opportunity signals, process and convert them into specific departmental deliverables; and ensures congruence of effort.

Scholars have studied the effect of interfunctional coordination on company performance, and Pinto and Pinto (1990) suggest that interfunctional coordination leads to higher project success, consequently increased company performance.

3. RESEARCH MODEL AND HYPOTHESES

Our research model and hypotheses were developed in order to answer this master thesis' problem definition: How does strategic orientation influence the commercial exploitation of digitalisation? This thesis will hence define commercial exploitation of digitalisation as a result of increased revenue through a differentiation strategy, and reduced cost through a cost leadership strategy. This implies that commercial exploitation of digitalisation may be considered as a means to improve company performance.

Following the three research questions outlined in the introduction, our approach is tripartite. Firstly, the thesis aims to examine how each strategic orientation may influence the commercial exploitation of digitalisation. Secondly, we will study whether a combination of strategic orientations will increase these effects. Thirdly, we will test how adding interfunctional coordination as a moderating variable to each strategic orientation will influence the commercial exploitation of digitalisation. Consequently, we present the following research questions:

RQ1: In which way and to what extent does the different strategic orientations influence the commercial exploitation of digitalisation?

RQ2: In which way and to what extent does a combination of various strategic orientations influence the commercial exploitation of digitalisation?

RQ3: In which way and to what extent is the commercial exploitation of digitalisation moderated by the interfunctional coordination of strategic orientations?

3.1 RESEARCH MODEL

A premise of this thesis is that digitalisation is a means to gain a competitive advantage, and that the two components of digitalisation correspond with differentiation leadership and cost leadership. While digitisation is mainly a process of efficiency and automatisation, contributing to a company reducing its expenses, digital transformation involves that a company goes through business model reconfiguration and digital innovation in order to digitally differentiate itself and increase revenue. The two dependent variables in our research model, namely the outcome variables, are based on two components of a

digitalisation strategy: 'digital differentiation' and 'digital cost leadership'. Interfunctional coordination is applied as a moderating variable, possibly influencing the relationship between the independent and dependent variables. The independent variables in our model, namely the predictor variables, are different forms of strategic orientations. We also include control variables in our model. Control variables are variations that might be due to exogenous factors (Saunders, Lewis & Thornhill, 2016). These variables can potentially undermine the inference drawn about the relationship between the independent variable and the dependent variable. The control variables will be measured and kept constant through all of our analyses to avoid this undermining of inference.

FIGURE 3

RESEARCH MODEL

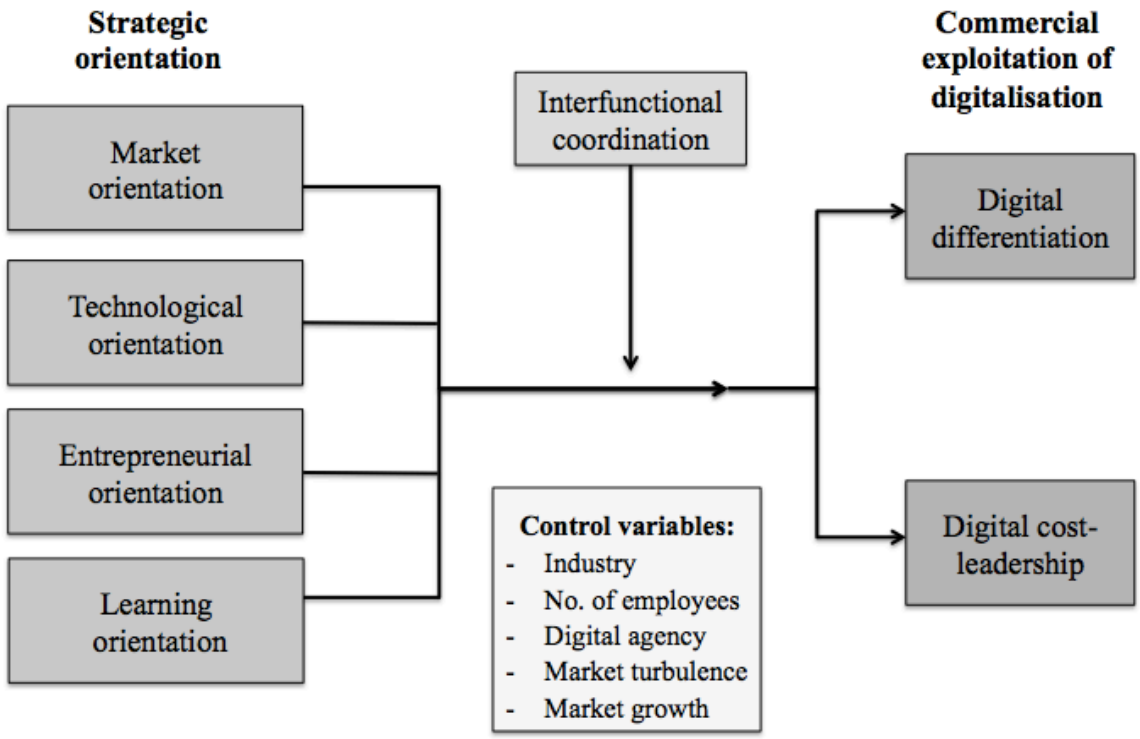

Figure 3: The research model for our problem definition: How does strategic orientation influence the commercial exploitation of digitalisation?

3.2 HYPOTHESES

3.2.1 Strategic orientation and digitalisation (H1) and (H2)

In the literature review, we presented how companies may boost their performance by attaining a competitive advantage (Barney, 2014). As outlined, a low-cost strategy, a differentiation strategy, or a combination of the two, can all lead to this. Moreover, the literature review demonstrated that the different strategic orientations of a company might influence performance. We therefore believe that it is reasonable to assume that the commercial exploitation of digitalisation also will be influenced by the companies' strategic orientation. Hence we posit the following two hypotheses:

(H1): A company's strategic orientation will influence digital differentiation.

(H2): A company's strategic orientation will influence digital cost leadership.

3.2.2 Market orientation and digital differentiation (H3)

A market orientation implies characteristics like gathering customer insights and keeping a close eye on competitors in order to meet customer needs. In other words, a market oriented company constantly search for ways to increase the value of its offerings (Ross, 2017). According to Andersen and Sannes (2017), these are important characteristic of digital organisations, with reference to the fifth argument in chapter 2.2 (p. 10**)**. A market orientation also harmonises with Porter's theory on gaining a competitive advantage through differentiation (cited in Robbins & Barnwell, 2006, p. 162). Furthermore, previous research has found a positive relationship between market orientation and company performance (Narver and Slater, 1990). In this thesis, we assume that commercial exploitation of the two components of digitalisation leads to increased performance. Based on the characteristics of a market orientation and previous research, it is reasonable to expect that a market oriented company will apply a differentiation strategy in order to improve their offerings and gain a competitive advantage. Hence, we posit the following hypothesis:

(H3): Market orientation will have a positive effect on digital differentiation.

3.2.3 Technological orientation and digital cost leadership (H4)

Companies with a technological orientation will use their knowledge to build solutions to meet customer needs, and hence possibly gain a competitive advantage (Gatignon & Xuereb, 1997). A competitive advantage through cost reduction, also known as a cost leadership strategy, can be operationalized through increasing the efficiency of operations, economies of scale or through technological innovations (Robbins & Barnwell, 2006). According to Andersen and Sannes (2017), a dominant technological department leads to a stronger emphasis on measures to increase efficiency through digital technology. Therefore, we expect that a company's degree of technological orientation will influence the strategic focus of digitalisation processes, and lead to the company seeking a competitive advantage through digital cost leadership. Hence, we posit the following hypothesis:

(H4): Technological orientation will have a positive effect on digital cost leadership.

3.2.4 Entrepreneurial orientation and digital differentiation (H5)

A key factor for an entrepreneurial orientation is differentiation (Hughes, Hughes & Morgan, 2007). An entrepreneurial oriented company will aim to gain its competitive advantage by adapting rapidly to environmental changes and market trends before competitors, and 'skate to where the money will be' (Christensen et al., 2001). According to Andersen and Sannes' (2017) characteristics of digital organisations, it is necessary to invest in risky projects and attempt to find new ways of doing business before the old ones expire. As previously mentioned, a company can gain a competitive advantage by applying a differentiation strategy (Porter, cited in Robbins & Barnwell, 2006, p. 162). Consequently, we suggest a connection between an entrepreneurial orientation and a differentiation strategy. Based on this, we expect that a company's degree of entrepreneurial orientation will influence the strategic focus on digitalisation and potentially lead to a competitive advantage through increased revenue. Hence, we posit the following hypothesis:

(H5): An entrepreneurial orientation will have a positive effect digital differentiation.

3.2.5 Learning orientation and digital differentiation (H6)

A company with a learning orientation gains a competitive advantage in the market by scanning the external environment for better means to deliver value (Baker & Sinkula,

1999). Furthermore, a learning orientation emphasises the importance of unlearning and continuously questioning the current organisational structure. Baker and Sinkula (1999) found that a learning orientation maximises innovation processes. It is reasonable to assume that the characteristics of this orientation are related to a differentiation strategy, as it enables companies to continuously improve at a faster pace than competitors (Porter, cited in Robbins & Barnwell, 2006, p. 162). Andersen and Sannes' (2017) also highlight these same characteristics as essential for a digital organisation. Accordingly, we expect that the degree of learning orientation within a firm will influence digitalisation through digital differentiation, and posit the following hypothesis:

(H6): A learning orientation will have a positive effect on digital differentiation.

3.2.6 Combinations of strategic orientations (H7) and (H8)

Our definition of digitalisation involves two components: digital transformation (business model reconfiguration and digital innovation) and digitisation (efficiency and automation). The strategic orientations presented above values and emphasise various means to achieve superior performance and hence competitive advantages. It is likely that the different strategic orientations will influence the choice of digital strategy.

As previously mentioned, several scholars have found a positive interaction effect on company performance deriving from combinations of different strategic orientations. We expect that this will also be the case for digitalisation. Furthermore, Wright and colleagues (1990) propose that both low-cost- and differentiation strategies can be adopted simultaneously by a company in order to better meet the demands of the market. In hypotheses H3-H6, we presume that a technological orientation will have a positive effect on digital cost leadership and reducing cost, whereas we expect the other orientations to have positive effects on digital differentiation and increasing revenue. Accordingly, we expect that a combination of technological orientation and the other orientations will lead to a combined focus on digital cost leadership and digital differentiation, resulting in increased commercial exploitation of digitalisation. Thereby, we propose the following hypotheses:

(H7): An interaction effect from combining technological orientations and other strategic orientations will have a positive effect on digital differentiation.

(H8): An interaction effect from combining technological orientations and other strategic orientations will have a positive effect on the digital cost leadership.

3.2.7 Interfunctional coordination and digitalisation (H9) and (H10)

As stated in our literature review, the interfunctional coordination within a company is crucial if the company is to continuously adapt its offerings to suit the often-changing needs of customers. It enables companies to enjoy congruence of effort across departments and strategies. The strategy of a company contains principles on how to achieve high levels of performance, which can be done through obtaining a competitive advantage (Barney, 2014). There is some research to support that interfunctional coordination is an important factor for company performance (Pinto & Pinto, 1990). As digitalisation is a means to create new revenue streams (Gartner, 2018a), we expect that companies are somewhat performance oriented in their digitalisation strategy. Without the presence of interfunctional coordination, a single department of the company rules the digitalisation process. Therefore, we expect that the presence of interfunctional coordination may increase the potential of a company's commercial exploitation of digitalisation. Accordingly, we posit the following hypothesis:

(H9): Interfunctional coordination will strengthen strategic orientations' effect on digital differentiation.

(H10): Interfunctional coordination will strengthen strategic orientations' effect on digital cost leadership.

4. METHODOLOGY

In this chapter we will present the techniques and procedures used to collect and analyse our data, as well as associated implications. In brief, the data was collected through an online questionnaire, and the analysis was conducted through the method of ordinary least squares (OSL).

4.1 RESEARCH APPROACH

The research of this thesis was carried out with an objective and external view, namely a positivistic approach (Dudovskij, 2016). Furthermore, the study can be characterised as deductive, as the intention was to collect observable and measurable data, and use this to create universal rules to explain and predict behaviour (Crotty, cited in Saunders et al., 2016, p. 145). This entails that we utilised existing theory to develop our hypotheses, and designed a research strategy to test these. By doing so, we seek to explain the causal relationships between the variables in our model.

4.2 RESEARCH DESIGN

A research design is a general plan for how to answer the outlined research questions. There are three types of research designs: exploratory, descriptive, and explanatory (Saunders et al., 2016). As this thesis has a positivistic and deductive approach, the research designs suitable are either descriptive or explanatory designs. An exploratory study is useful to clarify the understanding of an issue, problem or phenomenon when the researcher is unsure of its nature. An advantage of such research is that it may commence with a broad focus, but that it is flexible and adaptive and will narrow down as new insights arise. Explanatory studies seek to study a situation or a problem in order to establish causal relationships between variables. We have chosen to apply an explanatory research design as this research aims to study the relationship between the chosen variables.

4.3 RESEARCH STRATEGY

Whereas the research design is the overall plan for the study, the research strategy is a plan of action, describing the details of how data will be collected and analysed (Saunders et al., 2016). A suitable research strategy should lead to answering the research question and explaining the causal relationship between variables. The first methodological choice regarding research strategy is to decide on either a quantitative, qualitative or a mixed method research design. Based on the general characteristics of the research questions and sample size, we concluded on a quantitative method. We chose to apply a survey strategy to our research, allowing us to collect a great amount of quantitative data in an economical way that can easily be compared and analysed.

4.4 DATA COLLECTION AND SAMPLE

4.4.1 Data type and time horizon

The objective with our research was to study the relationship between the chosen variables in detail. After an extensive search in previous literature, we found no other research on the relationship between strategic orientations and digitalisation. We therefore based our analysis on primary data, i.e. new data collected specifically for our research (Saunders et al., 2016). By collecting the data ourselves, we ensured control over both the data and the sample structure. This increased the probability of collecting suitable data for our specific research.

The timeframe for our research project was only five months. Keeping both time- and resource constraints in mind, we chose to conduct a cross-sectional study, in other words a study of a particular phenomena at a particular time (Saunders et al., 2016). Hence, our study looks at the current status of digitalisation in Norwegian companies without studying any changes over time.

4.4.2 Sample

Our target population was Norwegian companies with more than 20 employees. The sample was targeted through probability sampling and non-probability sampling. 535 companies were invited to participate in our survey, and 117 companies replied.

Initially, 50 percent of the sample should have consisted of Knowit's customers and 50 percent from other Norwegian medium, medium-large and large companies. However, after designing the survey, it turned out that the contact information of Knowit's customers was confidential. Therefore, we had to look elsewhere for respondents. The first sampling method we applied was stratified random sampling – a modification of random sampling where the target population is divided into relevant and significant strata based on one or various attributes (Saunders et al., 2016). In our case, the sampling frame was a list of 1000 Norwegian companies purchased from Proff.no. The companies were selected from the ten most common industries amongst Knowit's customers (see Appendix 10.7.2). Company size was equally distributed amongst our target population. In order reach out to respondents with both digitalisation and strategy insight, we targeted employees primarily working in management. If they had no public email addresses, we targeted the marketing- or technology department. From the list purchased, we chose 500 companies through a sampling fraction of ½. Inconveniently, the list contained mainly nameless email addresses, e.g. post@company.no. Therefore, it did not provide sufficient information to reach the desired number of respondents. We extended the scope to include Kapital's list of the 500 largest companies in Norway (Kapital, 2017). From this list, we applied a combination of convenience sampling and snowball sampling. Naturally, some of the companies on Kapital's list were already targeted as they were also on the list from Proff. Furthermore, the survey was shared via Knowit's social media profiles on LinkedIn.

The questionnaire was distributed through the electronic research tool, Qualtrics, via email to 535 companies. From this sample, we got a total of 185 answers, with 80 partial/break-off responses and 105 complete responses. Our responses provided us with demographics on 117 companies, but only between 105-107 valid respondents for our main analyses. The active response rate was hence 185/ (535-80) = 0.406 = 40.6 percent (Saunders et al., 2016, p. 289).

In order to obtain the highest possible response rate we provided a reward for participation. The sample was offered an executive summary of the research as well as an invitation to a digitalisation conference hosted by Knowit later this year. In order to receive the executive summary and the conference invitation the respondents were encouraged to email us after completing the questionnaire.

4.4.3 Statistical power and sample size

Statistical power is a measure of the probability of finding a statistical relationship if one exists (Hair et al., 1998, p. 165). It is in other words the inverse probability of a type II (false positive) error. Cohen (cited in Hair et al., 1998, p. 12) recommends using a minimal power of .8, which with a standard significance level of 0.05 implies a minimal sample size of 5 respondents per independent variable. In our analysis, there were more than eleven observations per independent variable, which is more than double the minimum.

4.4.4 Questionnaire

The primary data was collected through a self-completed web questionnaire consisting of 46 questions (see Appendix 10.7.3). The composition and design of the questionnaire influences the response rate from the sample, as well as the reliability and validity of the data collected (Saunders et al., 2016). Our questionnaire consisted of mainly closed questions such as list- and rating questions. Closed questions were preferred as the responses are easier to compare when they are predetermined (Foddy 1994; as cited in Saunders et al., 2016, p. 453). Rating questions are used to collect opinion data. We applied the most common rating style - a seven-point Likert-scale. The scale ranged from ‘strongly disagree’ to ‘strongly agree’, with an option of ‘neither agree nor disagree’ to give respondents the chance to give a neutral answer. This scale was consistently applied throughout the questionnaire to avoid any confusion (Dillman, 2007). List questions are questions where the respondents can choose one or more options from a list of responses. These questions were applied to gather respondent demographics in the final part of the questionnaire. Throughout the questionnaire we used conventional language, and made sure to ask questions that made sense to the respondents (Fink, 1996).

When measuring popular constructs, it is common to use measurements from prior literature and theory (Johannessen et al., 2011). This was done when measuring our independent variables, moderating variable and control variables. To make a clear division between interfunctional coordination as a construct of market orientation and the moderating variable interfunctional coordination, we measured marketing orientation solely based on questions regarding the first two components of the construct. In other words, we excluded questions about the component of interfunctional coordination when measuring market orientation. The purpose of the questions regarding our dependent variables was to clearly distinguish

between the two different components of digitalisation. These questions were formulated based on the literature of Sannes and Andersen (2016) and advice from Professor Magne Supphellen and Stein Opsahl from Knowit.

The emails sent to our sample included the questionnaire link together with a cover letter providing a short introduction of the study (Appendix 10.7.1). In this letter, the respondents were informed that the questionnaire was related to our master thesis at the Norwegian School of Economics (NHH). Furthermore, the landing page of the questionnaire also included a reminder of the research theme, as well as a definition of digitalisation, to avoid confusion regarding terminology. The respondents were informed that the questionnaire included 46 questions, and that it would take approximately ten minutes to complete. The logo of NHH was also present in the header of the questionnaire, giving the study credibility.

4.4.5 Pilot test

In order to ensure that our respondents understood the questions and instructions in the questionnaire, a pilot test was distributed to parts of the sample (Fink, 2013). A pre-test may give indications of whether the questionnaire is too time consuming, or other valuable feedback the respondents might have regarding understanding issues or the layout of the questionnaire (Bell & Waters, 2014). When deciding on the size of the pilot test sample, we followed the guidelines of Fink (2013). Our pilot test was distributed to eleven respondents from our sample population. The respondents were provided the link and cover letter to access the questionnaire, and were asked to give feedback on their experience. The pilot test revealed that some respondents needed more time than ten minutes to complete the questionnaire, and therefore found it too time consuming. Furthermore, some mentioned that it was difficult to focus, as some questions were very similar. Additionally, the questionnaire did not include a progress bar. To ensure that the questionnaire was not too long, we removed some questions under the supervision of Professor Magne Supphellen. Furthermore, we added a progress bar, showing how many percent of the questionnaire, which was completed on each single page. We also cut down the number of questions per page, resulting in a maximum of eight questions on each individual page. After completing these adjustments, we distributed the new version to eight more respondents. The second and adjusted pilot provided no feedback indicating a need for additional adjustments.

4.5 MEASUREMENT

Our study consists of 12 different variables already presented in our research model. These variables were measured through 46 questions. All the questions measuring the strategic orientations and digitalisation have been grouped into indices. We will now explain each index in turn. The control variables are each based on one question, and will be explained separately. To meet the assumptions of OLS, all our independent variables need to be either quantitative or categorical, and the dependent variable must be measured at interval level, continuous and unbounded (Field, 2009). Unbounded entails that there are no constraints on the variability of the outcome. The majority of our variables, both the dependent and independent ones, are measured as continuous, interval variables on seven-point Likert scale, ranging from 1. 'Strongly disagree', to 7 'Strongly agree'.

4.5.1 Dependent variable indices

Digital differentiation

Question Q1, Q3, Q5, Q7 and Q8 asked the respondents to evaluate to what extent their company's actions were in line with different statements measuring 'Digital differentiation'.

Digital cost leadership

Question Q2, Q4 and Q6 asked the respondents to evaluate to what extent their company's actions were in line with different statements measuring 'Digital cost leadership'.

4.5.2 Independent variable indices

Market orientation

Question Q17, Q18, Q19, Q20, Q21 measured how the company's strategy related to the principles of a 'Market orientation'. All of the questions were adapted from previous literature.

Technological orientation

Question Q22, Q23, Q24, Q25 and Q26 measured how the company's strategy related to the principles of a 'Technological orientation'. All of the questions were adapted from previous literature.

Entrepreneurial orientation

Question Q12, Q13, Q14, Q15 and Q16 measured how the company's strategy related to the principles of an 'Entrepreneurial orientation'. All of the questions were adapted from previous literature.

Learning orientation

Question Q27, Q28, Q29, Q30 and Q31 measured how the company's strategy related to the principles of a 'Learning orientation'. All of the questions were adapted from previous literature.

4.5.3 Moderator variable index

Interfunctional coordination

Question Q32, Q33, Q34, Q35, Q36 and Q37 measured 'Interfunctional coordination' (IC) between the departments of the company. Based on the literature review, the six questions seek to capture how the cooperation and communication works between departments, and the company's level of agreement on statements regarding this.

4.5.4 Control variables

The research model included five control variables, which were incorporated into the questionnaire. Three of the control variables are categorical variables, namely 'Digital agency', 'Service industry', and 'Number of employees'. The first two control variables were re-coded into dummy variables.

Service industry

The purpose of Q38 was to control for the type of industry sector each company belonged to. The sectors the companies could choose from were: bank, finance and insurance, energy, retail and services, manufacturing industry, IT & telecommunication, media, education and entertainment, public sector and life science and medical. The respondents could also fill in the name of their industry if they did not believe they fitted into any of the options provided. The industries were later re-coded into the dummy variable 'service industries'. The remaining companies were categorised as manufacturing industries.

Number of employees

Question Q39 asked the respondents to specify the number of employees in their company. The companies could choose from '20-49', '50-99', '100-249' and 'more than 250'. The characterisation of company size is supported by a Norwegian government report from 2012, stating that less than 20 percent of all Norwegian companies count more than 10 employees (Nærings- og handelsdepartementet, 2012). Based on this, we assume that companies in a Norwegian context can be characterised as large if it counts more than 250 employees, medium-large if it employs 50-249, and medium if the number of employees are between 20-49.

Digital agency

The variable was meant to control for whether a company had hired external digital consultants or not. The options were 'yes', 'we have done so in the past', 'we are planning to' and 'no'. In our analysis this variable was transformed into a dummy variable, where the company had either hired external consultants or not.

Market change

This variable was meant to control for market change. Q44 asked the respondents to evaluate how accurate the statement: 'In our market, customer preferences often change' was on a Likert scale from 1-7.

Market growth

This variable was meant to control for market growth. Q45 asked the respondents to evaluate how accurate the statement: 'The market our company operates in is growing' was on a Likert scale from 1-7.

4.6 DATA ANALYSIS

4.6.1 Descriptive statistics

For the questions regarding demographics the survey had N=117 respondents. Descriptive statistics for all the variables of our study is presented in Appendix 10.2. The distribution of company and respondent characteristics are summarised in Table 2 and 3.

TABLE 2

COMPANY CHARACTERISTICS

	Frequency	Percent
Type of industry		
Service industry	68	58
Manufacturing industry	48	41
Unspecified industry	1	1
Sum	117	100
Sampled from		
Kapital	60	51
Proff	57	49
Sum	117	100
No. of employees		
20-49	11	9
50-99	23	20
100-249	23	20
More than 250	60	51
Sum	117	100
Digital agency		
Yes	65	55,6
We have done so in the past	14	12
We are planning to	1	1
No	37	31,6
Sum	117	100

The largest sectors amongst the responding companies were energy (21), bank, finance investments and insurance (17), manufacturing (16) and construction, engineering and infrastructure (13). The majority of the companies represented service industries (68), and the remaining companies represented manufacturing industries (48).

60 of our respondents came from Kapital's list of the largest Norwegian companies, and 57 were extracted from Proff.no. 51 percent of the respondents worked in what may be characterised as large companies in Norwegian scale, 40 percent came from medium-large sized companies and only 9 percent came from medium sized companies. As much as 35 percent of the companies were currently hiring help form a digital agency, 7.6 percent had done so in the past, 0.5 percent were planning to and 20 percent had not.

TABLE 3

RESPONDENT CHARACTERISTICS

	Frequency	Percent
Department		
Management	16	13,6
IT	21	17,9
Marketing	14	12
Accounting and finance	4	3,4
Administration	12	10,2
Product development	10	8,5
Other	40	34,2
Sum	117	100
Educational background		
Business and/or administration	73	62,4
Technology and engineering	30	25,6
I have not taken higher education	4	3,4
Sum	10	8,6

The respondents primarily had educational background from business and administration (61.5 per cent), but also technology and engineering (25.6 per cent). Only 3.4 percent had no higher education at all. 9.4 percent had other forms of educational background.

4.6.2 Factor analysis

A factor analysis may be used to construct indices and test whether they measure what they are supposed to (Field, 2009). In order for the questions in the indices to be substantive, the factors should have a loading above 0.4. The results from our factor analysis showed that all questions in each index were acceptable, apart from one question in the index ‘digital cost leadership’. This question had a loading below 0.4, and was therefore removed from the analysis. The complete factor analysis can be found in Appendix 10.3.

4.6.3 Cronbach’s Alpha

The Cronbach's Alpha (α) is a measure of reliability that ranges from 0 to 1 (Hair et al., 1998). This is a widely accepted measure to determine internal consistency, namely how

closely related a set of items are as a group. The lower the Cronbach's Alpha, the lower the reliability of the analysis (Field, 2009). Values of 0.6 to 0.7 are deemed as the lower limit of acceptability (Hair et al., 1998). The Cronbach's Alpha (α) of all of our coefficients were above the suggested threshold value. Consequently, our scale measurements have a relatively high internal consistency, and are suitable for research (see Appendix 10.4).

4.6.4 Assumptions for OLS

In order to draw accurate conclusions from our multiple linear regressions, assumptions of normal distribution, linearity, homoscedasticity and multicollinearity must be met (Field, 2009). Firstly, the residuals of the regression should follow a normal distribution. The assumption of normally distributed errors entails that the residuals in the model are random, normally distributed variables with a mean of 0. Examining histograms and normal probability plots (P-plots) can test for this. The plots are presented in Appendix 10.5.1. If they are normally distributed, they will conform to the diagonal normality line indicated in the plot. The histograms seem to be bell-shaped, and the P-plots indicate that the residuals are close to a straight line.

Homoscedasticity imply that the variance of the residual terms should be constant at each level of the independent variables (Field, 2009). If this assumption is violated, in other words that there is a problem with heteroscedasticity, a risk is that we get larger standard deviations and accept some of the H0, which should have been rejected. There does not seem to be an issue with heteroscedasticity in the scatterplots.

The assumption of linearity signifies that the predictor variables in the regression should have a straight-line relationship with the outcome variable. If the residuals are normally distributed and homoscedastic, there is no reason to check for linearity (Field, 2009, p.220). However, we still checked this assumption through producing partial plots between residuals of the dependent variable and each of the independent variables, and consider that this assumption is met.

Multicollinearity refers to when the predictor variables are highly correlated with each other. This assumption can be tested either by analysing the correlation coefficients or the variance inflation factor (VIF-value). According to Myers (1990), the VIF should be lower than ten (Field, 2009). We analysed the VIF values of our multiple regressions, and the range is summarised under each regression table. The level of multicollinearity of our independent

variables in regression 1-2 and 9-16 are sufficiently low, ranging between 1.059-1.960 and 1.055-9.795. However, regressions 3-8 show VIF values ranging between 33.676-36.452 for the interaction variables, which is much higher than the limit. This indicates that the results for these hypotheses are less accurate than the others.

5. RESULTS FROM HYPOTHESES

In the following chapter we will present the results from testing our eleven hypotheses. The tests are summarised in Table 4, 5, 6 below. Furthermore, we will present our additional analysis, summarised in Table 7.

5.1 MAIN ANALYSIS

5.1.1 Strategic orientations effect on digitalisation

We estimated two models using OLS in order to investigate the effects of strategic orientations on the two dependent variables. 'Regression 1' examines the effect of the strategic orientations on 'digital differentiation', while 'Regression 2' does the same for 'digital cost leadership'. There were no threats of multicollinearity for the two models, as the VIF-values were below the threshold value (see Appendix 10.5.2). With a significance level of .05 and power of .80, (ref. chapter 4.4.3, p. 32), the minimum adjusted R^2 that could be found statistically significant was 15 percent (Hair et al., 1998, p. 165). The model for 'Regression 1' was significant with adjusted R^2 of 45.9 percent, sufficient F-values and p-values < .01. However, the model for 'Regression 2' was not significant with adjusted R^2 of .00 percent, too low F-values and p-values >.05.

TABLE 4

STRATEGIC ORIENTATIONS EFFECT ON DIGITALISATION

	Digital differentiation (1)	Digital cost leadership (2)
Market orientation	0.406*** (4.180)	0.017 (0.125)
Technological orientation	0.256*** (2.702)	0.109 (0.849)
Entrepreneurial orientation	0.014 (0.145)	-0.043 (-0.327)
Learning orientation	0.113 (1.189)	0.218 (1.674)*
Service industry	0.189** (2.522)	0.121 (1.198)
Number of Employees	0.036 (0.486)	0.065 (0.651)
Digital agency	0.005 (0.062)	0.015 (0.146)
Customer change	0.111 (1.451)	0.044 (0.423)
Market growth	0.065 (0.867)	-0.044 (-0.427)
Adjusted R^2	0.459	0.000
F-value	10.896	1.005
P-value	0.000	0.442
Observations	106	107

t-statistics in parentheses.
* p<.10, ** p<.05, *** p<.01.
Standardised beta coefficients ($\beta*$) are presented in order to compare the different independent variables' relative effect on the dependent variables.
Adjusted R^2: Level must be above 0.15 in order to be statistically significant.
VIF values (1.059-1.960).
Note: Digital differentiation (1) presents the effect of strategic orientations on the dependent variable 'digital differentiation', Digital cost leadership (2) presents the effect on the dependent variable 'cost leadership'.

Regression 1 showed that both 'market orientation' ($\beta*$= .406, p<.01) and 'technological orientation' ($\beta*$= .256, p<.01) had a significant positive effect on 'digital differentiation'. The control variable 'service industry' had a significant positive effect on digital differentiation ($\beta*$= .189, p<.05).

Regression 2 showed no significant effect of strategic orientations on 'digital cost leadership'.

5.1.2 Combining strategic orientations

We conducted six multiple linear regressions to investigate the interaction effect from a combination of 'technological orientation' and the other orientations on the two components of digitalisation. Three interaction variables were added to both 'Regression 1' and 'Regression 2', e.g. 'technological orientation x market orientation'. However, this lead to

multicollinearity problems, i.e. VIF-values above ten. Thus, we entered the interaction variables separately into the regressions, ending up with six regressions in total - regression 3-8. ‘Regression 3’ and ‘Regression 4’ tested whether a combination of ‘technological orientation’ and ‘market orientation’ respectively influenced ‘digital differentiation and ‘digital cost leadership’. ‘Regression 5’ and ‘Regression 6’ addressed the combination of ‘technological orientation’ and ‘entrepreneurial orientation’, while ‘Regression 7’ and ‘Regression 8’ include a combination of ‘technological orientation’ and ‘learning orientation’ on the two dependent variables. Still, we experienced threats of multicollinearity as the VIF-values for the interaction variables were above the threshold value. The six models had varying explanatory powers, i.e. only regression 3, 5 and 7 had sufficient adjusted R^2. Furthermore, these models were statistically significant with sufficient F-values and p-values <.01. The models for regression 4, 6 and 8 were not statistically significant. The levels of adjusted R^2 and F-values were too low, and the p-values >.05.

TABLE 5
INTERACTION EFFECT OF
STRATEGIC ORIENTATIONS ON DIGITALISATION

	(3)	(4)	(5)	(6)	(7)	(8)
Market orientation	0.345 (1.582)	-0.163 (-0.553)	0.405*** (4.093)	0.015 (0.110)	0.405*** (4.056)	0.019 (0.136)
Technological orientation	0.157 (0.472)	-0.182 (-0.410)	0.269 (1.098)	0.132 (0.400)	0.279 (0.844)	0.078 (0.179)
Entrepreneurial orientation	0.014 (0.141)	-0.045 (-0.341)	0.029 (0.107)	-0.016 (-0.044)	0.014 (0.145)	-0.043 (-0.327)
Learning orientation	0.119 (1.222)	0.236* (1.771)	0.112 (1.169)	0.218 (1.652)	0.126 (0.601)	0.200 (0.691)
Service industry	0.187** (2.469)	0.117 (1.148)	0.189** (2.508)	0.121 (1.194)	0.190** (2.495)	0.120 (1.178)
Number of employees	0.036 (0.492)	0.069 (0.683)	0.036 (0.481)	0.065 (0.643)	0.036 (0.486)	0.065 (0.645)
Digital agency	0.001 (0.011)	0.004 (0.042)	0.005 (0.066)	0.015 (0.149)	0.006 (0.073)	0.014 (0.134)
Customer change	1.107 (1.376)	0.032 (0.306)	0.112 (1.444)	0.045 (0.426)	0.112 (1.437)	0.043 (0.404)
Market growth	0.061 (0.796)	-0.057 (-0.177)	0.066 (0.858)	-0.042 (-0.401)	0.066 (0.862)	-0.045 (-0.431)
Technological orientation x market orientation	0.135 (0.311)	0.401 (0.684)				
Technological orientation x entrepreneurial orientation			-0.025 (-0.059)	-0.044 (-0.078)		
Technological orientation x learning orientation					-0.032 (-0.073)	0.043 (0.073)
Adjusted R^2	0.454	-0.005	0.453	-0.010	0.453	-0.010
F value	9.724	0.946	9.705	0.896	9.705	0.896
P-value	0.000	0.495	0.000	0.540	0.000	0.540
Observations	106	107	106	107	106	107

t-statistics in parentheses.
* p<.10, ** p<.05, *** p<.01
Standardised beta coefficients ($\boldsymbol{\beta}*$) are presented in order to compare the different independent variables' relative effect on the dependent variables.
Adjusted R^2: Level must be above 0.15 in order to be statistically significant.
VIF values for Independent variables (1.060-21.276)
VIF values for Interaction variables (33.676-36.427)
Note: (3), (5) and (7) present the interaction effect from a combination of strategic orientations on the dependent variable 'digital differentiation'. (4), (6) and (8) present the effect on the dependent variable 'digital cost leadership'.

Regression 3, 5 and 7 showed that there was no significant interaction effect of 'technological orientation' and respectively 'market orientation', 'entrepreneurial orientation' and 'learning orientation' on the dependent variable 'digital differentiation'.

Regression 4, 6 and 8 showed no significant interaction effect of a combination of technological orientation and respectively ‘market orientation’, ‘entrepreneurial orientation’ and ‘learning orientation’ on ‘digital cost leadership’.

5.1.3 Interfunctional coordination and strategic orientation

Finally, we conducted eight linear multiple regressions to investigate whether ‘interfunctional coordination’ had a moderating effect on the relationship between strategic orientations and digitalisation. ‘Regression 9’ tests the effect of a combination of interfunctional coordination and market orientation on the dependent variable ‘digital differentiation’. ‘Regression 10’ does the same on ‘digital cost leadership’. The other regressions (11-16), measure the same effect of interfunctional coordination combined with respectively technological orientation, entrepreneurial orientation and learning orientation.

The models had varying explanatory powers, where only ‘Regression 9’, ‘Regression 11’, ‘Regression 13’ and ‘Regression 15’ had sufficient adjusted R^2. There were no threats of multicollinearity, as the VIF-values were below the threshold value. ‘Regression 9’, ‘Regression 11’, ‘Regression 13’ and ‘Regression 15’ were statistically significant with sufficient F-values and p-values < .01. ‘Regressions 10’, ‘Regression 12’, ‘Regression 14’ and ‘Regression 16’ were not. The levels of adjusted R^2 and F-values were too low, and the p-values >.05.

TABLE 6

INTERFUNCTIONAL COORDINATION AND STRATEGIC ORIENTATIONS ON DIGITALISATION

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Market orientation	0.485*** (3.401)	-0.094 (-0.490)	0.400*** (4.064)	0.002 (0.016)	0.400*** (4.061)	0.003 (0.022)	0.397*** (4.034)	0.002 (0.017)
Technological orientation	0.270*** (2.764)	0.084 (0.643)	0.387* (1.833)	-0.069 (-0.243)	0.271*** (2.754)	0.080 (0.606)	0.271*** (2.780)	0.090 (0.683)
Entrepreneurial orientation	0.012 (0.126)	-0.028 (-0.207)	0.012 (0.126)	-0.027 (-0.203)	1.131 (0.690)	-0.199 (-0.078)	0.010 (0.099)	-0.027 (-0.201)
Learning orientation	0.160 (1.425)	-0.171 (1.117)	0.155 (1.367)	0.170 (1.113)	0.153 (1.380)	0.166 (1.101)	0.269 (1.359)	0.113 (0.417)
Service industry	0.187** (2.447)	0.118 (1.157)	0.185** (2.413)	0.121 (1.179)	0.189** (2.475)	0.116 (1.138)	0.189** (2.484)	0.115 (1.128)
Number of Employees	0.031 (0.412)	0.082 (0.801)	0.035 (0.465)	0.077 (0.764)	0.034 (0.453)	0.079 (0.782)	0.029 (0.385)	0.080 (0.784)
Digital agency	0.016 (0.200)	0.002 (0.019)	0.014 (0.176)	0.002 (0.023)	0.013 (0.163)	0.003 (0.026)	0.018 (0.225)	0.006 (0.055)
Customer change	0.114 (1.461)	0.025 (0.238)	0.114 (1.461)	0.024 (0.230)	0.114 (1.464)	0.023 (0.221)	0.114 (1.468)	0.026 (0.251)
Market growth	0.057 (0.746)	-0.048 (-0.460)	0.059 (0.776)	-0.049 (-0.475)	0.060 (0.783)	-0.049 (-0.479)	0.060 (0.783)	-0.053 (-0.508)
Interfunctional coordination x market orientation	-0.134 (-0.798)	0.151 (0.668)						
Interfunctional coordination x technological orientation			-0.157 (-0.689)	0.204 (0.671)				
Interfunctional coordination x entrepreneurial orientation					-0.153 (-0.714)	0.222 (0.773)		
Interfunctional coordination x learning orientation							-0.170 (-0.897)	0.120 (0.467)
Adjusted R^2	0.443	-0.012	0.442	-0.012	0.442	-0.011	0.444	-0.015
F-value	9.271	0.873	9.239	0.873	9.246	0.889	9.304	0.848
P-value	0.000	0.561	0.000	0.561	0.000	0.546	0.000	0.584
Observations	105	106	105	106	105	106	105	106

t-statistics in parentheses.
* p<.10, ** p<.05, *** p<.01
Standardised beta coefficients ($\boldsymbol{\beta}*$) are presented in order to compare the different independent variables' relative effect on the dependent variables.
Adjusted R^2: Level must be above 0.15 in order to be statistically significant.
VIF values: (1.055 - 9.795).
Note: (9), (11), (13) and (15) present the effect of strategic orientations and 'interfunctional coordination' on the dependent variable 'digital differentiation'. (10), (12), (14) and (16) present the effect on the dependent variable 'digital cost leadership'.

Regression 9, 11, 13 and 15 show that there were no statistically significant moderating effect from interfunctional coordination on the relationship between strategic orientations and ‘digital differentiation’.
Regression 10, 12, 14 and 16 show that there were no statistically significant moderating effect from interfunctional coordination on the relationship between strategic orientations and ‘digital cost leadership’.

5.2 ADDITIONAL ANALYSIS

We conducted two additional analyses in order to measure whether a company’s digitalisation strategy had a positive effect on competitive advantage and profitability. Firstly, we tested the effect of ‘digital differentiation’ and ‘digital cost leadership’ on competitive advantage (Regression 17). Secondly, we tested the effect of ‘digital differentiation and ‘digital cost leadership’ company profitability (Regression 18).

The two models had sufficient explanatory power, respectively adjusted R^2 of 17.3 percent and 30.2 percent. There were no threats of multicollinearity as the VIF-values for the variables were below the threshold value. Both regressions were statistically significant with sufficient F-values and p-values < .01.

TABLE 7

DIGITALISATIONS EFFECT ON COMPETITIVE ADVANTAGE AND PROFITABILITY

	Competitive advantage (17)	Profitability (18)
Digital differentiation	0.557*** (6.323)	0.262*** (2.722)
Digital cost leadership	0.065 (0.770)	0.153* (1.659)
Service industry	-0.124 (-1.484)	-0.118 (-1.291)
Number of Employees	0.076 (0.942)	0.049 (0.560)
Digital agency	-0.158* (-1.927)	-0.321*** (-3.574)
Customer change	-0.031 (-0.381)	-0.011 (-0.127)
Market growth	-0.089 (-1.069)	-0.077 (-0.844)
Adjusted R^2	0.306	0.169
F-value	7.933	4.202
P-value	0.000	0.000
Observations	111	111

t-statistics in parentheses.
* p<.10, ** p<.05, *** p<.01
Standardised beta coefficients ($\beta*$) are presented in order to compare the different independent variables' relative effect on the dependent variables.
Adjusted R^2: Level must be above 0.15 in order to be statistically significant.
VIF values: (1.010-1.231)

Note: (17) measures the effect of 'digital differentiation' and 'digital cost leadership' on competitive advantage. (18) measures the effect of 'digital differentiation' and 'digital cost leadership' on profitability.

Regression 17 showed that digital differentiation has a significant positive effect on 'competitive advantage' ($\beta*$= .557, p<.01).

Regression 18 showed that digital differentiation has a significant positive effect on 'profitability' ($\beta*$= .262, p<.01). The control variable 'digital agency' is significantly negatively related to 'profitability' ($\beta*$= -.321 p<.01).

6. DISCUSSION

6.1 SUMMARY OF RESULTS

The research questions that guided our analysis were:

RQ1: In which way and to what extent does the different strategic orientations influence the commercial exploitation of digitalisation?

RQ2: In which way and to what extent does a combination of various strategic orientations influence the commercial exploitation of digitalisation?

RQ3: In which way and to what extent is the commercial exploitation of digitalisation moderated by the interfunctional coordination of strategic orientations?

Accordingly, six hypotheses were developed to answer RQ1, two hypotheses for RQ2 and two hypotheses for RQ3. The results are summarised in Table 8.

TABLE 8

SUMMARY OF RESULTS

Hypotheses	*Significant results*
RQ1:	
H1: A company's strategic orientation will influence digital differentiation.	Yes
H2: A company's strategic orientation will influence digital cost leadership	No
H3: A market orientation will have a positive effect on digital differentiation	Yes
H4: A technological orientation will have a positive effect on digital cost leadership	No
H5: A entrepreneurial orientation will have a positive effect on digital differentiation	No
H6: A learning orientation will have a positive effect on digital differentiation	No
RQ2:	
H7: An interaction effect from combining technological orientation and other strategic orientations will have a positive effect on digital differentiation.	No
H8: An interaction effect from combining technological orientation and other strategic orientations will have a positive effect on the digital cost leadership.	No
RQ3:	
H9: Interfunctional coordination will strengthen strategic orientations' effect on digital differentiation.	No
H10: Interfunctional coordination will strengthen strategic orientations' effect on digital cost leadership.	No

The results from the regression testing strategic orientation's effect on digital differentiation supports that both a market orientation and a technological orientation positively influence a company's digital differentiation. This indicates that we find support for H1 and H3, while H5 and H6 are rejected. Furthermore, none of the strategic orientations show any significant effect on digital cost leadership. Hence, we find no support for H2 and H4. Based on the results from H1-H6, the answer for RQ1 is that we cannot conclude that strategic orientation influences the commercial exploitation of digitalisation, even though a market orientation and a technological orientation influences one of its components.

The results from the regressions testing H7 and H8 show that none of the different combinations of strategic orientation had any significant effect on neither digital differentiation nor digital cost leadership. Although a market orientation and a technological orientation have a positive effect on digital differentiation separately, a combination of these does not show any effect on digital differentiation. We therefore reject hypotheses H7 and H8. The answer of RQ2 is that we find no evidence that a combination of strategic orientations influence the commercial exploitation of digitalisation.

The results from the regressions testing H9 and H10 show that interfunctional coordination does not significantly moderate strategic orientation's effect on neither digital differentiation nor digital cost leadership. These hypotheses are thus rejected, and the answer for RQ3 is that we cannot conclude that the commercial exploitation of digitalisation is moderated by interfunctional coordination.

Additional analysis

The results from the additional analysis show that digital differentiation has a positive effect on companies' competitive advantage and their profitability. However, digital cost leadership has no significant effect on neither competitive advantage nor profitability. Another surprising result from this analysis was that hiring a digital agency has a significantly negative effect on profitability.

6.2 THEORETICAL IMPLICATIONS

Traditionally, the theory of strategic orientations has mainly been applied in order to reveal successful strategies to increase company performance. The approach of this thesis was to apply this classic theoretical framework in a new context, in order to contribute to the theory of digitalisation. Sannes and Andersen (2017) have investigated the status quo for digitalisation efforts in Norwegian companies, and called for more academic investigation on this topic. This inspired the problem definition and research questions of this thesis, where we attempted to theorise more on this theme that have received little scholarly attention. The results from our analysis provide new insight and will now be addressed in the light of our literature review.

6.2.1 Strategic orientations and digitalisation (H1-H6)

Our results support that strategic orientation does influence one of the two components of digitalisation, namely digital differentiation (H1). Both market orientation and technological orientation show a significant positive effect. These findings follow Narver and Slater (1990), who found a positive relation between market orientation and company profitability. Furthermore, the findings provide empirical support for the research of Sannes and Andersen (2017) that states that companies need to adapt to customer needs in order to achieve commercial exploitation of digitalisation (i.e. H3: market orientation). However, the finding that technological orientation also has a positive effect on digital differentiation is not in line with our expectations from the theory as well as H4. Quite contradictory to previous literature, our findings support the opposite view. Nevertheless, this might have something to do with fact that the interpretation of a technological orientation varies. Some scholars claim that technologically oriented companies spend more resources on innovation compared to their competitors (Kelly, 1994). Moreover, scholars claim there is no distinction between technology and business in digital organisations (Sannes & Andersen, 2017). Both statements may lead to a technological orientation being interpreted as a characteristic of digital differentiation.

Another result conflicting with previous theory is that neither an entrepreneurial orientation nor a learning orientation show any effect on digital differentiation. First of all, we expected entrepreneurial orientation to have a positive effect on digital differentiation, as several scholars claim that differentiation is a key factor for this orientation (Hughes et al., 2007). Andersen and Sannes (2017) support the importance of radical innovation and experimentation in a digital organisation. The same applies to the findings on learning orientation, as several components of a learning orientation, namely the ability to challenge existing assumptions (Baker & Sinkula, 1997), are also amongst the characteristics of digital transformation (Andersen & Sannes, 2017).

The findings showed no effect from strategic orientations on the second component of digitalisation, namely digital cost leadership. This finding conflicts with our assumptions from the literature review (H2). According to Halac (2015), a technologically oriented firm will apply technology to increase speed of production, gain cost advantages and improve decision-making. Andersen and Sannes (2017) also claim that a dominant technology department leads to emphasis on efficiency through digital technology. Surprisingly, we

found no support for a relationship between a technological orientation and digital cost leadership (H4). The descriptive statistics show that the average score on our questions measuring digital cost leadership are higher than all other variables in our model (Appendix 10.2). This indicates that our respondents generally are invested in saving costs through applying digital solutions. Still, there is no relationship between strategic orientation and digitisation efforts. Sannes and Andersen (2017) claim that Norwegian companies generally possess large amounts of technology, and that cost saving and streamlining has been a focus for many years. From institutional theory, we know that companies operating in the same market tend to become increasingly more similar over time (Robbins and Barnwell, 2006). Managers are consistently studying other organisations and copying innovations they feel may be of use to them. This adaption lies behind the emergence of similar types of organisations, known as isomorphism. Isomorphism means that organisations within a field take on similar forms to survive competitively in their environment. Hence, a theoretical implication might be that automatisation and streamlining have become a necessity in order to compete in the Norwegian market.

6.2.2 Interaction effect of strategic orientations: (H7-H8)

Surprisingly, we did not find any significant results to support a positive interaction effect from combining technological orientation with any of the other orientations. Hence, H7 and H8 were rejected. These findings contradict previous research, which suggest a positive effect of combining technological orientation with other orientations on different measures of company performance. As we did not find any significant results, we conclude that interaction between the orientations is not important for the commercial exploitation of digitalisation. An explanation for this could be that there was no effect from technological orientation on digital cost leadership, while the opposite was true for digital differentiation. Although both a market orientation and a technological orientation separately had a positive effect on digital differentiation, the interaction effect was not significant. This result is contradictory to the theory of González-Benito (2009), who found a significant interaction effect from these two orientations on performance. An explanation for this could be that the measurement of performance in the study of González-Benito differed from ours. In our study, we only investigated one of many possible components leading to company performance, namely commercial exploitation of digitalisation.

6.2.3 The effect of interfunctional coordination and strategic orientation (H9-H10)

The results show no evidence of interfunctional coordination strengthening strategic orientations' effect on the two components of digitalisation (H9 and H10). This is contradictory to what we could expect from theory of strategic orientations, such as research by Pinto and Pinto (1990), which found that interfunctional coordination enhanced company performance. According to Sannes and Andersen (2017) a successful digital organisation has a holistic approach to digitalisation. In other words, a joint effort in digitalisation efforts across all departments of the company leads to a stronger focus on both digital transformation and digitisation. Based on this, we expected that a company emphasising communication and cooperation between departments in combination with their strategic orientation would increase their commercial exploitation of digitalisation. However, we found no evidence of such a positive moderating effect. The theory of Sannes and Andersen (2017) could possibly explain parts of the missing link, as they criticise Norwegian companies' for having a narrow approach towards digitalisation, and that the initiatives stem from only one department. Nevertheless, our descriptive statistics show that the respondents generally agree that measures of interfunctional coordination are present in their company.

6.2.4 Additional analysis competitive advantage and performance

In our additional analysis, we found that digital differentiation had a positive effect on both competitive advantage and profitability. This implies that a digital differentiation strategy is connected with increased company performance. The finding supports the theory of Andersen and Sannes (2017), which emphasises the importance of digital innovation initiatives in Norwegian companies in order to gain a competitive advantage. Furthermore, the positive effect from digital differentiation on competitive advantage supports the theory of Porter (cited in Robbins & Barnwell, 2006, p. 162) in that differentiation is a successful strategy for achieving a competitive advantage. However, the results show no effect from digital cost leadership on neither competitive advantage nor profitability. This finding is inconsistent with the theory of Porter.

6.3 MANAGERIAL IMPLICATIONS

The sample in this thesis consisted of medium, medium-large and large companies. Because the majority of the respondents came from Kapital's list of the 500 largest companies in Norway, we expect that the results are best generalised for medium to large Norwegian companies.

Sannes and Andersen's (2016) list three arguments for why Norwegian companies are lagging behind on digitalisation, namely that (1) There is too much attention on saving costs rather than exploring new business opportunities, (2) management lack digital competence and (3) digital innovation is incremental instead of radical.

Our results reveal a significant connection between the established framework of strategic orientations and digital differentiation – the component of digitalisation where Norwegian companies generally underperform in relation to other countries (Sannes & Andersen, 2017). More precisely, we find that either having a market orientation or a technological orientation positively influence digital differentiation. This finding indicates that Norwegian companies should investigate the components of these two orientations and consider adapting some of their characteristics, as this might be a contributor to maximising their commercial exploitation of digitalisation. Furthermore, previous empirical findings indicate that it is mainly the CTO of Norwegian companies that oversees digitalisation processes. Yet our results indicate that of the two orientations, market orientation had the strongest positive effect on digital differentiation. We therefore argue that Norwegian companies should consider implementing components of this orientation to their strategy. Our study also finds that Norwegian companies from service industries are more committed to digital differentiation than companies from manufacturing industries. Our results on digital differentiation relate to the three arguments of Sannes and Andersen (2016) by providing managerial guidelines on how Norwegian companies may better tackle digital challenges.

The analysis revealed no connection between strategic orientations and cost leadership. Whereas we could provide managerial suggestions regarding how companies can apply components of strategic orientations in order to excel through digital differentiation, we cannot provide such guidelines regarding cost leadership. Moreover, the results from our additional analysis demonstrate no significant effect from digital cost leadership on neither and competitive advantage nor profitability. This indicates that solely focusing on cutting

costs through digitalisation will not lead to a competitive advantage and better performance in the Norwegian market. On the other hand, a possible explanation of the results may be that companies who apply a cost leadership strategy are currently not cost leaders in their market. Furthermore, an explanation of the missing link between digital cost leadership and profitability could be that companies who are focusing on saving costs are doing so because their current profitability is low.

Another interesting result was the negative relationship between hiring an external digital agency on both competitive advantage and profitability. However, it is difficult to draw managerial conclusions based on this finding. A possible explanation could be that companies hired digital consultants due to inferior performance compared to their competitors. If this is the case, it might take some time before it is possible to trace a positive effect on both competitive advantage and profitability from hiring external consultants. Moreover, companies who choose not to hire external consultancy might already have a competitive advantage or are profitable without the need to implement digital solutions. Another possibility is that these companies already possess internal resources and are able to implement digital solutions in-house.

7. LIMITATIONS AND FUTURE RESEARCH

In order to assess the measurement accuracy of our thesis, we have evaluated the reliability and validity of our research design and measurements. Furthermore, we have discussed additional strengths and weaknesses. The suggestions for future research are based on limitations from our study, as well as experiences gained through working with our research project.

7.1 RELIABILITY

Reliability refers to the precision of our measurement and the replication and consistency of the study (Saunders, 2016, p. 451).

Threats to reliability are participant error, participant bias, observer error and observer bias (Saunders, 2016). Firstly, participant error refers to factors that can alter the way in which the respondents perform, for example that respondents might misunderstand questions or take the survey at an inconvenient time, causing the answers to be biased. As we were asking respondents questions regarding digitalisation, we provided the respondents with an explanation of how we defined the term on the first page of the questionnaire. Our questionnaire was voluntary, and we had no control of the test situation. However, the respondents could complete the survey at a convenient time within the timeframe of our research. A participant bias occurs if the respondents answer what they believe we want them to respond, which provides false responses (Saunders, 20163). To reduce this bias, we composed the questionnaire in order to make our research motive as diffuse as possible. We did not state that we were asking about different types of strategic orientations. Moreover, we randomised the sequence of all digitalisation questions in order to conceal the division of the concept of digitalisation.

The third threat to reliability, observer error, refers to any factors that alter the researchers' interpretation (Saunders, 2016). Because we collected online survey data, there was no occasion of misunderstanding the responses. Observer bias refers to any factors that induce bias in the researchers' recording of the responses. To reduce the probability of observer bias, the questionnaire was designed with no open-ended questions, avoiding researchers' subjective views when interpreting the answers.

As reliability is influenced by the quality control of our data, we ensured sound data registration by employing an electronic survey tool. Furthermore, the data was directly imported into SPSS, avoiding manual errors.

Internal reliability refers to the interrelatedness among the measures (Bryman & Cramer, 2009). The Cronbach's Alpha tests revealed that there was high internal reliability of the operationalized variables. We can thus conclude that our research has high internal reliability.

7.2 VALIDITY

Validity is defined as: 'The extent to which the data collection method or methods accurately measure what they were intended to measure and the extent to which research findings are really about what they proclaim to be about' (Saunders, Lewis & Thornhill, 2009, p. 603). We will first discuss internal and external validity, before assessing the statistical conclusion validity and construct validity.

7.2.1 Internal validity

According to Saunders and colleagues (2016), internal validity concerns whether our analysis measures what it is intended to measure. In order to make valid inferences on cause and effect, there are three criteria that need to be met. First, there must be either a positive or negative correlation between the dependent variables and the independent variables in our model, namely the strategic orientations and the two components of digitalisation. In our analysis, we found positive correlations for regression 1, 17 and 18.

Secondly, we must know that changes in the independent variables occur before the changes in the dependent variables, namely that changes in strategic orientations must occur before changes in the two components of digitalisation (timely precedence). This criterion is somewhat ambiguous, but one can argue that strategic orientation relates to company culture. Culture develops over time, and it is likely that the strategic orientation was established prior to digitalisation efforts in the companies. However, there is a chance that digitalisation efforts can influence the strategic orientation of the firm as well.

Finally, we need to eliminate alternative explanations for the observed relationship, that is an alternative explanation for a correlation between strategic orientation and digitalisation. This

can take place in several forms: There could be a relationship between our variables as well as a covariate that influences both the dependent and independent variable; there could be variables outside the model that either has a moderating or mediating effect; or a background factor that explains the relationship making the relationship between our variables spurious. All though we added several control variables to our model, as well as a moderating variable, we cannot be certain that we excluded all other possible explanatory variables. As some of the criteria of internal validity are met, it is not unlikely that there exists a valid cause-effect relationship in our research. However, we cannot make this conclusion based on this set of data.

There are several threats to the internal validity in our study, namely instrumentation threats, mortality threats and maturation threats. The testing threats occur whenever respondents are under the impression that the results may disadvantage them in some way (Saunders et al., 2016). We tried to limit the extent of bias by emphasising that our questionnaire was anonymous. However, the respondents were asked to provide information regarding their company's size and industry, and they were informed that a report based on the survey was to be published. We believe it is reasonable to assume that the responses in our survey are influenced by a social desirability bias – that our respondents answered the survey in a way that would favour their company.

Mortality threats refer to respondents dropping out of our study (Saunders, 2016). As mentioned, 350 in our sample of 535 did not participate in the survey. Our study is therefore accompanied by a loss of information due to non-response (Fink, 1995). These non-responses may introduce a bias error into our results, because of the possible differences between the respondents and the rest of our sample. We received an acceptable response rate, and adjusted our questionnaire after the pilot test. Therefore, we are confident that the non-responses are due to natural causes.

Maturation threats might occur when respondents perceive the questionnaire to be too time-consuming. This could lead to incomplete questionnaires or careless responding. In order to reduce maturation threats, our respondents were provided with an estimated completion time of the survey. A 'force response function' setting for our online survey would have prevented the unequal number of responses on our different constructs (Fink, 1995). Due to several incomplete responses, the number of responses in our analyses on descriptive

statistics (N=117), digital differentiation (N=105), digital cost leadership (N=106) and additional analysis (N=111) vary.

7.2.2 External validity

External validity refers to whether the results from our survey can be generalised or transferred to other contexts (Saunders et al., 2016). Threats to external validity occurs when the sample systematically differ from the population to which we want it to be generalised to. As our sample is based on both stratified sampling and convenience sampling, we cannot be sure that our results can be generalised to all Norwegian companies. However, as more than half of our respondents are from Kapital's list of the 500 largest companies in Norway, it is reason to believe that our results might be transferred to the context of other companies on this list.

Another threat to external validity might be a change in the context, for example changes in the level of consciousness regarding the research topic (Trochim, 2006). This might also be a threat to the validity of our research, as companies' approach to one of the concepts we are investigating, namely digitalisation, is developing at high speed. Regarding the timing of the study, our data was primary data collected during the same period as our analysis and the research is not at risk of being out-dated. This strengthens the validity of our findings. However, as we conducted a cross-sectional study, it does first and foremost provide a status quo on digitalisation and strategy in Norwegian companies in the spring of 2018.

7.2.3 Statistical conclusion validity

Statistical conclusion validity is concerned with whether the conclusions we reach about relationships in our data are reasonable (Saunders et al., 2016). There are two types of errors that could occur when drawing conclusions from samples, namely Type I and Type II errors. Type I errors occur when researchers conclude that something is true when in reality it is not (false positive), and Type II errors occur when researchers conclude that something is not true (false negative).

To prevent Type I errors, we employed Cronbach's Alpha tests, a test to measure the extent to which the individual statements comprising the scales of our indexed variables were connected. By using verified measures to analyse our data, we decrease the possibility of Type I errors.

The statistical power is the probability that a test will avoid Type II errors (Hair et al., 1998). As previously mentioned the recommended standard significance level is .05 with power of .80. The sample size of our study has implications for our statistical power. The ratio of observations to independent variables should never fall below five respondents per independent variable (Hair et al., 1998, p. 166). In our analysis, there were more than eleven observations per independent variable, which is more than double the minimum. Nevertheless, a ratio of 15 to 20 respondents for each independent variable is desired in order for the results to be generalizable. Our sample size is hence sufficient, but not optimal. Furthermore, one could argue that our sample is too heterogeneous in a Norwegian context, as our sample represents companies from more than 16 industries, and number of employees ranging from 20 to more than 250.

7.2.4 Construct validity

Construct validity refers to how we interpret the relationships between the variables in our research model, in other words to what extent our questions actually measure the constructs we intended them to measure (Saunders, 2016). We applied a factor analysis on our measurements to test for convergence amongst our questions. This analysis showed that the questions for our indices were highly correlated. The only exception was one question in the index digital cost leadership with a value below the threshold. This question was therefore removed from further analyses (Appendix 10.3).

As our measures of strategic orientations and interfunctional coordination are based on empirical measuring scales, we assume that divergent validity is not an issue. The measurement of the two components of digitalisation were developed by studying the previous work of Andersen and Sannes (2017) along with discussing the topic with Stein Opsahl, Knowit's director of strategic counselling and Professor Magne Supphellen. However, the composition of different measurement items and scales used for measuring 'digital differentiation' and 'digital cost leadership' has never been used together before, which can reduce the overall construct validity. Nevertheless, the Cronbach's alpha values show that these scales were internally consistent and thus, reliable according to common research norms (Bryman & Cramer, 2009). Based on this, the construct validity should be reasonable.

7.3 STRENGTHS AND LIMITATIONS

This thesis investigates the concept of digitalisation, a relatively new topic within strategic theory. In our literature review, we found that most contributions were non-academic, such as consultancy reports (e.g. EY, 2011; Microsoft, 2017; KPMG, 2017). A strength of this thesis is thereby its attempt to contribute to the theorisation of this topic in a Norwegian context.

Furthermore, we consider the construction of our sample to be a strength of our study. As we received responses from many of the largest Norwegian companies, we argue that our sample provides a representative view on Norwegian business. Additionally, the respondents in our sample hold high strategic positions within their companies. These respondents were targeted, as they were the ones that most likely possessed strategic insights.

A clear limitation of our research method is the evident possibility of self-serving bias amongst our respondents. To exemplify, Norwegian CEOs self-reported that their companies were performing well regarding digitalisation, even though Sannes and Andersen (2017) found that they were in fact doing the opposite. This indicates the possibility that the respondents are biased when answering questions regarding their own performance, namely answering in a way which will make their company look good or even answer because they do not have a enough insight on digitalisation to know. Having this in mind, some results from our survey might not be fully accurate. Moreover, the nature of some of our questions may have increased the possibility of such a bias: Our measures of profitability and competitive advantage are both subjective, meaning that the companies answered how much they agreed on having high profitability and a competitive advantage compared to other companies in their market. Hence, we cannot know whether this is true, or a biased response.

We also provided an external source of motivation, namely an executive summary of the results and an invitation to an upcoming digitalisation conference held by Knowit. This can also have influenced our sample, as one might expect that companies who acknowledge to be underperforming on digitalisation efforts might be motivated to take part in the survey.

Another limitation to our study is the measurements of the concept of digitalisation. Our suggestion was to divide the concept into ‘digital transformation’ and ‘digitisation’ and connect these two components of digitalisation to Porter’s theory of competitive advantage. Based on these definitions we created questions to measure ‘digital differentiation’ and

'digital cost leadership'. However, we know that the questions measuring the independent variables, namely strategic orientations, are more robust as they have been tested and improved through previous research. We ended up with five questions to measure digital differentiation, but only three questions to measure digital cost leadership. This may have influenced our lack of significant findings on especially digital cost leadership. Furthermore, the samples size effect on statistical power might have influenced the limited significant findings on digital cost leadership.

Finally, a last limitation to consider is the fact that this is a cross-sectional study. This indicates that we could not examine the long-term effects of our findings. Consequently, a longitudinal study could have been applied in order to study change and development (Saunders et al., 2016). This limits our ability to state anything about how digitalisation efforts might change over time. One could expect that some of the digitalisation efforts could have long-term effects, and thereby prove different effects from strategic orientations on the digitalisation components, or different effects from the two components of digitalisation on either competitive advantage or profitability. In other words, companies may have engaged in measures today that will not give visible results until more time has passed.

7.4 SUGGESTIONS FOR FUTURE RESEARCH

As discussed in chapter 7.3, we had relatively few questions measuring digitisation (i.e. digital cost leadership) in our questionnaire. This was due to the lack of theory on this component compared to digital transformation. Most articles about digitalisation evolve around how companies should strive towards digital transformation. With a more robust definition of digitisation, it would be easier to measure this concept. As our research makes applies theory in a new way, there is need for further studies to investigate this topic. Hence, we suggest that future research aim to conceptualise and test these definitions further.

Sannes and Andersen (2017) present statements regarding how many Norwegian CEOs leave the digitalisation responsibility to their CTOs. However, we did not find any research on who is primarily in charge of digitalisation in Norwegian companies. As previously mentioned, the CTO is primarily in charge of IT equipment, but not necessarily digitalisation. The lack of clarity of who is in charge made the sampling process inconvenient. We would suggest further research to investigate which organisational positions oversee digitalisation within Norwegian companies. Qualitative approaches would

in this context be advised. Furthermore, research on what are desirable characteristics for leaders in this type of position could be a valuable contribution to theory.

We also suggest that future research should aim to reduce the possibility of self-serving bias. In our thesis, we based all the information on the subjective opinion of our sample. A way to reduce this bias could be to include quantitative data on companies' digitalisation expenditures. This, combined with questionnaires, would probably give more accurate results regarding companies' digitalisation efforts.

Furthermore, we suggest that future research investigates the effect from combinations of strategic orientations as well as the concept of interfunctional coordination on digitalisation. As we found no significant results regarding this, it would be interesting to replicate the study with a stronger theoretical foundation on digitalisation as well as a larger sample.

8. CONLUSION

The ambition of this thesis was to investigate which strategic orientations that characterise companies that manage to increase revenue and reduce costs through digitalisation. A systematic review of the literature strongly indicates that no empirical research has been conducted on this specific topic. This leads to our problem definition: How does strategic orientation influence the commercial exploitation of digitalisation? The concept of digitalisation is twofold, understood as either digital transformation or digitisation. Both components were considered as means to attain a competitive advantage, either by increasing revenue (i.e. digital differentiation), reducing costs (i.e. digital cost leadership), or a combination of both, and thereby enhance the commercial exploitation of digitalisation.

Our findings indicate that a market orientation has the strongest positive effect on digital differentiation (i.e. digitalisation to increase revenue). A technological orientation shows similar effects, but to a slightly lesser extent. Moreover, we discovered that companies from service industries are more committed to digital differentiation than companies from manufacturing industries. The results regarding digital transformation are particularly interesting seeing that the established literature argue that Norway is lagging behind on this component of digitalisation.

We found no evidence of strategic orientation having an impact on digital cost leadership (i.e. companies' ability to reduce costs). This is interesting, seeing that cost saving seems to be a general focus across all strategic orientations. Furthermore, the analyses found no support of any interaction effect on neither digital transformation nor digitisation from combining various strategic orientations. Neither organisational collaboration nor communication across departments shows any significant effect. This finding is surprising, as organisational theory usually argues that communication and cooperation enhances company performance.

The results of our additional analyses indicate that digital transformation leads to both a competitive advantage and increased profitability across Norwegian industries. However, there is no significant correspondence between these measures of performance and digitisation. This indicates that focusing solely on cutting costs will not lead to increased profitability or a competitive advantage in the Norwegian market. Moreover, we found that hiring an external digitalisation agency in-fact is related to poorer overall profitability. An

important note to our findings from our additional analyses might by the fact that we conducted a cross sectional study, and did not measure long-term effects.

The digital revolution is influencing all industries and its consequences include great uncertainty and risk to established firms. A key to succeed in this increasingly competitive environment is digital competence. Our findings provide Norwegian managers with strategic suggestions for digital transformation, namely to investigate the components of a market orientation and a technological orientation. However, we suggest that there is a great need for more scholarly research on this topic.

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10. APPENDIX

10.1 HYPOTHESES

Hypothesis	Table	No. Regression
(H1) A company's strategic orientation will influence digital differentiation.	4	(1)
(H2) A company's strategic orientation will influence digital cost leadership	4	(2)
(H3) A market orientation will have a positive effect on digital differentiation.	4	(1)
(H4) Technological orientation will have a positive effect on digital cost leadership.	4	(2)
(H5) A entrepreneurial orientation will have a positive effect on digital differentiation.	4	(1)
(H6) A learning orientation will have a positive effect on digital differentiation.	4	(1)
(H7): An interaction effect from combining technological orientations and other strategic orientations will have a positive effect on digital differentiation.	5	(3), (5), (7)
(H8): An interaction effect from combining technological orientations and other strategic orientations will have a positive effect on the digital cost leadership.	5	(4), (6), (8)
(H09) Interfunctional coordination will strengthen strategic orientations' effect on digital differentiation.	6	(9), (11), (13), (15)
(H10) Interfunctional coordination will strengthen strategic orientations' effect on digital cost leadership.	6	(10), (12), (14), (16)

10.2 DESCRIPTIVE STATISTICS

DESCRIPTIVE STATISTICS ALL VARIABLES

	Cronbach's alpha	Mean	SD	Variance
Indices				
Digital differentiation	0.628	5.46	0.98	0.96
Digital cost leadership	0.604	5.74	0.92	0.85
Market orientation	0.746	5.08	0.92	0.85
Technological orientation	0.865	4.51	1.14	1.30
Entrepreneurial orientation	0.819	4.32	1.17	1.25
Learning orientation	0.787	5.38	01.01	01.02
Interfunctional coordination	0.787	5.12	0.82	0.68
*Company characteristics**				
What industry sector does your company operate in?		5.16	03.08	9.48
How many people are currently employed in you company?		3.71	1.54	2.40
*Performance**				
Digitalization processes have given us a competitive advantage		1.21	1.11	1.25
*Respondent characteristics**				
In which area of your company do you primarily work?		3.88	1.73	3.00
What is your field of specialisation in higher education?		1.55	0.80	0.65
*Market characteristics**				
Over the last three years our profitability has been high compared to our competitors.		4.72	1.48	2.19
In our market, customer preferances often change.		4.35	1.40	1.97
The market our company operates in is growing		4.99	1.27	1.61
In our company, digital initiatives stem from a collaboration between different departments.		5.36	1.18	2.50
In our company, digital initiatives stem from one department.		3.14	1.58	1.39

Note: *Variables not categorised in indices.

INDUSTRY CHARACTERISTICS

	Frequency	Percent
Industry sector		
Bank, finance, investment and insurance	17	15
Energy	21	18
Retail and Services	12	11
Manufacturing industry	16	14
IT & telecommunication	4	3
Media, education/R&D and entertainment	11	9
Public sector	7	5
Life science & medical	3	3
Transportation, travel & logistics	6	5
Construction, infrastructure & engineering	13	11
Other	7	6
Sum	117	100

10.3 FACTOR ANALYSES

FACTOR ANALYSIS
DEPENDENT VARIABLES

	Factor loading
Digital differentiation	
We are currently developing new areas of business through applying new technology	0.576
We employ digitalisation to create a better customer experience	0.675
We employ digitalisation to gather customer insights	0.458
We believe that it is important to digitally reconfigure our business model to survive in our industry	0.409
Digital cost leadership	
We employ digitalisation to cut costs	0.999
We employ digitalisation to streamline our internal workflow	0.474
We consider digitalisation to be primary an effort to increase our efficiency	0.241

Note: Factor loadings should not be below 0.4

FACTOR ANALYSIS
STRATEGIC ORIENTATIONS

	Factor loading
Market orientation	
We are more customer oriented than our competitors	0.656
We continuously gather information about the trends in our target market	0.705
We continuously gather information about our competitors strategies	0.486
Our strategy for competitive advantage is based on our understanding of customer's needs	0.823
We measure customer satisfaction systematically and frequently	0.501
Technological orientation	
We use sophisticated technologies in our new product development	0.752
Our new products are always state of the art concerning technology	0.773
We are proactive in the development of new technologies	0.912
Our technological expertise is superior to our competitors	0.688
Technological innovation based on research results is easily accepted in our organisation	0.640
Learning orientation	
Managers agree that our ability to learn is key to our competitive advantage	0.639
Employee learning is seen as an investment, not an expense	0.710
We are not afraid to reflect critically about the way we do business	0.732
All managers in the company are open to having their "view of the world" questioned	0.808
Our company places a high value on open-mindedness	0.839
Entrepreneurial orientation	
We have launched many new products/services on the market during the last five years (including both physical and digital products/service	0.578
We usually beat our competitors in developing innovative actions	0.652
We are prone to carry out risky projects when they involve profitable opportunities	0.690
When uncertainty is high, we adopt a brave and aggressive attitude to exploit possible opportunities	0.839
We consider ourselves to be more innovative than our competitors	0.702
Interfunctional coordination	
All departments across the company are integrated in serving the needs of our customers	0.662
Employees recognize each others' special talents and expertise	0.647
There is an agreement in our vision across all levels, functions and divisions in the	0.688

company	
Open communication of relevant information occurs among employees	0.572
When problems arise, departments perceive them as "mutual" problems that need to be solved	0.652
Employees across departments share resources to complete their tasks	0.489

10.4 CRONBACH'S ALPHA

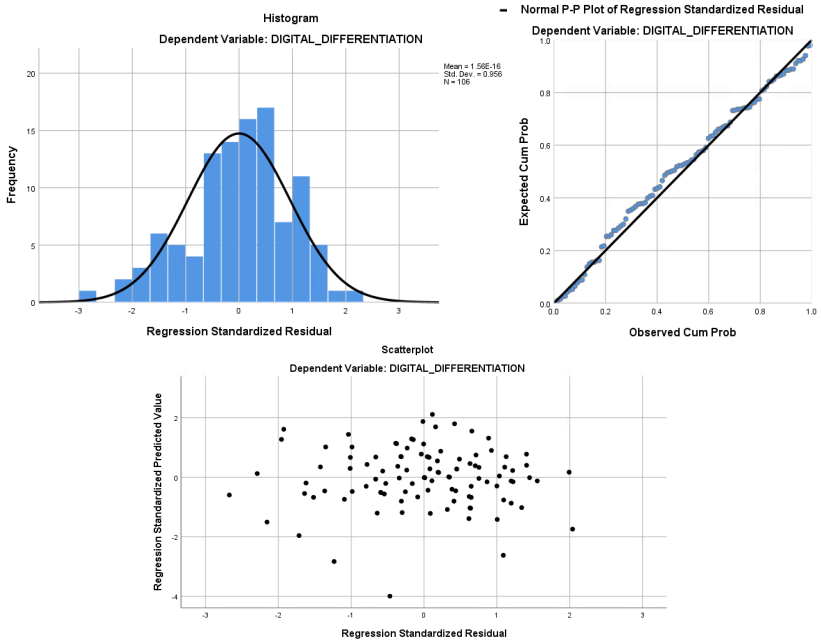
Indices		**Cronbach's Alpha**	**N of Items**
Digital differentiation	(N=132)	0.680	4
Digital cost leadership	(N=133)	0.604	2
Market orientation	(N=120)	0.746	5
Technological orientation	(N=120)	0.865	5
Entrepreneurial orientation	(N=123)	0.819	5
Learning orientation	(N=119)	0.787	5
Interfunctional coordination	(N=115)	0.787	6

Note: The value of Cronbach's alpha should be above 0.6-0.7**.**

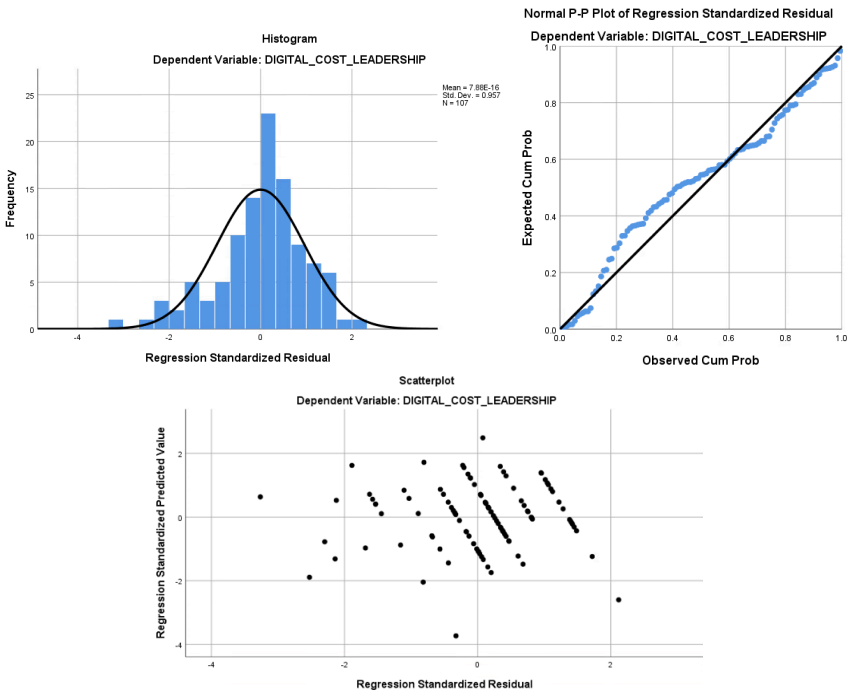
10.5 ASSUMPTIONS FOR OLS

10.5.1 Normality, homoscedasticity and linearity

Regression 1 - Digital differentiation



Regression 2 - Digital cost leadership



10.5.2 Multicollinearity: Variance inflator factor (VIF)

VARIANCE INFLATION FACTOR

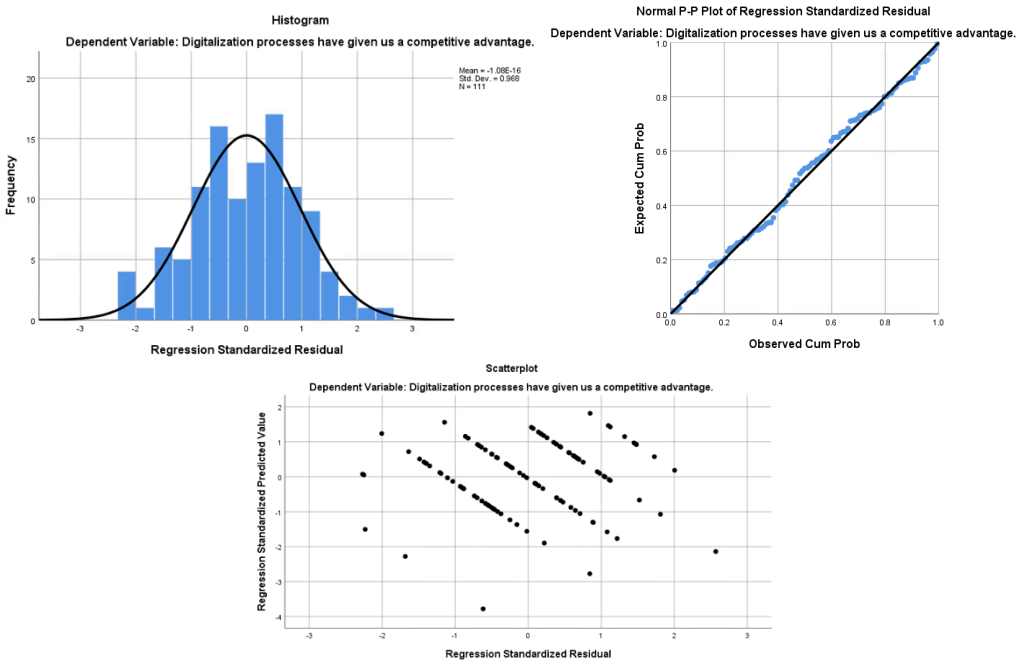
	(1)	(2)
Market orientation	1.833	1.902
Technological orientation	1.742	1.734
Entrepreneurial orientation	1.809	1.840
Learning orientation	1.743	1.806
Service industry	1.091	1.084
Number of Employees	1.059	1.067
Digital agency	1.108	1.112
Customer change	1.142	1.147
Market growth	1.097	1.116

Note: VIF-values should be lower than 10.

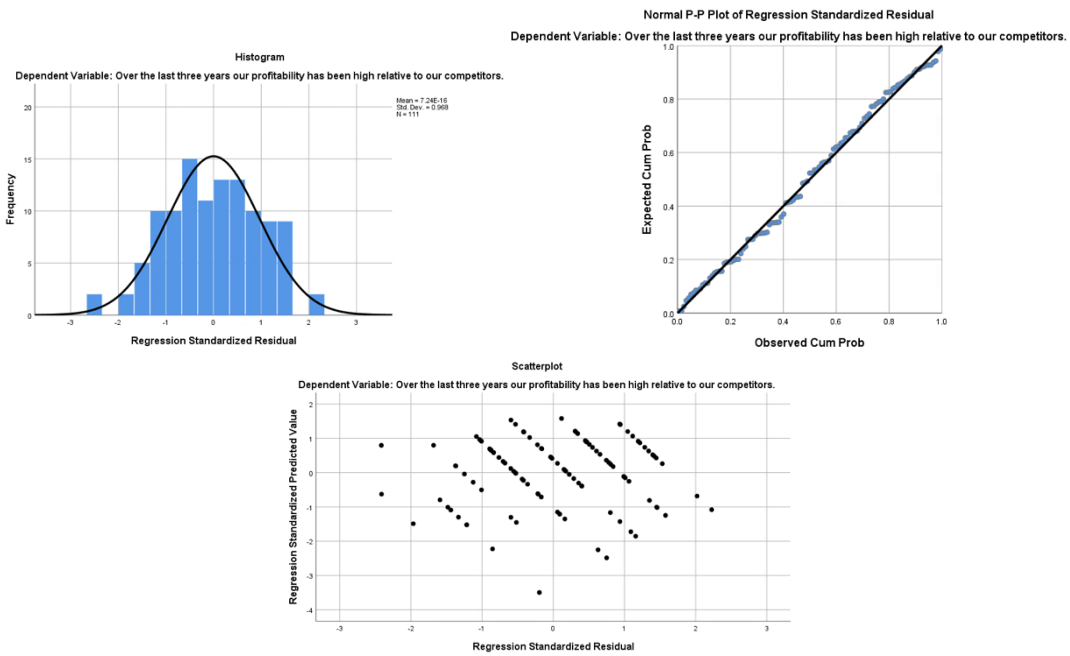
10.6 ASSUMPTIONS FOR OLS ADDITIONAL ANALYSIS

10.6.1 10.7.1 Normality, homoscedasticity and linearity

Regression 17: Digitalisations effect on competitive advantage



Regression 18: Digitalisations effect on profitability



10.7 QUESTIONAIRE

10.7.1 Cover letter

Kjære respondent

Ditt selskap får herved muligheten til å delta i et forskningsprosjekt i regi av Norges Handelshøyskole (NHH) og Knowit der det forskes på ledelse og digitalisering. Vi håper denne undersøkelsen kan bidra til ny kunnskap om hvordan norske selskaper i dag utnytter digitalisering, og ønsker å kartlegge hvilke strategiske grep som fører til størst kommersiell gevinst og konkurransefortrinn.

Respondenter vil få mulighet til å få tilsendt et "executive summary" fra undersøkelsen til intern bruk, samt invitasjon til en topplederkonferanse om ledelse og digitalisering.

Alle opplysninger vil bli behandlet konfidensielt. Data fra undersøkelsen vil oppbevares av NHH. Dataene vil etter innsamling bli anonymisert og arkivert ved prosjektets slutt (08.06.2018). Knowit vil ikke ha tilgang til dine svar, kun motta en rapport i aggregert form.

Det er frivillig å delta i studien, og du kan når som helst trekke deg fra undersøkelsen uten å oppgi grunn. Dersom du trekker deg, vil alle opplysninger om deg bli slettet. Studien er godkjent av Personvernombudet for forskning (NSD).

For å delta i undersøkelsen klikker du på linken under. Ved å klikke på linken samtykker du til å delta, samt til å svare på spørsmål om dine tanker og holdninger til digitalisering og organisasjonskultur. Spørreundersøkelsen vil ta anslagsvis 10-15 minutter å besvare.

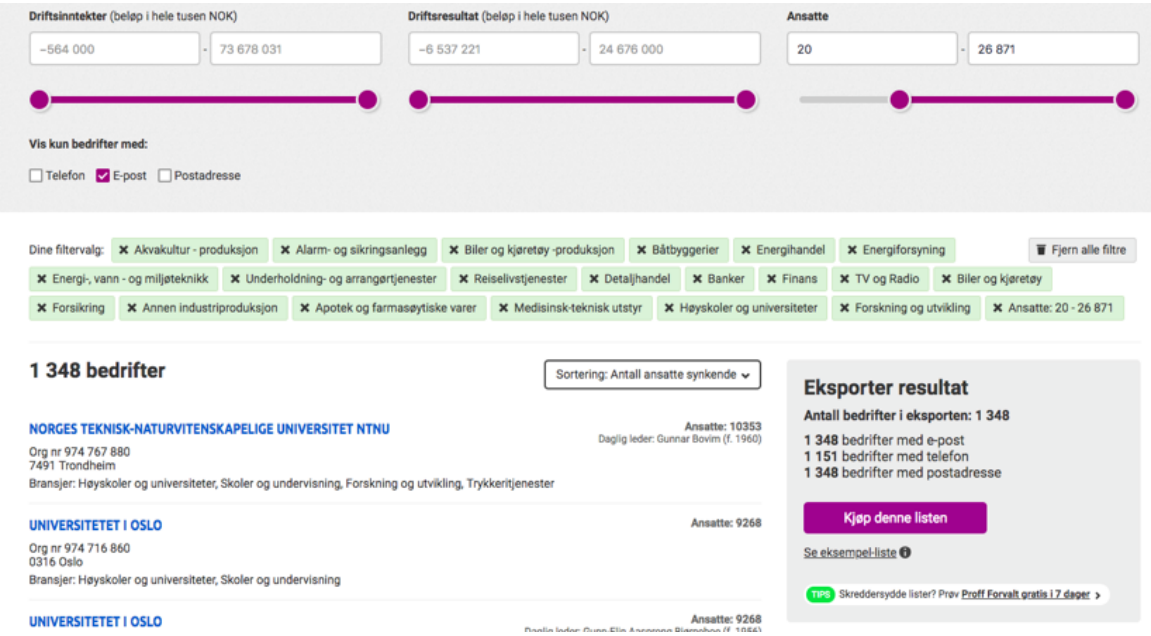
Vi setter stor pris på ditt bidrag.

Link til spørreundersøkelsen: https://nhh.eu.qualtrics.com/jfe/form/SV_8J1bvjtjRSX9BvD

Ønsker du å få tilsendt executive summary, delta på konferansen eller har du andre spørsmål? Send mail til linnea.oberg@student.nhh.no.

Vennlig hilsen
Anna Eitrem og Linnéa Öberg
NHH Norwegian School of Economics

10.7.2 Selected industries from Proff.no



10.7.3 Questionaire

Digitalization in Scandinavian companies

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Digitalization in Scandinavian companies

This is a survey about *digitalization in Scandinavian companies*.

Digitalization is in this survey defined as the collective term of the ongoing technological shift certain companies are experiencing today.

This questionnaire consists of 45 questions and will take approximately 10 minutes to complete.

.

Please answer to which degree your company complies to the following statements about *digitalization*.

Q1. We believe that it is important to digitally reconfigure our business model to survive in our industry.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q2. We employ digitalization to cut costs.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q3. We are currently developing new areas of business through applying new technology.

- Strongly disagree
- Disagree
- Somewhat disagree

- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q4. We employ digitalization to streamline our internal workflow.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q5. We employ digitalization to create a better customer experience.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q6. We consider digitalization to be primarily an effort to increase our efficiency.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q7. We employ digitalization to gather customer insights.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree

- Agree
- Strongly agree

Q8. Digitalization processes have improved the quality of our existing services.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

.

Please answer to which degree the following statements are accurate for your company.

Q9. Digitalization processes have given us a competitive advantage.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q10. In our company, digitalization initiatives stem from one department (For example the IT-department, marketing department etc.)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q11. In our company, digital initiatives stem from a collaboration between different departments of the company.

- Strongly disagree

- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

.

Please assess how your company relates to the following statements about *corporate practice and entrepreneurship.*

Q12. We have launched many new products/services on the market during the last five years (include both physical and digital products/services).

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q13. We usually beat our competitors in developing innovative actions.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q14. We are prone to carry out risky projects when they involve profitable opportunities.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q15. When uncertainty is high, we adopt a brave and aggressive attitude to exploit possible opportunities.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q16.
We consider ourselves to be more innovative than our competitors.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

. **Please assess how your company relates to the following statements about *corporate practice and customer orientation.***

Q17. We continuously gather information about the trends in our target market.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q18. We continuously gather information about our competitors' strategies.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
-

Somewhat agree

Agree

Strongly agree

Q19. Our strategy for competitive advantage is based on our understanding of customer's needs.

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

Q20. We are more customer-focused than our competitors.

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

Q21. We measure customer satisfaction systematically and frequently.

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

. **Please assess how your company relates to the following statements about corporate *practice and technology.***

Q22. We use sophisticated technologies in our new product development.

Strongly disagree

Disagree

- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q23. Our new products are always state of the art concerning technology.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q24. We are proactive in the development of new technologies.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q25. Our technological expertise is superior to our competitors.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q26. Technological innovation based on research results is easily accepted in our organization.

- Strongly disagree
- Disagree
- Somewhat disagree

- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

. **Please assess how your company relates to the following statements about *corporate practice and organizational learning.***

Q27. Managers agree that our ability to learn is key to our competitive advantage.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q28. Employee learning is seen as an investment, not an expense.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q29. We are not afraid to reflect critically about the way we do business.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q30. All managers in this company are open to having their “view of the world” questioned.

- Strongly disagree

- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q31. Our company places a high value on open-mindedness.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

.

Please answer to which extent the following statements are true for your company regarding *company culture and cooperation*:

Q32. All departments across the company are integrated in serving the needs of our customers.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q33. Employees recognize each others' special talents and expertise.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q34. There is an agreement on our vision across all levels, functions and divisions in the company

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q35. Open communication of relevant information occurs among employees.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q36. When problems arise, departments perceive them as “mutual” problems that need to be solved.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly Agree

Q37. Employees across departments share resources to complete their tasks.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

. **Lastly, please provide the following information about you, your company and the market you operate in.**

Q38. What industry sector does your company operate in?

- Bank, finance and insurance
- Energy
- Retail and services
- Manufacturing industry
- IT & telecommunication
- Media, education and entertainment
- Public sector
- Life science and medical
- Other

Q39. How many people are currently employed in your company?

- 20-49
- 50-99
- 100-249
- More than 250

Q40. In which area of your company do you primarily work?

- IT
- Product development
- Marketing
- Accounting and finance
- HR
- Other

Q41. What is your field of specialization in higher education?

- Business and/or administration
- Technology and engineering
- Other
- I have not taken higher education

Q42. Is your company hiring external consultants from a digital agency?

- Yes

- We have done so in the past
- We are planning to
- No

. **Please answer to which degree your company relates to the following statements:**

Q43. Over the last three years our profitability has been high relative to our competitors.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q44. In our market, customer preferences often change.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q45. The market our company operates in is growing.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Q46. In our company, we have implemented the following digitalization efforts (you can choose more than one).

- Improving websites and applications

- [ ] Improving internal work flow
- [ ] Creating new services/products
- [ ] Automatization
- [ ] Changing the core of our business