Digital Transformation in Projects

A study on how digital transformation affect project management.

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Preface

This master thesis is written as the final chapter of our master's degree in business and administration at the University of Agder and is worth thirty ECTS credits for each of us.

Today's digital era demands effectivity and puts pressure on time management, requiring project managers to create flexible strategies in order to stay competitive. With an increasing focus on digital transformation in business and projects, we believe our topic of how digital transformation affects project management is time-relevant. Through the course of our study, we have accumulated knowledge needed to conduct this master thesis. Existing research, relevant theory, and external perspectives have provided us with information relevant and needed to answer our research question.

We have found this an interesting topic to study and have learned a lot in the process. Writing this master thesis has been challenging yet educational, increasing our knowledge of a topic we are bound to face when entering the labor market.

We want to thank our respondents that have contributed to our master thesis. Their contribution has been a great help in our study to gain insights on how things are done in practice. Without their assistance, we would not have been able to answer our assignment, and we greatly appreciate their openness.

We also want to thank our supervisor, Andreas Erich Wald at the faculty for Business and Law at the University of Agder, which has contributed with excellent guidance, wisdom around our research topic, and good recommendations about our thesis. We are grateful for the support and the amount of work he has done to help us.

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Abstract

The purpose of this master thesis is to research what effect digital transformation has on project management. This is conducted by researching if there is a connection between digital transformation in the industry, the use of digital transformation in projects, and how project management has been impacted by digital transformation.

In this study, we have interviewed three respondents from different companies about the use of digital transformation in their company and projects. We have found out that all three companies have implemented digital transformation in their strategy and daily tasks. We have also found out that what used to be manual processes have now become partial or even total automated processes. Each company focuses on and uses a lot of recourses on digital transformation. Digital transformation is seen as a process that is time-saving and efficient. However, some express apprehension. As one of the companies raises concerns about the loss of work opportunities and how this can create resistance towards digital transformation, the other confirms such concern as they have themselves experienced such loss. One of the companies believes that you can lose some control of the accuracy of the numbers if you blindly trust the automated process.

With the help of our theoretical- and managerial implications, we conclude that digital transformation affects project management by creating more teamwork, efficiency and time-saving. Implementing digital transformation in project management gives management the time to focus more on numbers and results and less time on making the numbers.

Keywords: Digitalization, Digital transformation, Project, Project management

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1 Introduction

1.1 Background

Firms across numerous industries experience the transformative impacts of digital technologies on their external environment, such as the competitive dynamics or the expectations of their customers, but also in their internal environment – ranging from associated business models as well as the service and product offerings to organizational structures (Downes & Nunes, 2013; Lucas & Goh, 2009; Porter & Heppelmann, 2014). As a reaction to this, top management in companies approaches new opportunities and risks that originate from digital technologies by introducing company-wide digital transformation strategies that implement their already existing strategies. Their goal, in the long run, is to increases the company value creation (Chanias & Hess, 2016).

Terms like "Digitization", "Digitalization" and "Digital Transformation" describe how the use of technology and processes affects our daily routines and how we do businesses (Zigurat, 2019). Digitization is about transforming analog information and turning it into zeros and ones so that computers can process and transmit (Bloomberg, 2018). Digitalization, from a business perspective, is about how to use digital technologies and data to create more revenue, improve business, and create a digital culture in a company (Hapon, 2018). Routine tasks can be automated, which, if used correctly, results in a better work environment for the employees. Other tasks, such as recovery and retrieving data, will be much easier with digitalization (Parviainen, Tihinen, Kääriäinen & Teppola, 2017).

The term digital transformation is defined as follows "*the use of new digital technologies (social media, mobile, analytics or embedded devices) to enable major business improvements*" (Fitzgerald, Kruschwitz, Bonnet, Welch, 2013, p 4). There is no digital transformation or digitalization without digitization (I-scoop, n.d.). However, digital transformation looks more at strategic advantages instead of technological advantages (Tabrizi, Lam, Girard, Vernon, 2019).

A project can be defined in many various ways, one definition is: "*A project is a temporary endeavor undertaken to create a unique product, service or result.*" (Institute, p. M., 2017). Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. (Institute, p. M., 2017)

There is a lot of existing research on digitalization, projects and project management, but not that much on digital transformation as it is still a rather new concept. The corresponding phenomenon of digital transformation has received little attention in previous literature in respect to industries that work with projects. Most of the existing literature in this area focuses on how digital transformation is organized and which opportunities and challenges arise within firms (Stief, S. E., Eidhoff, A. T., & Voeth, M., 2016).

1.2   Research question

A research question is a question that a researcher is set out to answer. It is the driving force for most empirical studies (Yin, 2014). A research question should be clear and focused, as well as synthesize multiple sources to present our unique argument (Cuba, 1997).

Based on current studies in academic journals regarding digital transformation, the thesis at hand contributes to the literature by creating a holistic overview of the concept of digital transformation in projects with the help of three in-depth interviews with employees from Norwegian companies who have experience and work with digital transformation, projects and project management in their companies. In particular, we seek answers to the following main research question and two specific sub-questions. Our main research question for this master thesis is:

> *How does digital transformation affect project management?*

With the following sub-questions:
> (1) *How do the requirements for being a project manager change because of digital transformation?*
> (2) *How is digital transformation implemented in project management?*

The purpose of this master thesis is to contribute to a better understanding of the phenomenon of digital transformation as a strategic form of a firm's business and project development by giving essential insights into the organization. The sub-questions will provide an overview concerning the implementation of digital transformations in firms' projects and how project management has changed after the implementation of digital transformation. Thus, the focus is not if firms will implement digital transformation, but how the already implemented digital transformation has affected the firm's projects and project management.

1.3   Structure

The thesis uses a traditional structure for master reports. This involves a review of relevant literature, review of the research approach, descriptions of results from data collection, discussion and conclusion. Besides Chapter 1 - *Introduction*, the master thesis contains the following chapters:

Chapter 2 – *Conceptual framework* – presents the relevant literature that has been essential for this thesis. It explains the definitions of digitization, digitalization, digital transformation and the content of the concepts. The definition of projects and project management is briefly described. Lastly, existing research is presented.

Chapter 3 – *Method* – clarifies the choice of research perspective, the research design and research strategy. Furthermore, we present the method for data collection and a qualitative study with respondents from different companies, confirming the reliability of the respondents. Thereafter we explain the data analysis procedure and conclude the chapter by evaluating the study.

Chapter 4 – *Results and analysis* – presents the results of the data collection. To begin with, Case A, B and C are presented separately in a within-case analysis. The interview is coded into themes echoed in the transcribed text and summarized in a cross-case analysis, representing similarities and differences. Finally, we take a look at the theoretical- and managerial implications and discuss the results of the data collection against the research questions and previous literature.

Chapter 5 – *Conclusion* – intends to answer the research questions and briefly summarizes our findings.

2 Conceptual framework

2.1 Digitization, digitalization and digital transformation

Digitization is about transforming analog information (physical information) and turning it into zeros and ones so that computers can process and transmit (Bloomberg, 2018). Analog information can be paper documents, photos and music. An example of using digitization is converting handwritten or typewritten text into digital form. Digitization does not necessarily remove analog information; it simply finds a better way to use the information and make it easier to handle. Making it more automatic by injecting technology and creating digital information (I-scoop, n.d.). Digitization steps away from the time-consuming manual or semi-manual procedures by converting it into something automated. It creates a place to have analog information stored in a digital format so that it cannot be easily lost or broken.

As early as the 1670s, there were pioneers storing information in binary systems. For the next 250 years, such concepts were crucial to our technological advancements. The first computer was built in 1937 (Elliot, n.d.). Following this electronic device, many more variations of the computer were made in the next decade mostly due to military incentives. In the 1950s, computers started to quickly advance. They included numerous programs like languages, memory and operating systems. In 1975, Steven Sasson made the first digital camera and the first personal computers started getting introduced to the market, making digital storage more accessible to everyone (Elliot, n.d.).

By 1982, compact discs were produced and surpassed the sale of vinyl records by 1988. In 1986, the JPEG format was brought to light as a way to downsize image files to more accessible and transferable bytes. Compressing data and media into digital formats started becoming a norm to the common consumer. In 1980s, the World Wide Web was introduced to the public (Elliot, n.d.). After the World Wide Web became public, technology quickly advanced. Today we have digital tools such as smartphones, laptops and online streaming services like Netflix, Spotify and Origin.

Unlike digitization, **digitalization** does not have a single, clear definition. One of the definitions of digitalization is the following; digitalization is about how to use digital technologies and data to create more revenue, improve business and create a digital culture in a company (Hapon, 2018). Thus, digitalization is defined through the business perspective.

Brennen and Kreiss (2016: page 1) define digitalization, more from a social life perspective. *"We refer to digitalization as the way in which many domains of social life are restructured around digital communication and media infrastructures"*. Digitalization is closely associated with digitization and often used interchangeably in a broad range of literature (Bloomberg, 2018). We focus more on digitalization from the business perspective, given that digitalization is increasingly implemented and used by businesses around the globe.

Digitalization has a big impact on the internal processes in a company, where the traditional processes are challenged. The internal efficiency of a firm relates to factors such as process efficiency, quality and consistency. Digitalization of a firm gives the potential to improve these factors. The possibilities of more up to date information are high and may result in better views towards the firm. Routine tasks can be automated, which, if used correctly, results in a better work environment for the employees. Other tasks such as recovery and retrieving data will be much easier with digitalization (Parviainen, Tihinen, Kääriäinen & Teppola, 2017).

Digitalization does not only create opportunities inside the company, but also towards the external environment. This includes new business opportunities in existing domains. The company could be able to deliver completely new products and services to their existing target market. These new products and services could also reach different markets and attract more customers to the company. There is also the possibility to deliver existing products to new customers. Expanding the market by using a digital approach can be profitable for a company. All of these new entries can be done without digitalization, but it will be much more efficient to use it (Parviainen, et al. 2017).

The marketing of the company is largely enhanced by digitalization. Information about the products are spread over larger areas than before and companies experience an increase in their customer base. With this development, companies that only operate on a national level now has an opportunity to expand their operations to reach international consumers. The aspect of the entire world becoming more digital is what makes this type of development possible. (Kreutzer, Neugebauer & Pattloch, 2017).

There can also be disruptive changes in the operations of the business. These changes are mostly related to how the operating environment of the company change as a result of digitalization. The entire environment changes and a business can become completely

irrelevant. In this aspect, many may go out of business. On the other hand, new business opportunities can arise from the process of digitalization. (Parviainen, et al., 2017)

At this moment, 2020, we are experiencing the great impact digitalization can have. The current pandemic, Covid-19, has changed companies' internal processes; their way of doing tasks, communicate with each other, and their way to reach and communicate with customers. Sadly, many companies have been forced to close during this pandemic because of guidelines from the government. Companies that continue their operations have used digital tools and digitalization to manage working around Covid-19. An example of this is the change from having meetings at the office to having virtual meetings, where each employee is stationed at their home, with the help of digital tools like Zoom, Skype and Microsoft Teams. This pandemic has given companies a test-run on what type of digitalization works and does not work for the company. For many companies it has been, and still is, challenging, somewhat frustrating but also educational. In addition, many have expressed that the use of digitalization works during crisis, but that having a physical social framework around your work is important for both well-being and efficiency (Schei & Vartdal, 2020).

Since the 1750s, we have seen four industrial revolutions in the world. The first revolution was the steam engine which gave power to industrial production, an example is the steam locomotive. Around 1870 electricity was introduced to the world, which quickly gave possibilities for new forms of production and even replaced already existing productions. From around 1950, automation started to rise, which created less use for manpower because people started to be replaced with machines. As of today, the latest industrial revolution is digitalization (Lundin, 2015).

Joseph Alois Schumpeter was an economist and is regarded as one of the 20th century's greatest intellectuals. He is best known for his theories on capitalist development and business cycles and for introducing the concept of entrepreneurship (Liberto, 2019). Figure 1 below illustrates Schumpeter's long waves of innovation; it is about how five different waves of innovation changed economic activity and the world in general. These five different waves

are equivalent with the four industrial revolutions mentioned above. Right now, we are in the 5th wave, which is Digital networks, Software and New media.
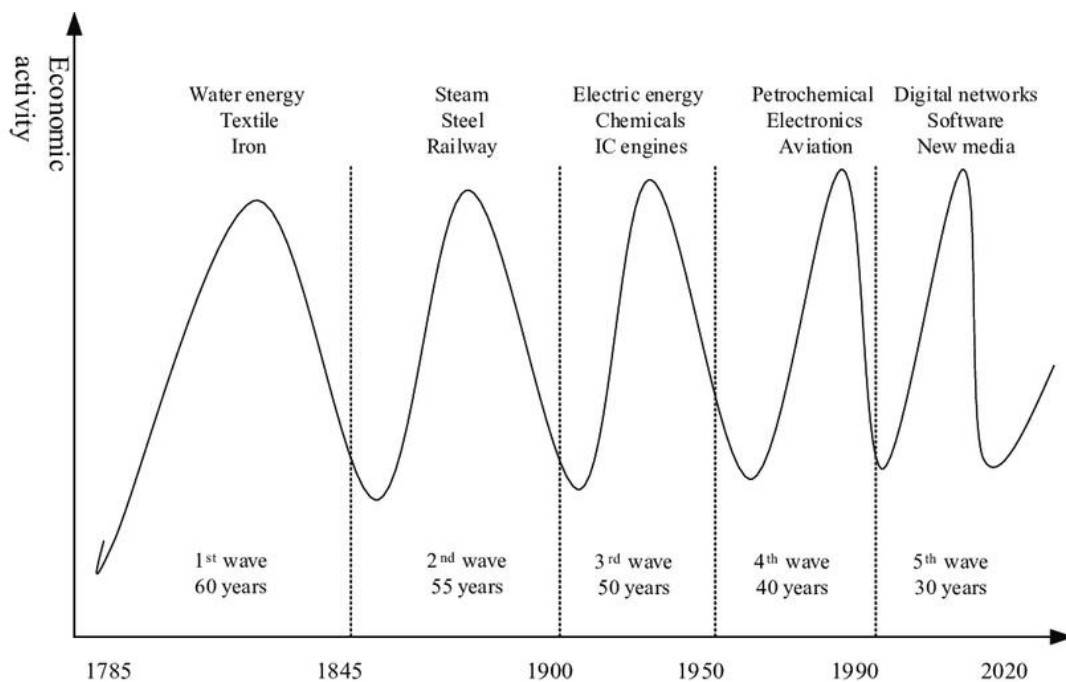

Figure 1 Schumpeter's waves of innovation (Levi Jakšić, Marinković, Petković & Rakićević, 2018)

As seen in Figure 1, the innovation started around the 1990s. Some digital networks, software, and media are already well known in societies around the world today. However, there are still rapid changes in the innovation wave and new digital networks. Software and media is still developing and have not yet been fully introduced to the outside world. Thus, it can be seen as an innovation still in process, making it even more interesting to research about it.

Digital transformation focuses more on the strategy of a business and not that much on the technology used, compared to digitization and digitalization. The term digital transformation is defined as *"the use of new digital technologies (social media, mobile, analytics or embedded devices) to enable major business improvements"* (Fitzgerald et al., 2013, p 4). Thus, there is no digital transformation or digitalization without digitization (I-scoop, n.d.). Digital transformation looks more at strategic advantages instead of technological advantages (Tabrizi et al., 2019). It gives businesses the opportunity to create new business models. This does not necessarily mean that they replace the already existing business models but find a way to use the different business models to create more value and making it easier to achieve the organization's goals.

The framework, illustrated in Figure 2 below, contains a digital transformation framework. (Matt, Hess & Benlian, 2015). It is about how to balance four transformational dimensions when implementing digital transformation. These four transformational dimensions are:

- ▫ Use of technologies
- ▫ Change in value creation
- ▫ Structural changes
- ▫ Financial aspects

The use of technologies addresses how a company reacts towards new technologies as well as its ability to exploit these technologies. IT has a strategic role in a company when using technologies and its future technological ambition. A firm needs to decide whether it wants to become a market leader in terms of technology usage with the ability to create own technological standards, or whether it will resort to already established standards and sees technologies as means to fulfill business operations. From a business perspective, the use of new technologies often implies changes in value creation, this can be concerning for a firm on what impact digital transformation strategies has on a firms' value chains (Matt et al., 2015). With different technologies in use and different forms of value creation, structural changes are often needed to provide an adequate basis for the new operations. These structural changes are especially concerning the placement of new digital activities within the corporate structures, but also whether it is mainly skills, processes, or products that are affected most by these changes.

However, the former three dimensions can only be transformed after considering financial aspects, which can be a driver and a bounding force of the transformation. While lower financial pressure on the core business may reduce the perceived urgency to act, companies already under financial pressure might lack external ways to finance a digital transformation. Therefore, firms should openly and timeously consider the need of, and how to, conduct digital transformations. It is also important for firms to explore their options. To ensure that the strategy of implementing digital transformation is successful it is essential for firms to closely align the four different dimensions use of technologies, value creation and structural changes and financial impacts (Matt et al., 2015).
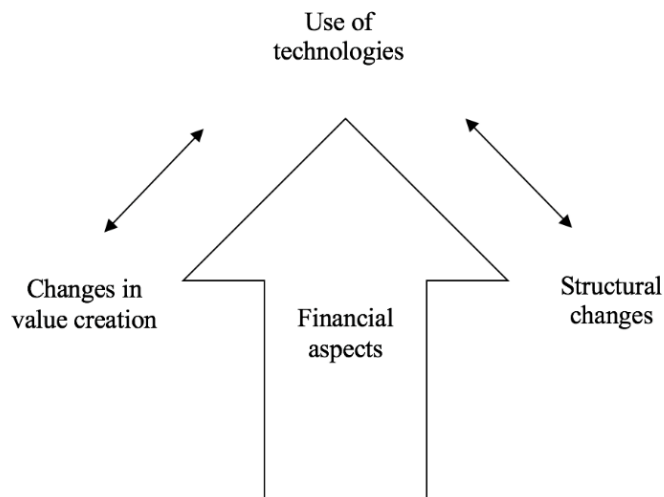
Figure 2 Four transformational dimensions when implementing digital transformation

There are three areas in a firms' organization that are impacted when implementing digital transformation (Westerman, Bonnet & McAfee, 2014). These three areas are customer experience, operational processes and business models. Each of these key areas has three different elements that are changing. This gives a total of nine elements that can change because of digital transformation. These following nine elements distributed in customer experience, operational processes and business models are:

Transforming customer experience

- □ Customer understanding
- □ Top-line growth
- □ Customer touch points

Transforming Operational Processes

- □ Process digitization
- □ Worker enablement
- □ Performance management

Transforming business models

- □ Digital modified businesses
- □ New digital businesses
- □ Global digitalization

Changing elements under customer experience are customer understanding, top-line growth and customer touch points. Customer understanding becomes easier with the help of digital media. Businesses can promote their business wider than their current geographic area. It gives easier access to the outside world and the acquisition of customers (Westerman et al., 2014).

With the help of social media, businesses can figure out what customers like and do not like about their products or services without using a lot of resources to obtain this information. It gives them easy feedback on what requires change and what does not. Building new online communities makes it simpler to create loyal customers (Westerman et al., 2014). For example, members of the community receiving special offers that non-members do not receive.

Top-line growth is about how mobile tools are helping businesses transform a customer sales experience, and how these tools are replacing paper documents and even personal interaction (Westerman et al., 2015). For example, pitching a sale with the help of a tablet instead of paper documents.

Customer touch point is about how customer service can be enhanced by digital initiatives (Westerman et al., 2014). For example, a restaurant making a Facebook account to rapidly answer questions or complaints customers may have. Another tool to enhance customer touch point is a company's app. Companies in different industries are more frequently using apps to create a feedback platform, offers and even a way of payment.

The next key area is about transforming operational processes. Although external transformations, such as creating new or different customer experiences, might be the most visible directly to the consumer, companies are also realizing that internal transformation can create great benefits through the process digitization, worker enablement and performance management (Westerman et al., 2014).

Process digitization is about how automation can enable companies to refocus their people on more strategic tasks. Automation can be allowing economies of scale by self-service, freeing HR and administration employees of conducting time-consuming tasks (Westerman et al., 2014). For example, how most companies today have a login/logout system when arriving and leaving work. The workhours are automatically registered in the system, making it easier to inspect the workhours and less chance of employees registering wrong hours.

Automation also allows researchers to focus on their creativity and innovation rather than repetitive offers. It also creates streams of data that can be useful in later data-mining efforts. Some digital efforts can also reduce the development life cycle, reduce labor requirements and improve product quality (Westerman et al., 2014).

Worker enablement is about how individual-level work has been virtualized. Working from home or an assigned office does not make much difference anymore because through digital tools the employee can access information and their tasks at any geographic location. The worker enablement has become more flexible with the help of digital tools. Through virtualizing individual-level work knowledge sharing has become a powerful gain in a company. More so, it creates access to a single, global view of the interactions between a company and its customers (Westerman et al., 2014).

The last element under transforming operational processes is performance management. Transactional systems give employees deeper insights into products, regions and customers, allowing decisions to be made on real data and not assumptions. This is happening not only in the internal process but also in the customer-facing process. The level of detail is also increasing, making it easier to compare status across sites or reallocate product manufacturers capacity in ways companies could not do before (Westerman et al., 2015).

The three changing blocks in business models' transformation are digital modifications to the business, the creation of new digital business and digital globalization. A digital modified business is about how not necessarily changing the way we do technology but changing the way how we do business. Thus, finding ways to replace physical offerings with digital offerings to share content across the organization (Westerman et al., 2014). An example of this is how a credit company is developing a digital business for some credit products that require less involvement than their traditional high-touch offerings. Another example is a hotel that offers online check out instead of the traditional front office check out, simplifying the check-out process for both the guest and the employees.

New digital businesses are about how companies are introducing digital products that complement traditional products (Westerman et al., 2014). An example is an airport authority that is aiming to become an owner of a traveler's end-to-end process by providing a multichannel experience, which includes information on airplane traffic and reservations, duty-free shopping promotions and other benefits. Digital globalization is about how

companies are increasingly transforming from multinational companies to truly global companies (Westerman et al., 2014).

Digital transformation requires strong leadership and a vision about what you want to change in the company and how this change will affect the company. When working with digital transformation, focus is important. Industries and regions all over the world are experimenting with, and some benefiting from, digital transformation. This is known to create a lot of opportunities. It is something that has come to stay and while the nine elements are important to create digital transformation, more companies are getting creative and finding their own ways to implement digital transformation (Westerman et al., 2014).

Digital Transformation today

Implementing digital transformation can be quite the process and keeping it active and using it right in the organization can be challenging. When working with digital transformation, there are five lessons that are essential (Tabrizi et al., 2019). These five key lessons can be helpful for organizations to learn and keep on the right track when working with digital transformation. These five lessons are:

Lesson 1: Figure out your business strategy before you invest in anything. It is important to remember that digital transformation should be guided by the broader business strategy. If the two are not cohesive, it will not work.

Lesson 2: Leverage insiders. It is important to not only rely on bringing in outsiders with external competence or knowledge but also employ the existing competence and knowledge of employees within the institution.

Lesson 3: Design customer experience from the outside in. Leaders often expect that the implementation of one single tool or app will enhance customer satisfaction on its own. However, experience and research show that the best way to maximize customer satisfaction is often to make smaller-scale changes to different tools at different points of the service cycle. Through obtaining extensive and in-depth input from the customers, institutions will know how to alter the customer experience.

Lesson 4: Recognize employees' fear of being replaced. Many employees perceive digital transformation as a threat to their jobs, they may consciously or unconsciously resist the

changes. If the digital transformation turns out to be ineffective, management will eventually abandon the effort and their jobs will be saved. Here it is critical for leaders to recognize those fears and to emphasize that the digital transformation process is an opportunity for employees to upgrade their expertise to suit the marketplace of the future.

Lesson 5: Bring Silicon Valley start-up culture inside. Silicon Valley start-ups are known for their rapid prototyping, agile decision making and flat structure. The process of digital transformation is inherently uncertain. Decisions need to be made quickly, and changes may be adjusted along the way. It is important that groups from all over the organization are involved. Traditional hierarchies get in the way and it is best to adopt a flat organizational structure that is kept somewhat separate from the rest of the organization.

Even though these five lessons were created from an American perspective with grounds in a traditional hierarchy culture, we still consider it applicable to the Norwegian, somewhat flatter structure, organizational culture.

2.2   Projects and project management

Packendorff (1995) defined a project in terms of the organizational perspective. The research of projects comes from the engineering perspective. In the article, Packendorff uses multiple project management literature as a source to say that most literature defines a project as *"a unique, once-in-a-lifetime **task**; with a predetermined **date** of delivery; being subject to one or several performance **goals** (such as resource usage and quality); consisting of a number of **complex** and/or interdependent activities."*

After the article by Packendorff was published, multiple economics and political scientists started to research more about projects in light of an organizational view. Shenhar (2004) published an article that demonstrated how strategic project leadership is a new approach to turn projects into powerful competitive weapons. Shenhar says it is time to expand the traditional focus of project management from an operational, to a more strategic perspective. Shenhar defines a project as: "*a temporary organization and process set up to achieve a certain goal under the constraints of time, budget and other resources*". Shenhar introduces the human aspect to the project definition by including resources and talking about leadership in projects.

If we compare Packedorff's article, from 1995, with an article by Burke & Morley from 2016, who defined the temporary organizations as "*a temporally bounded group of interdependent organizational actors, formed to complete a **complex** task*", we find similarities to Packendorff's definition. The difference is that Burke & Morley define a project as a complex task and expanded the definition to also consist of actors who form a team. This makes Packendorff's definition still relevant today, but in later years there is more focus on human participation in projects.

Project Management Institute (PMI) was established in 1969 and is the largest member association in the world of project management. *"Through global advocacy, collaboration, education and research, we work to prepare more than three million professionals around the world for the Project Economy"* (Institute, p. M., 2020). In the Project Management Body Of Knowledge (PMBOK), they define that: "*A project is a temporary endeavor undertaken to create a unique product, service or result.*"

The various definitions we have presented show a development from 1995 to the present. Packendorff started by defining projects from an organizational perspective, while Shenhar expanded to also talk about resources in the project. In the article by Burke & Morley, much of the same was also mentioned, but the definition was developed to include projects being created to perform a complex task.

Characteristics of a project

By analyzing the various definitions, we can assume that a project is a one time – limited task performed by a temporary group. One of the main characteristics of a project is that a project has a predetermined date of delivery. The project has a beginning and an end. Jacobsen (2016) compares a project to a human life and states: *"a temporary organization is born and dies, just like a human life"*.

A project is created to solve a unique, once-in-a-lifetime task. The task is clearly defined in a project and can be innovative, which means that it has not been solved before. In that case, you may need broad expertise or different perspectives to solve the task, especially if the task is complex.

Another characteristic of a project is that it consists of a group of people. The project group differs from the permanent organization typically in that there are participants from different departments from the organization and can also be from outside the organization. As mentioned, the project is created to solve a unique task, and it can therefore be important to include people from different professions and different backgrounds.

A project is complex and not an individual task, but a group effort. The size of the group depending on the size of the project. Tuckman's stages of group development consisting of forming, storming, norming and performing reflect the stages a group works through, from the start to a finished project, describing phases from "getting to know each other", "establishing group dynamics" and "performance". Tuckman claims that all groups go through each phase in any given project (Tuckman, 1965). A project is time-limited and group dynamics, there being differences in e.g. culture, values, religions or traditions, can create challenges for group performance and time-management within a project.

The fourth characteristic of a project is complexity. Complexity is referred to as the number and heterogeneity of different elements that interrelate (Burke & Morley, 2016). Hanisch & Wald (2014) distinguish between three main types of complexity: structural complexity, task complexity and temporal complexity. Structural complexity is about the size, and how many people that are working in the project, professional diversity and what role they have in the organization (Geraldi, Maylor, & Williams, 2011; Williams, 1999). Task complexity focuses on technology (routine, engineering, craft, or non-routine) and its effects on task structure (i.e.control and coordination) (Perrow, 1967). Temporal complexity is about the four dimensions of time: sequence, duration, synchronization and tempo. (Bengtsson, Müllern, Söderholm & Wahlin, 2007). However, Hanish & Wald (2014) state that out *"Of the three types of complexity considered, only structural complexity significantly influences efficiency and effectiveness of temporary organization's"*.

From Group to Team

There is a difference between a group and a team (Jacobsen, 2016). A group can be defined as people who are given a task to solve, resources to solve the task, as well as a formal work and authority distribution (Jacobsen, 2016). A team is a group that has a common understanding of the goals and how to obtain the goals, understanding of division of labor and

understanding of division of authority. We can describe a group as being a "pre-stage" to team-development. Some factors that can influence and challenge a project are (1) the project group never becomes a team, and that (2) the project group does not have shared memory (Jacobsen, 2016).

The project group never becomes a team. The members have no previous relation to each other. A project is a one time-thing, and there is often a new project group for every new project. This means that the members have not worked together before. For a group to progress into a team it is important that each member feels ownership towards the project. Many of the members may have prior relations for example through previous long-term work relations in the same organization and therefore know each other strengths and weaknesses. Despite, previous relations, dynamics still have to set in each new group and often the time-consuming process of "getting to know each other" can hamper their ability to progress from group to team (Jacobsen, 2016).

The project group does not have shared memory. Projects are temporary organizations that have defined start and finish dates and many people who come together in a project have never worked together before. There is often institutional memory and standard procedure in an organization. Institutional memory is the collective knowledge and learned experiences of a group (Kidd, 2009). Institutional memories are incorporated in the organizational culture and is often taken for granted. Not everyone has the same background in a project. People can come from different parts of the company, and with different educational backgrounds. People think differently and *must* think differently. A project group cooperates at their best in the ending phase of a project when they have started to know the strengths and weaknesses of the people in their team, but as the group is dismissed and a new group forms each step of the team development process must start over. This creates a possible loss of knowledge and the group does not create a shared memory with the main organization (Jacobsen, 2016).

In some projects, it can be an advantage to include people with different background, but in other projects it can be a disadvantage. There are two types of projects, one consisting of inequality, while the other consisting of equality. In a *development project,* there is an advantage with inequalities. This leads to creative and exploratory processes. You also have different perspectives and diversity, which can lead to innovation. Creative processes serve different perspectives and diversity (Jacobsen, 2016). In a *production project*, there is an advantage with equalities. It is best to be equal, because then the communication flows more

efficiently. People have the same understanding, a professional language and frame of reference, something that the production process benefits from (Jacobsen, 2016).

Project perspectives

A project is evaluated differently depending on which interest is emphasized, hereby providing us with different project perspectives (Andersen, 2018). Some of these perspectives are:

- Task perspective
- Organization perspective
- Resources perspective
- Stakeholder perspective
- System perspective

The task perspective's primary function is to deliver a clearly specified product. To complete a specified product, good organization and planning is essential as each individual's contribution assembled will result in said product (Andersen, 2018).

In the organizational perspective, the project is regarded as a temporary organization. Their task is to deliver services or more durable products to the main organization, or to other organizations on behalf of the main organization. Labor between the temporary organization and main organization becomes central. It is important that the temporary organization works well internally and that there is good interaction between the project manager and employees in the project (Andersen, 2018).

From the resources perspective the main focus is that a project is an expression of how the basic organization prioritizes the use of its resources. It is an important task for the project manager to decide where parts of the organization's resources are to be used for development. Meaning, having the awareness of how much of the organization's resources are being channeled into project work (Andersen, 2018).

The main focus in the stakeholder perspective is on who the project stakeholders are, what power they have and how they act. This perspective is of interest for anybody that wishes to influence the project. If you do not have a clear view of who the stakeholders are, and what

kind of strength and influence they have, it is hard to successfully conduct or impact work (Andersen, 2018).

When implementing systems perspective in a project, one often has production considerations. You consider the resources and the conditions that underlie the production and the results. The system perspectives main focus is to ensure systems performance and is fitting for those who want to evaluate a project. It has relevance both for the person who initiated the project and for project management (Andersen, 2018).

The most used perspective within project management is task perspective. However, everybody has a different view on reality. One creates a perspective to understand and explain based on their knowledge, past experiences and what they see as important. In projects there must be created a community; a common perspective on what the project stands for (Andersen, 2018).

Characteristics of a project manager

The project manager has the responsibility and authority to lead the project and deliver the necessary products within the limits and limits defined by the project owner (Digitaliseringsdirektoratet, 2019).

The main tasks for a project manager are planning, delegate tasks to the rest of the project team, monitor activities and progress, and manage all aspects of the project. The project manager must motivate everyone involved to help achieve the project's goals within defined requirements and expectations (Digitaliseringsdirektoratet, 2019).

Andersen (2018) states that *"No one goes far as a project manager without learning to act like a politician"*. By this statement, he means that in many ways a project manager must have the same work tasks and characteristics as a politician. The project manager shall ensure coverage of the main elements of the project, be the project group's spokesperson, and at the same time support the project group in the relationship with stakeholders. In addition, the project manager must secure resources for the project.

The project manager has a key role between the project and the organization and communicates both internally with the project group and outwards with the organization. It is also important that the project manager has confidence in all parts of the organization, both

with the management, and especially in the project group. It is also very important that the project manager is good at communicating, both open, honest and proactive, especially because he talks to so many different people. Influence is also important, here you look at the previous result and knowledge. The role of the project manager is to reduce disagreement and keep everyone satisfied.

People tend to believe that digital transformation is something that happens at the board or executive levels with no substantial decision power for other people in the organization. That cannot be further from the truth – project managers play a vital role during a digital transformation (Butkus, n.d.). Swaminathan (2017) describes the difference between a technological transformation and a digital transformation, and why project managers are relevant in the latter. If a company decided to introduce an enterprise resource planning system for financial operations, it does not entail a fundamental change in how the company interacts with customers or operates. This is an example of technological transformation, where the senior executives make the main decision and the rest of the affected employees have to adopt to a new reality.

2.3 Existing research

From a project management perspective, digital transformation is not something that should be feared. It will take time, effort and a bit of disruption when implementing but it will also empower you as a project manager to better manage your team members, more efficiently deliver projects and, hopefully, better serve for your company's customers (McAbee, 2019).

McAbee (2019) has come up with four different ways on how digital transformation is changing project management. The first change is that it has created more efficient and strategic communication among teams and companies. *"One of the biggest areas in which modern digital technology is redefining project management is cross-team communication"* (McAbee, 2019). Traditional tools like email are not designed for real-time dialogue.

The second change is that there is more collaboration within teams and ownership from team members. *"Workers who feel they are part of a collaborative effort have been shown to have greater engagement, lower fatigue, and higher success rates than those who are isolated from peers."* (McAbee, 2019). With new modern technologies, collaboration between teams have become easier.

The third change of digital transformation in project management is that there is more focus on result rather than process. *"As digital transformation automates workflows and coordinates traditional project management tasks like scheduling, PMs are getting more time to focus on strategy optimization and project delivery."* (McAbee, 2019). With more digital tools and automated processes, project managers are focusing on delivering outcomes that are more successful in the process.

The fourth change is that there is more analytics for improved project manager processes, outcomes and ROI (McAbee, 2019). *"Digital transformation is providing PMs the analytical technology to make data-driven decisions, break down patterns and trends, and ultimately enhance project outcomes and success rates."* (McAbee, 2019). Analytic reports help the managers to get an overview of the project in real-time and keep it within budget.

In a digital transformation, top management outlines the vision, but the implementation of it lies with the "executive muscle" of the organization – that is, the project managers. This puts a lot of power and decision making within the purview of the project manager (Butkus, n.d.). However, no project manager can single-handedly make or break a digital transformation because it is a company-wide effort. Nonetheless, project managers can be effective in the scope of their responsibilities, which would improve the chances of a successful transformation. This can lead to better career opportunities within the company, as people are most effective during the transformation and are better prepared to be well adapted for the new digital reality in the company (Butkus, n.d.).

More recently, Stief et al. (2016) provided an overview on research addressing how digital transformation is organized and which opportunities and challenges arise within firms. They found that some of the opportunities are faster and more flexible processes, optimization of internal workflows and increase in efficiency. Some of the challenges, based on their research, are increased complexity, high initial effort to build up IT infrastructure, face resistance and fear among employees, and foster acceptance among employees.

The development in digitalization is happening fast and will continue to change over time. *"Digital transformation will fundamentally change business activities in the long run*" (Stief et al., 2016, p. 1836). *"Digital transformation is not a new phenomenon but rather an ongoing process that has steadily changed underlying processes over a period of many years"* (Stief et al., 2016, p 1838). The top management is responsible for the transformation

processes in the company. They decide which areas to focus on and which are in the best interests of the organization. (Stief et al., 2016)

In their conclusion, Stief et al.'s (2016) results reveal that the main drivers for transforming business activities are customers, competition, intrinsic motivation and technical innovation, along with the strategic considerations of the firms. Their research findings suggest that the majority of companies have just recently started to assimilate new technologies in order to improve and enhance their business activities.

Bicak (2019) claims that digital transformations are going to change the role of the project manager- and project management – in big ways. Furthermore, Bicak explains that project managers are going to be leaders of their organizations, using different ways and methodologies; so that project managers will be agnostic how projects should be delivered, because they are focused on delivering outcomes that their organizations are trying to achieve in the marketplace (Bicak, 2019).

Prakash (2019) explains that many traditional responsibilities can already be replaced by technology. He also emphasizes the importance of aligning the business with the project and describes this as a time-consuming process. Simplifying processes such as scheduling and planning by utilizing software and technology will provide the project manager with valuable time for other important tasks. Prakash states: *"Today, projects are talked about as strategy: delivery of strategy. That is the real project manager's role. And technology will help project managers to align the business part of the project with delivery"* (Prakash, 2019).

3 Method

3.1 Research design

The empirical data of our study includes qualitative data. We have decided to use a qualitative method, because the topic, Digital transformation, is a rather challenging topic and requires some degree of knowledge. A case study research can be based on either single or multiple cases (Yin, 2014). We chose a multiple-case research design for our study. The reason for choosing this method is that it gives us the possibility to conduct a cross-case analysis, matching and comparing our findings across cases in order to retrieve conclusions that are more general.

One may define a case study as a research strategy that involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple methods of data collection (Yin, 2014). Multiple-case study is a case study organized around two or more cases. Each case must be carefully selected so that it either (a) predicts similar results (*a literal replication*) or (b) predicts contrasting results but for anticipatable reasons (*a theoretical replication*) (Yin, 2014).

The study consists of qualitative data, based on semi-structured interviews, that allows us to get in-depth information about the topic. The interviews mainly served to generate insights into how digital transformation affects project management and how it is implemented in companies.

Explorative, descriptive or causal research design

Research is gathering and analyzing information systematically. After having set the objectives of research, the next step is to decide the research design that best suits the research objectives. It is on the bases of the research design that the research methodology and sampling procedure are selected. The research design is implemented and this begins by the design of the data collection. After that follows the data collection itself, analysis and at last the data is interpreted to know the results (Pratap, 2019).

Explorative research design is a lot like detective work fueled by curiosity. Researchers should use their instincts to find clues and venture into new territories in search of information. Flexibility is important in exploratory research and it is bound to result in new

ideas, revelations and insights (Pratap, 2019). Descriptive research is used to describe a phenomenon or idea. Its data collection method is highly rigid and follows standardized methods. Causal research is effective in terms of identifying covariation between variables when it comes to identifying causality. Causal research helps identify if there is a causal relationship between two or more variables (Pratap, 2019).

Our research design will be explorative because we wish to explore a phenomenon closer. Digital transformation is a phenomenon that we want to find more information about especially how it affects project management.

Qualitative method

While quantitative data operates with numbers and sizes, qualitative operates data with opinions (Dey, 2003, p 11.). In other words, qualitative data are data in the form of words. Qualitative data can be generated from the broad answers in interviews, or from responses in open-ended questions in a questionnaire, or through observation (Sekaran & Bougie, 2016). Figure 3 below, shows our research design when using a qualitative method and is based on Dubè and Robeys research design from 1999.

We have chosen a qualitative, inductive method, moving back and forth between our findings and theory. Through our qualitative method we are looking at findings from three different companies in different industries and the connections between these findings. When using a qualitative method, there are few respondents and the findings cannot be said to be representative or generalizable.
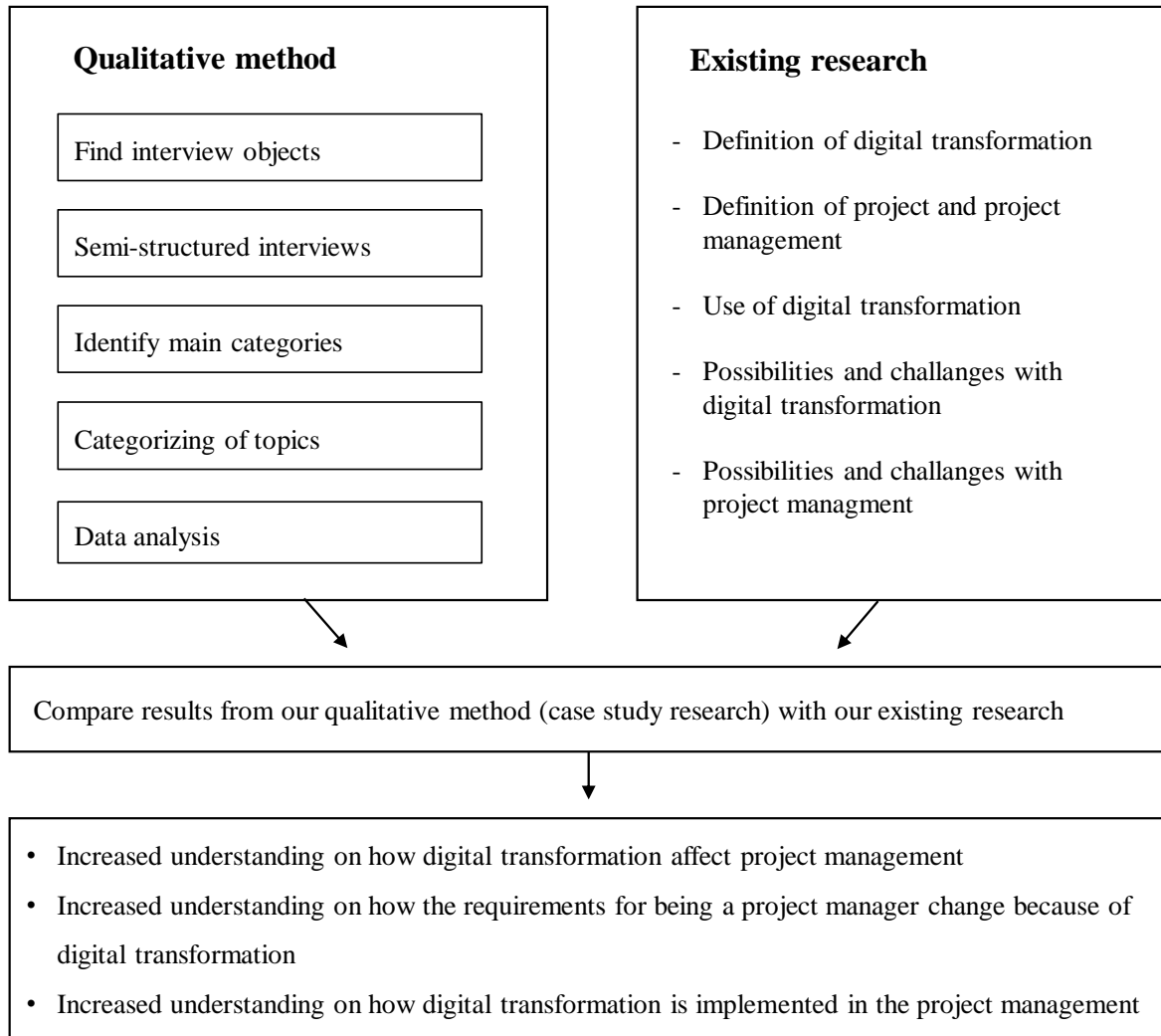
Figure 3 Qualitative research design

As any other method, qualitative method has its advantages and disadvantages. Advantages of using a qualitative method is that it gives the research an openness, nearness, relevance, uniqueness and flexibility. It is important that the researcher creates a natural and comfortable setting for the responder in order to retrieve as valid and reliable data as possible (Jacobsen, 2015). Phenomenon such as digital transformation require understanding of reflections and opinions created through social interactions to gather a comprehensive epitome. A qualitative method allows for an extensive and wholesome understanding of a phenomenon and its context (Busch, 2018, p.56). The goal is to get the responders' perception conveyed through his or her own words (Jacobsen, 2015).

A researcher utilizing a qualitative method will most often not be able to predict the results. Therefore, we can claim that qualitative approaches usually have high relevance. It gives the

researcher the "right" understanding of a situation. It is those who are responding that in a large degree define what the "correct" understanding about the situation should be (Jacobsen, 2015). Because qualitative data has openness to it, they will often be very unique and nuanced. The responder gives their determination, opinions and understanding of a situation. The data we receive will be specific and unique and less of the general is captured (Jacobsen, 2015).

A qualitative approach is also flexible. In other words, we have a research question we want to clarify, but this question can change as we learn more along the way. The process becomes interactive, meaning we can go back and change the research question and the data collection method as the research is ongoing. We will often experience that the distinction between data collection and analysis is unclear in a qualitative method (Jacobsen, 2015).

Disadvantages of using a qualitative method is that it is resource demanding, can have generalization problems, is complex, and can create a research effect. A qualitative research demands resources and is a time-consuming process. This, in combination with a time-limit to the master thesis, requires a precise and contemplated decision regarding how many respondents we have the time to interview. Choosing too many respondents may result in an overload of information and a poorer analysis, should time be an issue. Interviewing few respondents also affects the possibility of generalization, as it is difficult to generalize when you only have three unique and personal answers, and the population cannot be said to be representative. Therefore, a qualitative approach will often have a weaker external validity, which can lead to a more difficult and complex data interpretation and analysis for the researchers (Jacobsen, 2015). Closeness and flexibility can be an advantage, but also a disadvantage (Jacobsen, 2015). Many will experience the feeling that they are never done, as more new information constantly emerges (Jacobsen, 2015). We have to be aware of the research effect, meaning that we as researchers may end up with biased results.

3.2 Data

Our method for data collection is semi-structured and in-depth interviews. Semi-structured interviews allow for follow-up questions should something be unclear. We have chosen a multiple-case study and are conducting an interview with one subject from each case. Each employee in the chosen companies has experience and works with both digital transformation

and project management. We have only conducted one interview with each subject, with no plan of follow-up or future series of interviews with the different subjects.

Before the interviews, we prepared an interview guide to have specific topics for the conversation. The interview guide consists of ten questions. There is a certain structure in the interview guide, but there is also openness to flexibility and follow-up questions that are not defined in advance if necessity arises.

In this study, we have face-to-face interviews. The main advantage with this form is that the researcher can adapt the questions as necessary, clarify doubts, and ensure that the responses are properly understood. It creates trust and openness, less distractions and a better flow in the conversation. The researcher can also pick up nonverbal cues from the respondent (Sekaran & Bougie, 2016). The main disadvantages of conducting face-to-face interviews is that it creates high cost because the method takes personal time and the researchers effect on how the interview will be led can potentially be strong (Jacobsen, 2015) Another drawback is that respondents might feel uneasy about the anonymity of their responses when they are face-to-face with the interviewer (Sekaran & Bougie, 2016).

Due to the current global pandemic, Covid-19, our interviews will take place through Microsoft Teams, a communication and collaboration platform that allows us to do video interviews with our three subjects. It is a "face-to-face" interview while being in different places and for us, socially isolated, because of Covid-19. The interviews were completed in Norwegian, as it is our main language in Norway. The interview is themed, with a structure consisting of a fixed order and open answers (Jacobsen, 2015). We are determined to be good listeners, staying adaptive, having a firm grasp of the issues being studied while trying to avoid bias, and conducting the research ethically (Yin, 2014).

Case Selection and Sample Description

The sample consists of project-based companies that have implemented digital transformation as part of their strategy. We believe the respondents sample is a large enough representation of actors in similar positions although with few respondents the results are not generalizable (Jacobsen, 2015).

The sample size in this research is limited because of the short time frame. We decided to carry out the case study with three companies. The companies and participants were recruited through our professional network and we have chosen to keep both the companies and participants anonymous. We predict literal replication, meaning that the cases are similar, and we predict similar results within the cases (Yin, 2014). Table 1 below shows an overview of the companies and participants, the duration of the interviews and the participant position in the firm.

Table 1 Sample and participant overview

	Company A	Company B	Company C
Size	Large	Large	Large
Number of interviews	1	1	1
Interview Duration	30 min.	40 min.	30 min.
Participant Position	Manager controller group	VDC Developer	Project Manager
Age/Gender	59/F	34/M	52/F

3.3 Data analysis

The analysis of qualitative data is aimed at making valid inferences from the often overwhelming amount of collected data (Sekaran & Bougie, 2016). There are three important steps in qualitative data analysis: data reduction, data display, and the drawing of conclusions. (Miles & Huberman, 1994). The first step, data reduction, refers to the process of selecting, coding and categorizing the data. The second step is different ways of presenting the data to make it easier for the researchers to understand the collected data. This will make it easier to draw conclusions, which is the third step, based on the patterns in the reduced data.

We have recorded the interviews with the consent of the respondents, in order to focus on the interview itself and not on taking notes along the way. This means that we have brought all relevant and accurate information into the research.

To transfer the results from the interviews into the research we transcribed the interviews from audio recordings to text. In this process, words and sentences are converted into a text, and it is then easier to process the information. When you have a written copy of the interview it is easier to move forward and backward in the conversation, and it is easier to use quotes.

Transcribing an oral interview removes some of the original information. The body language, tone, mood and visual emotions do not appear through the transcriptions (Jacobsen, 2015). After completing the interviews, we have transcribed all the audio material. One of our challenges while conducting the analysis was translating the transcriptions from Norwegian to English, to make sure the data presented was accurate and not lost in translation. This was a time-consuming process, and has provided us with a good depth of information after transcribing the interviews. This contributes to the coding of the interviews and the further analysis work.

Transcribing is necessary if we want to use an analytical tool to analyze qualitative data (Jacobsen, 2015). Such tools are used to upload texts that can be organized in different ways. For the analysis of the transcribed interviews, we have used the analytical tool NVivo. NVivo is a complex software for qualitative researchers. In NVivo, one can establish different nodes that makes it easier to sort information, and it becomes easier to categorize, compare and analyze the findings of the research.

To do our analysis we uploaded all our transcriptions to NVivo and started to reduce and categorize the data. To categorize the data, we created different nodes in NVivo. NVivo explains that a node is a collection of references about a specific theme, where you gather the references by coding the interviews. This narrows down all the text from the interviews, and you get the most important from each interview. We extracted categories and assigned sentences from our transcripts to these categories, as shown in Figure 4. These categories have been used to analyze with-in case results, to conduct the cross-case analysis and discussion, and relate our data to the theoretical framework.

Sample Quotes   **Categories**

Sample Quotes	Categories
• "It is about how we have changed the way we work because of digitalization" (A) • "When we talk about digital transformation we don't just talk about digitalization of old processes and reaching full potential with your digital tools and technology, but how you actually need to change the companies processes as a whole. (B) • "It is changes made in the company because of new technology and new systems that have been made available and implemented" (C)	The term "digital transformation"
• "I think it depends on the person, and also whether it is a big or small project how much you depend on the person in charge" (A) • "It is important for the project manager to be a facilitator to make sure all perspectives are considered, heard and looked at" (B) • "I think it is very important to communicate clearly the expectations, and the goal for where we are going, and also the road ahead, and be able to motivate. (C)	Requirements for a project manager
• "Now you can focus more on numbers and results, and think of what they actually mean, and not use so much time on getting the numbers" (A) • "It gives us data from building site about what is happening day by day, something we didn't had before and gives us another possibility to learn and become better" (B) • "Much more effective than before, and it can be cost-saving" (C)	Digital transformation in projects
• "Gives employees the possibility to quickly retrieve economic status reports, graphs, and forecasts" (A) • "Gives data information on what happens from day to day" (B) • "Now (because of digital transformation) we have systems that are more alike, making information given from the different systems more aligned with each other". (C)	Systems

Figure 4 Coding example

3.4 Evaluation

During the research process, it is important that validity and reliability are verified. *"It is important that the conclusions that you have drawn are verified in one way or another. That is, you must make sure that the conclusions that you derive from your qualitative data are plausible, reliable, and valid"* (Sekaran & Bougie, 2016, p. 348).

The research process requires a critical evaluation whether the results cover validity and reliability. *"To critically discuss validity and reliability, even in qualitative studies, does not mean that we submit data to a positivist logic. It just means that we try to relate critically to the quality of the data we have collected"* (Jacobsen, 2015, p. 228). It is important to evaluate if what we have found and presented in the research is true (Jacobsen, 2015).

Validity

There are both internal and external validity that should be evaluated. Validity refers to the extent to which the research results (1) accurately represent the collected data, which is called internal validity and (2) can be generalized or transferred to other contexts or settings, which is the external validity (Sekaran & Bougie, 2016).

The survey aims to find out how our research questions contributed to the method we have used as discussed earlier. The sample of respondents from three different companies is too small to be generalized as a group. The geographic location is another factor influencing our respondents. The respondents are affected by their surrounding community and vise-versa. When analyzing phenomena that are constructed by subjective understandings through e.g. cultures, norms and values it is important to consider the context in which the respondent find themselves while answering our interviews. As the respondents mainly reflect the social surroundings of Southern Norway, companies being based in said location despite being multinational, we can evaluate our findings to be somewhat generalizable, yet not completely for similar organizations in other geographic locations. Therefore, we can conclude that the external validity is limited.

By building the study on relevant theory and conducting individual in-depth interviews without the possibility of communication with others remove some of the possibilities of influencing uncontrollable factors and strengthen the validity of the task. In addition, the respondents were chosen based on their work positions and the knowledge they carry concerning our research topic, hereby strengthening and securing high internal validity.

Reliability

Reliability means accuracy, and the results should be possible to recreate at a later time. If the researcher is able to achieve the same conclusion with different measurements, you can say that the results are reliable. Reliability is about whether features in the study have produced the received results. The research process, the data collection and the analysis can influence the results. *"The investigation is influenced by the investigator, while the investigator is influenced by the relationships that arise in the data collection process itself"* (Jacobsen, 2015, p.241)

It is expected that a new study will give different results. The research is based on a semi-structured in-depth interview, with the possibility of flexibility. It will also be a variation in the amount of information received about the various topics. We have prepared an interview guide to ensure that we ask the same questions in our survey to all respondents. It enhances reliability through increased probability of the same result. In addition, we used a recorder to prevent some of the possibility of subjectivity in the interpretation of findings (Thagaard, 2013).

Privacy

The purpose of the General Data Protection Regulation (GDPR, 2018, §1) is to protect individuals from the violation of privacy when handling personal data. GDPR requires notification for all projects that use personal data by electronic devices. It is considered necessary to submit the project to the Norwegian Center for Research Data (NSD) as we wanted to record the interviews. NSD concludes that the personal information collected is not sensitive and that the project is consent-based. Based on this review, they consider the project to have a low privacy disadvantage. We have received approval from NSD to initiate our research project. Approval from NSD is attached in Appendix A.

It is required to give information about collecting personal data in accordance with the GDPR (2018). The thesis is based on personal interviews where we as researchers want a deeper understanding of our research problem. The results are anonymized, and personal information is not published in the thesis. We have sent a consent form based on a template from NSD to everyone interviewed. The consent form is attached in Appendix B (in Norwegian).

4 Results and analysis

4.1 Within-case results

In this chapter, we will look at the within-case results from each case. Due to anonymization, the cases are referred to as the following: Case 1: Company A, Case 2: Company B and Case 3: Company C. To analyze each case, we used the categories displayed in Figure 4. These categories are: Digital transformation, Experience with digital transformation, Requirements for a project manager, Digital transformation in projects, Systems, Situation today and Strategy.

4.1.1 Case 1: Company A

Digital transformation: We started the interview explaining the difference between the term digitalization and digital transformation. Our interviewee at Company A was not familiar with the term digital transformation and had made a search on Google about the term before the interview took place. However, after our explanation of the term digital transformation, she knew what we were referring to. She explained it as the following: *"It [digital transformation] is about how we have changed the way we work because of digitalization"*. In Company A they use the word digitalization when talking about creating an efficient process, and when creating a better foundation for the work you do. Many people in the company do not use the term digital transformation, instead, they use "digitalization", but they often mean digital transformation.

Experience with digital transformation: The experience with digital transformation in company A is that they have introduced a new system, tool, to help with project management, which causes the employees to work slightly different than before. Before this tool was introduced, they made the reports in Excel and checked the numbers manually. This was a very time-consuming process. In the new system, it goes more by itself, and they do not have to punch everything in manually, compared to what they did before in Excel. However, they still use Excel as a tool to double-check numbers if needed. The new system updates the reports rather quickly and automatically. The employees now have more time to analyze the numbers rather than first making all the numbers in an Excel file before analyzing it. This makes project management more efficient and less time consuming.

Requirements for a project manager: To get an insight on what they mean the requirements for being a project manager are, we asked: What are the requirements of being a competent project manager? The interviewee answered the following: *"I think it depends on the person, and also whether it is a big or small project and on how much you depend on the person in charge".* She explained that in bigger projects it is important to have a person in charge that is good at coordinating and talking to everybody involved in the project, and create the motivation that together they can do it. Being coordinated, alert and caring are important characteristics in a leader. The interviewee also explained that in addition to the personal characteristics, it is also a key aspect to know their academic field in projects, and that especially in bigger projects, being able to be good at organizing is essential.

Digital transformation in projects: One of our main questions was how digital transformation is affecting their projects. Company A is going to introduce a new CRM system, which is a customer relationship management system, where you input a good amount of information about the customer, which gives a better review if the company should indulge in a contract with that customer. Based on the information received and previous experience, the employees will make better decisions, which company A believes can lead to increased profit. The interviewee also explained that the manual tasks have decreased and the most important tool used to be their numeric keypad, which she rarely uses today. Today, the numbers automatically come up when retrieving files and data. The interviewee meant this was an absolute improvement, and a benefit with digital transformation. The interviewee ended with the following: *"Now you can focus more on numbers and results, and think of what they actually mean, and not use so much time on getting the numbers".* She explains that there is no value in making a report, but the value is in the analysis of the numbers.

In Company A employees are encouraged to use the systems that are available and not use Excel to make manual reports, but use their time understanding the numbers. The systems available make them work more efficient, employees manage to get a status on multiple projects at the same time and it is easier to follow up on the projects than before. In addition, we asked if digital transformation has increased monitoring on their projects and employees. In Company A leaders manage to monitor more of the project progress than before and it gives a better overview of the project status if the systems are used correctly.

Systems: We asked if there were any examples where digital transformation is used in the organization and projects. Company A uses a program, here called System A,

which *"gives employees the possibility to quickly retrieve economic status reports, graphs, and forecasts"*. Many in the same industry use this system. The interviewee stated the following: *"Our project management system has been improved compared to when I started at the company"*. She repeated that the already mentioned CRM system will be introduced to the company soon.

The interviewee mentioned when Company A's systems are upgraded, the change may not be that major and the process is pretty much the same. However, the difference is that the systems are more user-friendly and informative after an upgrade. The number of users of System A has increased a lot recently, and the user-friendliness of System A make the company spend less time on teaching the users in the system, because they can teach themselves. The interviewee stated that if you know Excel, you can manage most of the other systems used.

Situation today: We asked if the company is currently spending time and focus on digital transformation, and if so, how has this changed compared to three-to-five years ago. In Company A there is a big focus on digital transformation and the company has a lot of ongoing digitalization projects. The interviewee stated: *"There is especially a lot of focus on digitalization from the top management"*. She explained that their project management systems have improved significantly compared to when she started a little over four years ago.

Strategy: Our last question was if digital transformation was intact with the company's strategy. The interviewee answered the following: *"There is a lot of focus on it [digital transformation], there are own projects where substantial sums are used on digital transformation. So yes, there is a big focus on it and digital transformation is aligned with the company strategy"*.

4.1.2   Case 2: Company B

Digital transformation: Our interviewee at Company B explained the term digital transformation as the following: *"When we talk about digital transformation we do not just talk about digitalization of old processes and reaching full potential with your digital tools and technology, but how you need to change the company's processes as a whole. You have to work smarter to reach the company's potential, not just doing what you have also done when it comes to digital tools"*.

Experience with digital transformation: In Company B the interviewee explained that from his experience there is a lot of focus on making technology, processes and digital tools that are easier to understand and use for everybody. Company B focuses on how it will be easier for each one to do a good job, how it will be easier for each one to make a good choice and how it will be easier for each one to see what the challenges are.

Requirements for a project manager: When we asked what could be defined as a competent project manager, the interviewee answered the following: *"The big difference is at the superior level. Traditionally, in the industry the last sixty years, the competence has been with individuals higher up in the hierarchy, and then internet appeared, which led to information being available to anybody, which again led to individuals not being able to keep information for themselves"*. The interviewee continued to explain that when we use the internet and digital tools, today, everything has become more visible. To succeed as a project manager, you need more teamwork and interaction and not just one person sitting with the answers and answering questions. It is about how to work together to find the answers. He also explained that the skills of a project manager are different today, because of digital transformation and the use of data, than the skills needed earlier. Instead of the project manager telling what to do and not to do, it requires teamwork to find the right answers, because one person does not have all the answers anymore, things have become too complicated. The interviewee also believes that the competence needed has changed and people are often in the wrong position, even though their existing competence is still needed and important, they are needed and better suited at other positions in the projects.

The management aspect of projects has changed, and a type of openness is needed, because if openness exists there will also be more trust and maybe other contract structures. He also explained that an important task for a project manager is to create a culture where everyone's contributions are brought to light and opinions heard. It is about understanding how people are put together and have that degree of emotional intelligence within you. The interviewee told us the following: *"Some people say everybody talks but not everybody gets heard, and this is something I believe happens in many teams and projects. Those who scream the loudest get to say what they want to say. It is important for the project manager to be a facilitator to make sure all perspectives are considered, heard and looked at. Many employees may be shy and do not just spill out what they need to say unless you ask them directly, but their perspective is still very important to take into consideration"*. The interviewee added: *"Human competence is important and underestimated, I believe"*. The interviewee further

believes it is about the ability to fight the best for others and not just yourself. To create trust between all relationships, create an atmosphere where people dare to be themselves and express the input they have. Have a transparent culture where people understand that the management does not keep things from them.

Digital transformation in projects: When asked how digital transformation is used in projects, Company B means it gives the projects a much better overview. The interviewee said the following: *"It gives us data from the building site about what is happening day by day, something we didn't have before, and gives us another possibility to learn and become better"*. He told us that if they have the possibility to catch problems quicker because of digital transformation they also have the possibility to solve it quicker, and even before the building process starts. In Company B they use the expression: *"Everyone should see"*. Meaning if everyone can see the problems and opportunities, there is a much greater chance that they can make good contributions to the problem. *"Earlier, maybe ninety percent of the time was spent on understanding the problem. New digital tools have made it possible to visualize and identify problems much faster. So now you can spend ninety percent of the time coming up with good solutions instead"*. The interviewee also added that it gives employees immediate learning and insight to become better and understand that using digital transformation is involved in creating a more predictable workday.

We also asked if digital transformation has increased monitoring on their projects and employees. The interviewee believes that digital transformation has increased monitoring on their projects and that some employees may feel that everything becomes visible and open, especially when they are not doing a good job, they feel it becomes more visible to others. In addition, the interviewee explained that a part of the frustration employees may have with the increased monitoring is that even though you can see the problem does not necessarily mean that you can do something about it, or that it is an easy problem to fix. Therefore, the employee may feel that their digital tools are working against them. Here it is important for management to help them, find a collective solution, and make sure not to repeat the situation. He further believes that the increase in monitoring mostly means that people in management are better in getting involved and that again is seen as something positive.

Systems: When asked how digital transformation has changed their systems used in the company, Company B used to adapt their processes to new technology and ended up working the way the digital technology forced them to, instead of thinking about how they actually

wanted to use the technology. However, Company B has now changed this. They have built a System B, based on how they think information should be available. System B *"gives data information on what happens from day to day, something we haven't had before, and it gives us another opportunity to learn and improve"*. With this system, Company B means they have a much better overview of the projects. Company B has also created a system, called System C to handle documents. Earlier, they had many documents that were connected, but did not have any automatic integration, so if you updated one document, you had to update it other places as well. With System C, they have a clear plan and one source for all their data that is easy to use, and everything is now connected, with multiple access points to the same information, where the information that is most important to you shows up. Moreover, if you make a change or update something it will update everywhere in the system.

Situation today: Company B is constantly moving forward when it comes to using technology and digital transformation. The interviewee states: *"There are more questions about how to do it now and not whether or not to do it"*. Company B thinks digital transformation is a positive development and that most people are positive to change, which is essential when implementing a digital transformation strategy. However, he emphasizes that *"Companies and management must be aware that there may be employees who consciously want to counteract change because it will jeopardize their own position"*. The interviewee also told us *"Most companies understand that they have to digitalize and implement digital transformation, but that there are still many that are unsure how to implement it and how they will get value back for it"*.

Strategy: When asked if digital transformation is implemented in the company's strategy the interviewee answered the following: *"I experience that we have a clear intention with our digitalization and digital transformation. That is, like I said, with how we focus on digitalizing our core process. What we make money from is building less expensive and using less time than others"*. Company B believes that their digital transformation processes are corresponding with their strategy.

4.1.3   Case 3: Company C

Digital transformation: We asked the interviewee in Company C about what the term digital transformation means. The interviewee explained that before the interview she had to google

the term and that it made sense compared with our definition of the term that was presented when explaining the difference between digitalization and digital transformation in the beginning of the interview. The subject told us the following: *"It is changes made in the company because of new technology and new systems that have been made available and implemented"*.

Experience with digital transformation: Company C's experience with digital transformation is that it has changed the workday a lot, and how they work. The interviewee emphasizes the following: *"Especially, relative to how we handle larger amount of data, how we communicate and how much easier it is to sort out and get an overview over what we are doing"*.

Requirements for a project manager: When asked what the interviewee defines as a competent project manager the answer was the following: *"I think it is very important to communicate the expectations clearly, and the goal for where we are going, and also the road ahead, and be able to motivate others. Furthermore, it is important to be a fellow human and show compassion, and to understand that people have different opinions and reasons for that they may not manage to finish the task when they should be finished. However, a good manager should help employees prioritize and be proactive. Maybe the most important thing is to get a head start of things and simply be a good planner"*. The interviewee continued explaining that the activities needed to accomplish this is teambuilding, giving positive feedback, but also negative feedbacks. However, it is important to give these feedbacks in a constructive and good fashion. Company C believes that clearly stated reports and status meetings will help keep the projects on track.

Digital transformation in projects: We asked how digital transformation is used in projects, and if, how it has changed the way of operating projects. In Company C the biggest change is how big data is handled. The communication between the different departments in the company and projects has become better. Company C also experiences more control over the projects because of digital transformation. Earlier they had face-to-face meetings or meetings over the phone, now they use Skype a lot more. Specially, when people are geographically apart or when the meeting is short enough to carry out online. Skype makes it possible with the feature "screen sharing", to let others see what you are presenting and explaining. It also creates less unnecessary travelling for employees and management. In Company C, digitalization and digital transformation has led a possibility to have areas in the project with

low staffing. The interviewee also added the following: *"Much more effective than before, and it can be cost-saving"* when it comes to digital transformation in projects. Today there are fewer manual processes than before, especially when it comes to manual transfers between systems, which makes things go faster and more efficient than it did before. However, she did point out that efficiency also could lead to less control, because everything becomes automatic. She believes it is important to double-check the numbers.

We also asked if digital transformation has increased monitoring on their projects and employees. The interviewee believes that it is not necessarily the case. Rather that it has become easier to follow up on the project without taking direct contact and management having easier direct information on the project.

Systems: When asked about systems in their company, the interviewee told us the following: *"Now [because of digital transformation] we have systems that are more alike, making information from the different systems more aligned with each other"*. The company believes that digital transformation has created better communication between their systems. It also gives the company the possibility to transfer between their systems and less manual plotting of numbers. They have System D that shows all document profiles per project and shows the progress of the project. System E is an aid to standardize, by making item registers in a way that they always use the same type of standard components and not many difference components. By doing this, the company reduces the risk by assembly so that more can be saved, and something will not be destroyed because of wrong use of components. The company also uses System F that qualifies and approves a supplier. Information about the supplier is registered and attached to their quality assurance system, capacity, financial statements and so on. Company C has also recently introduced a tool that gives them a virtual reality insight of their projects while being at the office. The tool gives them the opportunity to have remote controlled maintenance and monitoring. In addition to these different systems, Excel and Word are still frequently used for planning and following-up projects both in the regard of time, cost and quality.

Situation today: When we asked about how the situation in the company is today, after digital transformation was implemented, she said the following: *"It is clear today that there are fewer manual processes. Things move quicker than it did before"*.

Strategy: Last question was if digital transformation is in line with the company strategy. Company C believes that it is necessary to have digital transformation if you want to keep up with the rest in the industry and be able to communicate on the same platforms. They work to deliver projects to their customers in an efficient way, within the timeframe and within the budget and the quality it is supposed to be. Company C believes their digital transformation processes are in line with their strategy.

4.2 Cross-case analysis

In this section, we discuss the cross-analysis results based on our research framework. We analyze some of the similarities and differences the companies have with each other.

Digital Transformation: When it comes to the term digital transformation, all three companies were not really familiar with the term before the interview. All three companies use terms such as digitalization, digital tools and technological aids to explain their digital transformation processes and strategies. All of the respondents agreed that digital transformation was changing the way their business works to make it more effective and less time-consuming.

Experience with digital transformation: Both Company A and B pointed out that systems and processes have been introduced in the company and has forced employees to not necessarily work harder but more efficient. Company C experience that with implementing digital transformation large data has been easier to handle. All companies agreed that digital transformation has changed significantly the way of doing things.

Requirements for a project manager: We asked the question in a rather personal opinion and not necessarily for the whole company. However, because the interviewees represent the companies, we do believe that the answers we received are in line with the companies' beliefs. All three companies agreed that the project manager needs to show compassion and care towards your employees. Company A and C also pointed out that being organized and coordinated is important while Company B believes its more about human competence. Company A, B and C believes that good project management is about teamwork, giving feedbacks, and to both see and listen to employees' opinions and emotions. All three companies agreed that keeping your employees in the loop is important.

Digital transformation in projects: All companies agreed on that digital transformation affected projects in a way that there is more overview of the projects than before. Less manual processes and more frequently updates on the status of the projects. The change both Company A and B have experienced is that identifying problems has become easier and are discovered earlier than before. All three companies believe that digital transformation in projects has resulted in more cost-saving. Company A and B believe that digital transformation has increased monitoring on their projects and employees in a way that everything becomes more open and available and more people have insight on the project. They do not believe this is necessarily a bad thing if it is used correctly and fair. Company C did not think of it as monitoring but easier access to information without having to reach out to people. Company A and B stated that it is important that employees are familiar with using digital transformation and see the benefit of using it so they do not go back to their old ways of doing things.

Systems: All three companies had examples where digital transformation was implemented with the help of new systems and processes. All three companies expressed that the new systems introduced in the companies are user friendly and were not that difficult to implement. The systems have also been created in such ways that they are working together and more automatic making it easier for all three companies to keep overview over the projects. All three companies expressed also that the new systems implemented has made information easier and more available.

Situation today: Company A and B believe there is a lot of focus on digital transformation today compared to a few years ago. All three companies also expressed that things are more automatic than before making things easier and provides increased value creation. Company B expressed that they have to be aware that there may be resentment towards digital transformation from employees, if the employees are scared of being replaced by a digital tool, process or system. Company C already pointed out that manual-labor has been reduced because of digital transformation.

Strategy: All three companies strongly believe that their digital transformation strategy was intact with their business strategy. The focus on digital transformation is strong.

4.3 Discussion

The aim of this study was to analyze the effect of digital transformation in project management. Thereby, we seek answers to three research questions. First, we were interested in how digital transformation affect project management. Second, we wanted to analyze how the requirements for being a project manager changes because of digital transformation. Third, we wanted to discover how digital transformation is implemented in project management. By building on prior research, this paper contributes to theory by focusing on digital transformation as a factor that affects project management and influences the companies.

Digital transformation's effect on project management

In view of our research question, the findings showed that digital transformation makes the communication among teams more efficient. The communication is now more digitalized, and it is easier to communicate with employees who do not belong to the same department. This is in line with McAbee (2019) that came up with different ways on how digital transformation is changing project management. One of the findings was "more efficient and strategic communication among teams and companies".

Another finding is that digital transformation affects the collaboration within teams and ownership from team members. It is crucial with teamwork and interaction with all the members of a project to find the best solutions together. It is not sustainable if the project manager thinks he or she has all the answers. This corresponds to the work of McAbee (2019).

From our research, we discovered that digital transformation leads to more focus on results rather than process. With digital transformation the management can spend more time on coming up with good solutions to a problem, instead of finding and understanding the problem. The results also showed that digital transformation make it possible to focus more on the numbers and results and think of what they actually mean instead of using the time to produce a report that shows the numbers, which also is in line with the findings of McAbee (2019). Our finding is also in line with Stief et al.'s (2016) finding that some of the opportunities with digital transformation are faster and more flexible processes, optimization of internal workflows, and increase in efficiency.

An unexpected finding in our research was that digital transformation can lead to less control, because the efficiency in the process can make you trust the system too much and forget to be critical to the results. Another finding is that employees can counteract, either consciously or unconsciously to change because it will jeopardize their own position. Companies and managers must be aware of this behavior. This is in line with the findings of Stief et al. (2016) in their research, where they found that some of the challenges of digital transformation are to face resistance and fear among employees, and foster acceptance. Tabrizi et al.'s (2019) fourth lesson also recognizes employees fear of being replaced.

Requirements for being a project manager

The first sub-question was to look into how the requirements for being a project manager has changed because of digital transformation. We found that, because of digital transformation, project managers need to be more of a team player and that employees positioned as project managers may have outdated competence relative to the competence needed when having implemented digital transformation. The skills of a project manager need to be different from what was required before, because of digital transformation and the use of data. This correlates with the findings of McAbee (2019).

Another finding is that the requirements for being a project manager depend on if the projects are small or big, and if they are complex. In a big, complex project you are more dependent on the project manager. It requires a project manager that is capable of motivating and including all employees that work with the project and create a collective understanding of the work that needs to be done. This corresponds with Andersen's (2018) statement that *"No one goes far as a project manager without learning to act like a politician"*. This contributes to Westerman et al. (2014) that stated:*"digital transformation requires strong leadership and a vision about what you want to change and how this change will affect the company"*.

From our research, we discovered that even though being good at planning is still an important skill a project manager should have, the new technology, due to digital transformation, has in some ways taken over the responsibility from the project manager. Now, he or she can spend more time fixing and preventing problems instead of using the time to find the problems. This corresponds to Prakash's (2019) statement about how digital transformation is disrupting project managers and leaders.

Digital transformation implemented in project management

The second sub-question was to look into how digital transformation is implemented in project management. Based on our research we discovered that digital transformation is implemented in a way that gives project managers more overview of the project with the help of digital tools. Due to digital transformation, there is less room for mistakes and more time for being productive. Project management experience having more control and making better decisions with the help of systems, detailed reports and good planning. With the help of digital transformation, project managers have a better understanding and more information about their customers available. This is in line with the findings of McAbee (2019).

Another finding is that systems used to complete projects are more aligned with each other and are more automated than before digital transformation was implemented. New technology has given project managers the opportunity to be more efficient, use less time and create a more successful delivery for their customers. This is in line with the findings of McAbee (2019) about how project managers are getting more time to focus on strategy optimization and project delivery. Our research corresponds with Prakash's (2019) statement about how technology will help project managers to align the business part of the project with delivery.

4.4   Managerial implications

The findings of this study lead to several implications for managing projects with digital transformation. First, digital transformation should be implemented in a way that it establishes a more efficient work environment. This correlates with the findings in this research that digital transformation led to more effective communication and collaboration among teams.

Second, companies should streamline digital transformation in accordance with their strategy, using systems that fit their company and projects. For example, how one of the companies in this research has created a document system that specifically works for them. All three companies stated that their digital transformation process is in line with their strategy.

Third, project management should be highly involved in the digital transformation process and should use the digital tools available as good role models for other employees. This emphasizes our findings where two of the companies stated that employees should be familiar

with the newly introduced systems and digital tools so that they will not go back to their old ways of managing tasks.

Fourth, project managers should involve employees in the digital transformation changes and make sure that everybody is accepting the digital transformation process and motivate his or her employees and show them clearly why the digital transformation process is needed and helpful. This correlates to our finding that digital transformation can create resistance from employees due to fear of becoming redundant, if they do not see the potential digital transformation has to offer.

Fifth, realize that nobody can implement digital transformation alone, it requires teamwork. Top management, project management and employees need to work together, and employees need to feel that they are involved in the digital transformation process. This corresponds to our results where the companies in this research stated that digital transformation has led to more teamwork. Project managers are obligated to share information to the others in order to succeed in the project. This may lead to less resistance and because of an open-dialog, project managers get a better understanding and overview of the project.

Our research shows that digital transformation has come to stay, and as it may not be relevant for some companies today, it may be in the near future. The biggest mistake a company can make is implementing digital transformation just for the sake of it and not making sure that the process established will work for them. Digital transformation is a costly process that requires knowledge and patience.

4.5   Limitations and future research

There are several challenges with a qualitative study. The findings that have been discussed in this study are based on our interpretations. It may be that these findings would have been different if others, with expertise in the field of digitalization and digital transformation, had conducted the same study.

One weakness of this assignment is that our sample is limited, and we have interviewed a small number of subjects in this study. We have interviewed three respondents representing three companies in Southern Norway. We see that it might be appropriate to interview more key people and possibly more companies as well. This would have contributed to more views

on the topic and made the research more generalizable. Interviews of three key people in the companies do not necessarily represent views that are representative of the company or industry.

Another weakness in this study is time limitation. The limited time with this research affected the range and scope of the study. A longer timeframe on the thesis would have allowed us to research more in depth and we could have had a larger and more representative population. A five-month period limits the task and findings of the study. As mentioned, the world of digital transformation requires more research and this can be said to have affected our study in regards to the comparison of existing theory and literature.

Based on the study's limitations we have some suggestions that we could not explore due to the time limit of the study. This thesis has focused only on how digital transformation, in three different companies in the same geographic location, have an effect on project management. Therefore, when it comes to the transferability of this study, we want to emphasize that our findings cannot easily be transferred to the entire industry. This is based on the fact that the informants are few in numbers and not randomly selected from the units in the organizations. We recommend that further research examine whether our findings also apply to companies with different characteristics such as organizational structure, size, industry affiliation, or regional background.

It would have been interesting to extend the study to include other countries to see if digital transformation has come further or shorter in other countries concerning how to manage projects. Seeing whether geographical location influences digital developments and digital transformation in companies would have been interesting to research.

5 Conclusion

The aim of this research was to examine how digital transformation affects project management, how the requirements for being a project manager changes due to digital transformation, and how digital transformation is implemented in project management. In view of our research questions, we found literal replications, but also some unexpected findings in our three cases. Previous studies in this field focus more on digital transformation in an organizational perspective as a whole and not necessarily in a project management perspective.

This research contributes to theory by focusing on a project management perspective. Our findings are that digital transformation affects project management in a way that leads to more teamwork, creates more efficiency, and contributes to timesaving tools. It forms better communication and collaboration between employees and managers. Implementing digital transformation in project management gives management the time to focus more on numbers and results and less time on making the numbers. It also contributes to quick problem-solving, given that the processes and systems implemented are quicker with identifying the problems.

Digital transformation can create resistance from employees due to fear of becoming redundant, as digital tools implemented replace them, and may outdate their existing knowledge. Some believe that systems and daily tasks become too automatic and can result in a loss of control.

The results show that the role of a project manager has changed to a more strategic leader and is a role that is essential when implementing digital transformation. Project managers today are forced to be more open-minded, a team player and share information and knowledge with their employees. Digital transformation is a costly process that requires knowledge and patience, and can change a company's internal and external processes. Digital transformation is implemented with the ambition of having a more efficient work environment, better customer relations, and increasing the value of the company in the long run.

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Appendices

Appendix A: NSD approval

NSD NORSK SENTER FOR FORSKNINGSDATA

NSD sin vurdering

Prosjekttittel

Master oppgave 2020

Referansenummer

270685

Registrert

27.02.2020 av Melissa Geradina Maria Sinfield - mgsinf15@student.uia.no

Behandlingsansvarlig institusjon

Universitetet i Agder / Handelshøyskolen ved UiA / Institutt for økonomi

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Andreas Erich Wald, andreas.wald@uia.no, tlf: 95732342

Type prosjekt

Studentprosjekt, masterstudium

Kontaktinformasjon, student

Melissa Geradina Maria Sinfield, melissa_sinfield@hotmail.com, tlf: 40319510

Prosjektperiode

01.01.2020 - 02.06.2020

Status

11.03.2020 - Vurdert

Vurdering (1)

11.03.2020 - Vurdert

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet den 11.03.2020 med vedlegg, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte.

MELD VESENTLIGE ENDRINGER

Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde: https://nsd.no/personvernombud/meld_prosjekt/meld_endringer.html

Du må vente på svar fra NSD før endringen gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 02.06.2020.

LOVLIG GRUNNLAG
Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER
NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om ogsamtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte ogberettigede formål, og ikke viderebehandles til nye uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante ognødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for åoppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art.
12.1 og art. 13.
Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.
FØLG DIN INSTITUSJONS RETNINGSLINJER
NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og eventuelt rådføre dere med behandlingsansvarlig institusjon.
OPPFØLGING AV PROSJEKTET
NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.
Lykke til med prosjektet!
Kontaktperson hos NSD: Simon Gogl
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

Vil du delta i forskningsprosjektet

" Masteroppgaven: Hvordan digital transformasjon påvirker prosjektledelse"?

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å undersøke hvordan digital transformering påvirker prosjektledelse. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål
Masteroppgave hvor formålet er å finne ut hvordan digital transformasjon påvirker prosjektledelse i forskjellige bedrifter.

Hvem er ansvarlig for forskningsprosjektet?
Universitet i Agder er ansvarlig for prosjektet. Prosjektet gjennomføres av Camilla Arnesen og Melissa Sinfield med veiledning av professor Andreas Erich Wald.

Hvorfor får du spørsmål om å delta?
Vi har bestemt oss for å gjennomføre en sammenlignende casestudie der vi studere tre forskjellige caser. I vårt tilfelle er disse casene prosjekter med prosjektledelse som er borti digital transformasjon. Grunnen til at du ble valgt er fordi du oppnår utvalgskriteria med tanken på din arbeidsstilling og erfaring. Vi har fått kontakt med deg enten gjennom vår arbeidsplass eller nettverk.

Hva innebærer det for deg å delta?
Hvis du velger å delta i prosjektet, innebærer det at du deltar i et intervju. Det vil ta deg ca. 45-60 minutter. Intervjuet inneholder spørsmål om digital transformasjon, prosjektarbeid og prosjektledelse. Dine svar fra intervjuet blir registrert med hjelp av lydopptak. Opplysningene vil oppbevares elektronisk fram til prosjektet er ferdig.

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle opplysninger om deg vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

- Dine opplysninger oppgitt i intervjuet vil kun behandles av oss prosjektansvarlige og vår veileder ved Universitet i Agder.

- Navnet og kontaktopplysningene dine vil vi erstatte med en kode som lagres på egen navneliste adskilt fra øvrige data.
- Deltakerne og arbeidsplassen til deltakerne vil bli anonymisert i vårt forskningsprosjekt.
- Deltakerne vil ikke gjenkjennes i publikasjon.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?
Prosjektet skal etter planen avsluttes 02.06.2020. Personopplysninger og lydopptak vil slettes etter prosjektet er levert.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra Universitet i Agder har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:
- Universitet i Agder ved Camilla Arnesen (tlf. 47391518) og Melissa Sinfield (tlf. 40319510). Veileder Professor Andreas Wald (tlf. 95732342)
- Personvernombudet UiA: ina.danielsen@uia.no (tlf. 38142140) Kontor A5003, Universitetsveien 25, Kristiansand.
- NSD – Norsk senter for forskningsdata AS, på epost (personverntjenester@nsd.no) eller telefon: 55 58 21 17.

Med vennlig hilsen

Andreas Erich Wald   Camilla Arnesen og Melissa Sinfield
Veileder   Prosjektansvarlige

Samtykkeerklæring

Jeg har mottatt og forstått informasjonen om prosjektet, masteroppgaven: «Hvordan digital transformasjon påvirker prosjektledelse», og har fått anledning til å stille spørsmål. Jeg samtykker til:

☐ å delta i et intervju

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, ca. 02.06.20

(Signert av prosjektdeltaker, dato)

Appendix C: Interview guide

I anledning vår masteroppgave vil dette intervjuet være en del av vår datainnsamling. Vår oppgave handler om hvordan digital transformasjon i ulike selskaper har en effekt på hvordan prosjekter blir styrt. Vi vil derfor spørre om din oppfattelse av begrepet digital transformasjon og prosjektledelse og tema rundt det. I tillegg hvordan deres bedrift bruker digital transformasjon til å lede prosjekter.

- Du vil bli anonymisert
- Du kan trekke deg når du vil og kan nekte å svare på spørsmål.
- Er det greit at vi tar opp lyd under intervjuet? (Rådataen vil bare bli benyttet av oss, og slettet så fort prosjektet er ferdig.)

Introduksjon
- Hvem vi er, og presentasjon av oppgaven
- Kort introduksjon av de ulike begrepene (forskjellen på digitalisering og digital transformasjon)

Innledningsspørsmål
1. Kan du fortelle litt om din arbeidserfaring og bedrift?
    a. Stilling/arbeidsoppgaver
2. Hva legger du i begrepet digital transformasjon og hva er din erfaring med digital transformering?
    a. Innholdet av konseptet
    b. Forretningssammenheng

Hovedspørsmål
3. Hvordan opplever du at digital transformasjon påvirker prosjektet?
    a. Framgangsmåte
    b. Hva er utfordringene og fordeler med bruk av digital transformering.
4. Kan du komme med noen eksempler der digital transformasjon er brukt i denne bedriften?
5. Hva mener du er god prosjekt ledelse, og hvordan oppnår man det?
    a. Prosjektleders egenskaper
6. Hvordan opplever du at digital transformering påvirker din ledelse?
    a. Har fokuset endret seg de siste årene?
    b. Økning i overvåkning?
7. Hvordan er dagens situasjon med digital transformasjon i denne bedriften?
    a. Bruk av digitale systemer
    b. Endringer i verdiskapning
    c. Strukturelle endringer
8. Hvordan er bruken av digital transformasjon i dag sammenlignet med for tre-fem år siden i denne bedriften?
9. Er digital transformering i takt med bedriftens strategi?

Oppsummering
- Oppsummering av svar (har vi forstått deg riktig?)
- Eventuelle spørsmål du har til oss
- Andre ting?
- Takker for intervjuet

English

For the purpose of our master's thesis, this interview will be part of our data collection. Our thesis is about how digital transformation in different companies have an effect on managing projects. We will therefore ask about your understanding of the concept of digital transformation and project management and themes around it. In addition, we will ask how your business uses digital transformation to lead projects.

- You will be anonymized
- You can retire whenever you want and can refuse to answer questions.
- Is it okay that we record audio during the interview? (The raw data will only be used by us and deleted as soon as the project is complete.)

Introduction

- Who we are, and presentation of the thesis
- Brief introduction to the different concepts (the difference between digitization and digital transformation)

Interview questions

Introductory questions:

1. Could you tell us a little bit about your work experience and your workplace?
    a. Position/tasks
2. What do you think about when you hear the concept digital transformation and what is your experience with digital transformation?
    a. The content of the concept
    b. The concept in relation to business

Main questions:

3. How do you feel that digital transformation is affecting the project?
    a. Approach
    b. The challenges and benefits of using digital transformation
4. Do you have any examples their digital transformation is used in the organization?
5. What are the requirements of being a competent project manager?
    a. Characteristics
6. Does digital transformation affect the way you manage a project?
    a. Has the focus changed in the recent years?
    b. Has it created an increase in monitoring?
7. How is the situation in the business today with digital transformation?
    a. Use of technologies
    b. Changes in value creation
    c. Structural changes
8. How is the use of digital transformation today compared to three to five years ago in the organization?
9. Is the organizations digital transformation a close fit with the organization's other strategies?

Summary

- Summary of the questions asked. Have we understood you correctly?
- Any questions for us?
- Something on your mind before we end this interview?
- Thank you for your participation, we appreciated it

Appendix D: Reflection notes

Reflection note 1

By: Camilla Arnesen, 2020

As part of the guidelines for writing a master's thesis at the School of Business and law at the University of Agder, the candidates are required to write a reflection note. In the reflection note, one should discuss how your thesis relates to the three broad concepts international, innovation and responsibility. The purpose is to see whether the School of Business and Law succeeds in integrating these concepts and to look for any improvement of the master's program.

Summary of the master thesis

The purpose of this thesis was to research how digital transformation effect project management, how the requirements for being a project manager change because of digital transformation, and how digital transformation is implemented in the project management. The theme of digital transformation has caught our attention by the fact that there is a rather new topic regarding project management. The topic is something I think seems interesting and the theme is not researched a lot in the past. I think this will be more relevant in the future and wanted to gain a deeper understanding of the theme and how this works in practice.

In this survey, we conducted three in-depth interviews with employees from Norwegian companies who have experience and work with digital transformation, projects and project management in their companies. We wanted to get a deeper insight in how digital transformation affects project management in practice. We used an interview guide, with flexibility and openness in the questions. All respondents were asked the same questions, and we could ask follow-up questions. The main finding was that implementing digital transformation makes the communication among teams and collaboration more efficient. Furthermore, it gives the management more time to focus on the results rather than the process. However, it can also lead to less control of the numbers, if you trust too much on the systems.

Internationalization

The theory and the research used in this study are international and the theory is relatively similar in other countries. The Project Management Institute (PMI) is the world's leading association for project management, with members from 185 countries. Global standards and eight different certifications, extensive research programs and professional development opportunities support PMI's worldwide practice (Institute, p. M., 2020). Even though the topic is relevant in other countries, and digital transformation will affect project management all over the world, our thesis is based on how digital transformation affect project management in Norwegian companies. It would have been interesting to extend the study to include other countries to see if digital transformation has affected the project management differently. In other words, finding out whether geographical locations influence digital developments and transformations or not.

Innovation

Digitalization and digital transformation are largely linked to innovation. The thesis describes technology as a key to digital transformation. New technology drives the digitalization process forward and can lead to new business operations. Digital developments are constantly changing, and innovative solutions are constantly emerging. Such new technology also comes in project businesses, such as tools that make the management of the projects easier. We then talk about systems that lead to less manual reports, as you now get the numbers directly from the system, and can use more time on analyzing the numbers, instead of making them.

It is clear that digitalization is a hot topic, and several of the large firms invest heavily to gain a competitive advantage or to be competitive. In this thesis it has been mentioned a CRM (customer relationship management) system, that makes it easier to see whether you should work with the customer or not. It has also been mentioned a system that manages to update a document which is published in multiple places. An improvement for the companies could be to implement a document system that works efficiently, in order to save time and get an overview of all the information needed. It is important for the companies to keep up with new technology that creates value and makes the processes more efficient.

Responsibility

The participants from the three companies we studied expressed that teamwork, trust and communication are important values in the organizational culture. These values will increase the responsibility of project managers, but also employees. Since digitalization will affect both internal and external processes, it is important that companies take the digitalization process seriously. A positive mindset and mutual responsibility will help implementing new systems and routines. This is to make sure that the systems and routines manage to handle the tasks they are assigned to do.

The five years of studying economics have taught us how to relate to the law, but also how we as economists should behave morally and ethically correct in the choices and judgments we make. In this thesis, we had to consider the privacy protection of our respondents. The purpose of the General Data Protection Regulation (GDPR, 2018, §1) is to protect individuals from the violation of privacy when handling personal data. The companies were anonymized by calling them Company A, B and C. The results were anonymized, and personal information were not published in the thesis.

The education at the University of Agder has been very informative. It has been useful to apply the accumulated knowledge from the program to the master's thesis. Furthermore, I see that this will be useful and relevant knowledge to bring into working life.

Camilla Arnesen, 27.05.20, Kristiansand

Reflection note 2

By: Melissa Geradina Maria Sinfield, 2020

Summary

The purpose of this master thesis is to research what effect digital transformation has on project management. This is conducted by researching if there is a connection between digital transformation in the industry, the use of digital transformation in projects, and how project management has been impacted by digital transformation.

In this study, we have interviewed three respondents from different companies about the use of digital transformation in the company and projects. We have found out that all three companies have implemented digital transformation in their strategy and daily tasks. We have also found out that what before were manual processes have become partial or even total automated processes. Furthermore, each company focuses and uses a lot of recourses on digital transformation. Digital transformation is seen as a process that is time-saving and efficient, however, some express apprehension. As one of the companies raises concerns about the loss of work opportunities and how this can create resistance towards digital transformation, the other confirms such concern as they have themselves experienced such loss. One of the companies believes that you can lose some control of the accuracy of the numbers if you blindly trust the automated process. With the help of our theoretical- and managerial implications, we conclude that digital transformation affects project management by creating more teamwork, efficiency and time-saving. Implementing digital transformation in project management gives management the time to focus more on numbers and results and less time on making the numbers.

International

One of the companies that have participated in our master thesis is influenced by international forces given that they operate global wide. Thus, they must organize in such way that it works for all countries they are established in. Furthermore, they must look at their surroundings, what legal guidelines and government policies are set in each given country. Being a globalized company, they have to keep up to date with the trends in the given industry forcing

them to introduce new systems and other digital tools in their company. For example, as mentioned in the thesis, a virtual reality system that gives them the possibility to see projects located outside of Norway. Furthermore, the company exists of people with different nationalities, background, culture and religions, here it is important to have ethic guidelines that represent the organization as a whole but also have ethic guidelines that is crafted for each specific country or surroundings.

Not only is the international company that participated in our thesis influenced by international trends, our other to participants are also influenced by international trends. This is because of the digital era we are currently in. As mentioned in our thesis, companies today are implementing digitalization and digital transformation more than ever before. This is almost necessary to keep up with both national and international competitors but also to achieve a broader customer base. Company strategies are intertwined with international forces via the impact latter in consumers and demand, experience both at home and globally. Another way of how international trends and forces have changed companies is in the labor market itself (Nachum, 2012). Companies today are quicker to find and hire the right highly skilled professional needed, whether this person comes from foreign countries or from their country to suite their organization. This has given an increase in foreign labor in many countries. We also see that many of these companies use English as the main language. This also applies for the companies participated in our thesis.

Innovation

Digital transformation expects companies to become more innovative. Digital transformation improves companies with new innovative systems and processes to become more efficient, something al companies have experienced after implementing digital transformation. Furthermore, the companies participated stated that with the help of digital transformation tasks has become less time-consuming. Less time is used on finding the numbers and more time is used on understanding the numbers. Digital transformation forces top-management and employees to be more innovative and creative with the ultimate goal of having increase in value.

Responsibility

One of the ethical challenges we found when conducting our research is that companies need to release the employees fear of being replaced by digital tools. Some digital transformation strategies even force companies to do so, replacing manual labor with digital tools. Another ethical challenge for companies after implementing digital transformation is that everybody's mistakes become more visible which may result in to resentment towards the digital transformation processes. It is the top-management responsibility to keep their employees informed about the digital transformation process and listen to the employee's opinions. Furthermore, management need to become a role model for employees when using digital tools so that employees are motivated to use the tools themselves. It is also top-management responsibility to replace and move people to another position who are currently in outdated positions because of digital transformation.

It was, us researchers, responsibility to make sure the participants privacy was protected. Early on in the master thesis we decided to keep our participants anonymous. Furthermore, we decided to conduct in-depth interviews with the desire to record these interviews with a voice recorder. Thus, we applied to Norsk senter for forskningsdata (NSD) our research and got approval to record the interviews. Furthermore, we got each of the participants sign under a consent form with the possibility to withdraw from the interview if they wanted to and with our promise to keep them anonymous. We also conducted our research in according to the General Data Protection Regulation (GDPR) 2018. We named the companies in our case result Company A, B and C and their examples of systems used in their company System, A, B, C and so on.

As discussed above we can conclude that digital transformation relates to *international*, *innovation* and *responsibility*. Both when it comes to the ethical challenges that may arise but also how they are influenced by international forces. It forces companies to be more innovative and creative but also realize that it comes with more responsibility.

Through the course of my master's degree, I myself, have related to *international*, *innovation* and *responsibility*. International in representing University of Agder last semester when I was exchange study at Queensland University of Technology in Brisbane, Australia. International as English being just as much used through the course of my study as the Norwegian language. Innovation in a way of findings my own ways to make sure I learn the courses in the best way possible. Responsibility in it being my responsibility to make sure I graduate and to make sure what I learned the past five years is taking with me when entering the labor market.

Melissa Geradina Maria Sinfield, 28.05.2020, Kristiansand

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