UMEÅ SCHOOL OF BUSINESS,
ECONOMICS AND STATISTICS
UMEÅ UNIVERSITY

Digitalization of Project Management

A phenomenographic study of project managers' perceptions regarding challenges and actions to handle them

Frida Engkvist, Marielle Lindkvist

Department of Business Administration
Master's Program in Management
Master's Thesis in Business Administration II, 15 Credits, Spring 2024
Supervisor: Ulrica Nylén

[This page was intentionally left blank]

Abstract

As project-oriented work, project management, and digitalization is growing in society, more and more attention is given to these fields. The benefits of project-oriented work and project management lead to an increase in utilizing it in organizations and industries. Projects enhance organization flexibility, can provide a competitive advantage, increase the quality and value for the customer, and lead to quicker response capability such as speed to market, among others. Moreover, digitalization is vital for organizations in today's society. New technologies are disrupting the market, providing opportunities like efficiency, reduced costs, and better customer knowledge. But both fields have inherent challenges. For example, in the field of project management, challenges can occur if the project team is lacking in collaboration, problem solving, or if they are missing opportunities. Moreover, challenges with digitalization can be related to lack of digital skills, resistance to change, and inefficient virtual teams.

As digitalization is moving into all aspects of society, project management is also highly affected by it. Digitalization of project management is said to restructure the nature of project management and its practices, affecting both the way people work as well as business models, structures, etc. It includes new technologies being used as tools in project management. Technologies like automation, cloud-computing, artificial intelligence (AI), and data analytics, among others, are used to enhance both success-rate, decision-making, productivity, and innovation, if done correctly. But, as for the parallel fields of project management and digitalization, the conjoined field of digitalization of project management also has challenges. Several challenges are described, but these are not described from the project manager's perspective based on their perceptions. There is also a gap in research on how these challenges are actually perceived and are perceived to be handled by project managers. Moreover, digitalization of project management is also relevant in the Swedish context, where Swedish project management professionals see the need for digital transformation and to start using new technologies and systems in project management. But even though Sweden is a highly developed country from a digitalization aspect, there are challenges related to it.

A phenomenographic study has been conducted on seven project managers from different organizations and industries in Sweden. Data has been collected through semi-structured interviews. This study resulted in three categories of descriptions regarding perceived challenges of digitalization of project management; (1) challenges related to digitalization of project management as technological, (2) challenges related to digitalization of project management as human factors, and (3) challenges related to digitalization of project management as leadership complexities. The study also resulted in three categories of description on how these challenges of digitalization of project management are perceived to be handled; (1) actions to handle challenges related to digitalization of project management as organizational, (2) actions to handle challenges related to digitalization of project management as guidance, and (3) actions to handle challenges related to digitalization of project management as adapting.

[This page was intentionally left blank]

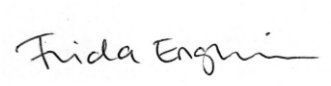
Acknowledgements

This thesis marks the end of our master's degree in management, as well as our time at Umeå University after five years of studies. We would like to start by expressing our gratitude to our supervisor Ulrica Nylén for her valuable input during the conduction of this thesis. We kindly thank you for taking the time to support us during these weeks. Your feedback has been very important throughout this whole process.

Secondly, we want to express our appreciation to all of our respondents. We are very thankful for the valuable insights that you have been providing us with, and the time you have given during the interviews. Without your help, this thesis would not have been possible to accomplish.

Lastly, we would like to thank each other for good cooperation and support, both throughout this thesis but also during the last five years of our studies.

Umeå, 2024-05-21



Frida Engkvist

Marielle Lindkvist

[This page was intentionally left blank]

Table of Content

List of Figures & Tables

1. Introduction

In this chapter the growing areas of project-oriented work, project management, and digitalization are presented. This is followed by a paragraph linking the areas together, describing digitalization of project management, and the opportunities and challenges that come with it. This will then be described in the Swedish context. This chapter will end with a problem discussion which results in the research gap, this study's research questions, purpose, and contributions.

1.1. Problem Background

1.1.1 Project-Oriented Work and Project Management

Project-oriented work has grown in the global economy, and it will keep on growing in the future according to Anderson Economic Group (2017, p. 3-4). From a study they conducted on eleven countries such as Germany, Canada, the United States and more, on behalf of the Project Management Institute, they found that the sectors that will expand the most in project-oriented work between 2017 and 2027 are the manufacturing and construction sector, the publishing sector, finance and insurance sector, management and professional sector, the utilities sector, and the oil and gas sector (Anderson Economic Group, 2017, p. 3). Project management is also expanding within industries which have not been as project-oriented before, such as publishing and health care. The fact that project-oriented work is becoming more and more common is also strengthened by a survey made on executives by Accenture (Metasysinc, n.d.), which shows that nearly 80 percent of the executives agrees that project-oriented work will become more common than traditional role-based work in the future. One reason for the increased use of projects is the opportunities arising from technology (Anderson Economic Group, 2017, p. 3). Moreover, Teamwork (n.d.) argues that the reason for the increased demand could be due to the fact that projects, when managed correctly, can help every part of the organization to run more smoothly. It fosters better communication and collaboration between team members, provides data-driven insight which can result in better decision making, it facilitates better risk management, and it enables objectives and deliverables to be completed on time and within budget (Teamwork, n.d.).

The characteristics of project-oriented work are for example that it entails an assignment with a specific start and finish time, a set budget, activities that are unique and non-repetitive, and that resources are utilized from different departments (Burke, 1999, p. 2). In the project, there is an assigned project manager who is responsible for the success of the project. Project management is about meeting the customers and other stakeholders' needs and expectations from the project by applying the knowledge, skills, tools and techniques needed for project activities (Burke, 1999, p. 3). To be a successful project manager, general management skills such as leadership, communication, staffing, planning, implementing, monitoring, controlling, teambuilding etc., need to be possessed (Burke, 1999, p. 4). Besides these general managerial competencies, they should have knowledge within areas such as scope management, time management, cost management, quality management, risk management, and more (Burke, 1999, p. 6-7). The project manager also needs to be able to be more flexible and adjust their strategy in order to accommodate for example the goal, resources, or time frame that each unique project has (McDowell, n.d). Furthermore, they should act more as an agent of change, being able to work under pressure, and oscillate more between having a holistic perspective and a detailed one.

In general, projects enhance organization flexibility, it provides a more holistic view of problems, and it encourages a more decentralized management responsibility (Burke, 1999, p. 4). It also makes it easier to do estimation based on collected data from previous projects

(Burke, 1999, p. 8). Furthermore, due to the fact that project teams are known for being cross-functional, several possibilities arise (Wilemon, 1998, p. 279). For example, it can provide a competitive advantage, it can increase the quality and value for the customer, and quicker response capability such as speed to market. It also provides new ways of thinking and acting. However, it can result in challenges if the project team, for example, is lacking in their ability to work together, if they are bad at problem solving, unable to change with the time, or are unable to take advantages of potential opportunities (Burke, 1999, p. 275).
Furthermore, depending on what type of project there is, the project management method can be different (Keller et al., 2017, p. 2). Traditional project management is known for following the five phases: initiation, planning, execution, monitoring/control, and project closure. These types of projects are built upon these phases where they take one phase at a time in a sequel order, and the project manager is focusing a lot on the planning, execution, and control. However, due to the fact that traditional projects are not as flexible and suitable in more uncertain environments, another project management method has been developed (Keller et al., 2017, p. 2). Agile project management is known for being an excellent option in fast changing or complex environments since its working method is more iterative (Larson & Gray, 2021, p. 13). Instead of phases, the team works in shorter sprints.

To summarize, project-oriented work and project management has been growing (Anderson Economic Group, 2017, p. 3-4; Metasysinc, n.d.). Due to this we see that there is an importance and interest in this type of work. It has many benefits to it, such as the possibility of using many different competencies, and it makes it easier to track costs and revenue, which enables a more controlled and flexible way of working (Burke, 1999). But the uniqueness of project-oriented work also contributes to challenges and requirements, especially for project managers (Burke 1999, p. 6-7; McDowell, n.d.). Furthermore, challenges within the project team can also occur, such as them not being able to work together or in them missing opportunities (Burke, 1999, p. 275). There are some general actions described to handle project management in a successful way (Burke, 1999, p. 4; 6-7; McDowell, n.d.), but these do not focus on how to handle the mentioned challenges.

1.1.2 Digitalization

Digitalization has been a relevant factor in society for multiple decades, but it has recently gained more and more attention, integrating itself into all of society (Pegulescu, 2023, p. 207). A factor affecting this was Covid-19 which created a need for digital transformation. This was due to the fact that most national governments in the EU ordered workers to work from home. Organizations were obliged to quickly invest in different software platforms that facilitated communication and meetings, and other processes that could help reduce face-to-face interactions (Contreras, n.d.). Now, going digital is no longer an option but instead a precondition to staying competitive in today's digital world (Roy, 2023). Digitalization is described as the adoption and integration process of digital artifacts (Gradillas & Thomas, 2023, p. 20). Digital transformation takes it a step further, going beyond digitalization. It is described to be a transformation that affects the whole organization instead of just changes in simple organizational processes or tasks (Amit & Zott, 2001, p. 497). It is not something that the organization can implement as a project, instead it requires a broader cross-cutting organizational change and implementation of digital technologies (Bloomberg, 2018), and it is a process that does not stop (Schallmo et al., 2017, p. 11). Verhof et al. (2021, p. 892) defines digitalization as a process starting with digitization, followed by digitalization, and then digital transformation. Digitization is turning something analog into something digital, digitalization is the introduction of digital distribution and other digital technologies, and digital transformation is taking a step further, introducing new business models based on the new technologies. Furter on in this thesis when we say digitalization, we refer to digitalization as a process, including both digitalization and digital transformation.

Moreover, in relation to digitalization the fourth industrial revolution has been accelerating lately (McKinsey & Company, 2022). The fourth industrial revolution builds on the invention of the digital revolution which started to unfold from the 1950s and kept going to the early 2000s (McKinsey & Company, 2022). However, while the third industrial revolution gave us the internet and electronic tools such as computers, the fourth industrial revolution is bringing these inventions further ahead than what was believed to be possible. The fourth industrial revolution is characterized by disruptive technologies such as cloud technology, advanced analytics, artificial intelligence, virtual reality, robotics, automation, 3D printing, and more which provides significant potential for organizations (McKinsey & Company, 2022). This is because it can help with factors such as reducing factory waste and making working hours more productive. Besides this, digital technologies enable new ways of working, create new work roles, and enable the possibility of working remotely (Hallin, 2018). Furthermore, it increases process efficiency (Tacke & Annette, referred to in Bloomberg, 2018), and cost optimization (SAP India, 2022). This is, for example, due to the fact that automation saves time, and resources can be used in better ways (SAP India, 2022). It also helps organizations to take advantage of the knowledge gathered from data to gain better customer insights and track competitors on a real time basis, among other opportunities (SAP India, 2022).

Although digitalization is growing and provides several opportunities it has drawbacks and potential consequences for organizations. For example, Hallin (2018) mentions that virtual teams are not as effective as when the team is working together in real life, due to the fact that it is harder to build trust and common knowledge remotely. Some people also feel a sense of worry due to the fast development of digitalization. Moreover, the organization needs to be mature for the digital transformation to not meet challenges related to lack of skills and clear visions, resistance to the planned change, etc. (Gökalp & Martinez, 2022, p. 6288). Heavin & Power (2018) discuss seven general challenges that come with digital transformation. They mention, among others, that technology in fact is only one part of digital transformation, and to succeed they discuss the need of humans and good leadership, and a strategy and culture in the organization that supports the transformation (Heavin & Power, 2018, p. 41-42). Furthermore, competition between organizations is also changing dramatically due to the more digital world (Verhoef et al. 2021, p. 890-891). This is for example due to global integration and changed consumer behavior as a response to the digital revolution.

Conclusively, digitalization is described as something needed for the survival of organizations today (Roy, 2023). Due to this we see it as highly important to understand. It poses both opportunities and challenges (McKinsey & Company, 2022; Tacke & Annette, referred to in Bloomberg, 2018; SAP India, 2022; Hallin, 2018; Gökalp & Martinez, 2022, p. 6288; Heavin & Power, 2018, p. 41-42). Process efficiency, cost optimization, insights from data, and remote working are only a few of all opportunities related to digital technologies in organizations. But challenges are for example those of efficiency within virtual teams, resistance to change, changing competition, and lack of required skills, among others. Hence, adapting digital technologies and undergoing a digital transformation is complex and requires many different factors to succeed. Some actions to handle the stated challenges are also described, for example making sure that the organization is mature and that humans are considers (Gökalp & Martinez, 2022, p. 6288; Heavin & Power, 2018, p. 41-42)

1.1.3 Digitalization of Project Management

The digitalization of society has affected all different areas of organizations, including project management (Narayanan et al., 2022). The way projects are managed, and project management in itself as a field, is changing due to it (Marnewick & Marnewick, 2022, p. 9). It affects both the way people work as well as the business models. In project management, digitalization means that the project management processes are affected to some degree. It also includes new technologies being used as tools in project management. Wu (2022, p. 323) defines digital project management as a mix of fully adopting digital technologies and tools into the project management process with traditional project management. Handojo (2023) states that digital transformation of project management restructures the nature of project management and its practices. It comes with great potential to enhance both success-rate, customer experience, decision-making, productivity and innovation if done correctly.

The digital transformation process in project management involves integrating technologies like automation, cloud-computing, artificial intelligence (AI), machine learning (ML), internet of things (IoT), data analytics, among others (Handojo, 2023). Nilsson et al., (2024, p. 13) states that the market for AI in project management is predicted to grow with an annual growth rate of 17.3 percent. In IT project management there are multiple opportunities to leverage these kinds of technologies (Khazanchi et al., 2022, p. 5-7). Out of five project management processes presented, technologies like AI and ML can be utilized in at least three of them, referring to the planning, the initiation, and the execution stage. Hickey et al. (2023, p. 726) mentions that utilizing digital tools for project management related to manufacturing could better the development process. In construction project management, Covid-19 led to presented opportunities in new smart technologies to improve, for example, communication and visualizations (Li et al., 2023, p. 3380-3382). This shows the broad application potential of digitalization in project management in different industries and approaches.

There are also challenges related to digital transformation in project management (Handojo, 2023). Cyber-security risks, managing the change it requires, gaps in skills and the need for training are mentioned. Korherr et al. (2022, p. 7-8) distinguishes the digital transformation towards using analytics and handling big data in project management as one of the most challenging ones for organizations. The digital transformation also puts more pressure on project managers (Hallin, 2018; Langley referred to in PMI, 2018, p. 1). The project manager cannot only focus on the SMART goals anymore (Hallin, 2018), which are goals that are specific, measurable, attainable, realistic, and timely (Deslippe et al., 2021, p. 1). Instead, they also need to focus on handling the potential worries of the stakeholder that stem from digitalization (Hallin, 2018). In other words, they need to focus on managing the change towards digitalization. Wu (2022, p. 325) mentions that besides needing to possess regular project management skills, digital project managers also need to understand technology and handle data. Langley (referred to in PMI, 2018, p. 1) defines the top six digital skills needed as; data science skills (e.g. data management, analytics, big data), having an innovative mindset, knowledge about security and privacy of data, knowledge of legal and regulatory compliance, knowledge when it comes to taking decision based on data, and lastly collaborative leadership skills. In order to effectively manage the disruptive technologies as a project manager, they first need to make sure that they possess these digital skills (PMI, 2018, p. 3). Second, they should use multiple approaches and tools, such as collaborative platforms and hybrid methods. Third, they should make sure to create a culture which sees these disruptive technologies as opportunities. Moreover, related to AI in project management in general, AI is predicted to have a big impact, but there will be a gap in training and expertise related to it, leading to pressure on increasing knowledge and skills (Nilsson et al., 2024, p. 39).

When it comes to the research field of digitalization of project management there is an interest in gaining more insights into it from different aspects and perspectives. Marnewick & Marnewick (2022, p. 10) states that the research field of digitalization of project management is fairly new. They argue that this field could have an impact and that efforts should be made to understand how technology and the digitalization of project management can help, and how project management is changing due to it. Project Leadership and Society (Narayanan et al., 2022) published a special issue calling for papers and research with the focus on digitalization of project management. They state that project management is highly affected by digitalization and therefore want to invite researchers to provide insights into how digitalization and project management interrelate, are affecting, and are affected by each other. Examples of research they are interested in gathering are both empirical, systematic reviews, theoretical insights, and so on. Topics of interest range from empirical insights into the project management function and how it is transforming, to sociotechnical considerations, how it differs across countries, and so on. Kozarkiewicz (2020, p. 246) mentions that the field of digital transformation of project management is a field to be discussed and researched in regard to how it changes project management from both hard and soft perspectives. Hard perspectives entail the processes and tools, and the soft perspective regards the team and its collaboration, the management practices and the new roles needed. Varzaru (2022, p. 12) studied employees' and project management specialists' perceptions on integrating digital technologies into the project management process in Romani, more specifically in accounting, finance and management systems and processes, and states that future studies like this should be made in other countries, management areas, and contexts.

To summarize, both the project management process, the way people work in projects, and what tools are being used are affected by the digitalization of project management (Marnewick & Marnewick, 2022, p. 9; Wu, 2022, p. 323; Handojo, 2023). Furthermore, the mentioned disruptive technologies are being used in project management in different ways, for example in improving development processes, communication, in planning, initiating, and executing projects, for decision-making, to enhance productivity and so on (Hickey et al., 2023, p. 726; Li et al., 2023, p. 3380-3382; Khazanchi et al., 2022, p. 5-7; Handojo, 2023). But similarly to digitalization in general, there are challenges related to digitalization of project management, such as cyber-security risks, the need for training and potential gaps in skills, being able to properly handle data and analytics, that it puts higher pressure on project managers, the need for the organizational culture to support the technology, managing the change, worried stakeholders and resistance, and so on (Handojo, 2023; Nilsson et al., 2024, p. 39; Wu, 2022, p. 325, Korherr et al., 2022, p. 7-8; Hallin, 2018: Langley, referred to in PMI, 2018, p. 1; PMI, 2018, p. 3; KPMG & PMI Sweden Chapter, 2020, p. 14). The way some of these challenges are to be handled is mainly described as the project manager's responsibility (Hallin, 2018; Wu, 2022, p. 325), and PMI (2018, p. 3) describes how digitalization of project management should be handled in a normative way, but these are not described based on how project managers perceive this.

1.1.4 The Swedish Context of Project Management and Digitalization

Looking at project-oriented work in Sweden, the methods of project management started in the construction industry in 1967 (Engwall, 1995, p. 120). Now it is included in almost every sector of society, such as culture, government work, IT, and finance. More and more people are getting certifications as project managers (Svenskt projektforum, 2010). Swedish project management professionals agree on how important it is to introduce new technologies and systems (KPMG & PMI Sweden Chapter, 2020, p. 8). Out of the respondents included in a survey conducted by Project Management Institute Sweden and KPMG (KPMG & PMI

Sweden Chapter, 2020, p. 8), 92 percent agree on the importance of digital tools and systems to improve performance. But, to benefit from the opportunities related to it there is a need for organizational change and new ways of working. This survey shows that change management is the most challenging part of the digital transformation, partly because people are not always open to change, and that there are almost always a diverse crowd affected by the change. Hence, different types of change management practices might be necessary. But even though change is seen as important and prioritized, 75 percent respond that their ability to respond to, and manage change, is low to medium (KPMG & PMI Sweden Chapter, 2020, p. 14).

The European Commission (2020) has set digital goals for 2030 where the aim is, among others, that at least 80% of the populations have basics digital competence, and that 75% percent of organizations are using AI, big data, and cloud. Sweden is a country that has a high ranking when it comes to the development of digitalization, with a point as high as 69,7 compared to the average point in EU which is 52.6. The is due to the digital skills that people in Sweden have gained through jobs, school, and private life. Digital skills are described as being both about the technical competences when it comes to being able to use digital tools, but also about being able to find, create and analyze information in the new digital workspace (DIGG, 2023, p. 12). DIGG (2023, p. 8) also mentions that Sweden, in comparison to other countries, have good digital skills. These skills play a key role when it comes to taking advantage of the opportunities of technical development.

As a result of the Swedish society turning more digital some job positions and work tasks will disappear, new ones will be created, and existing ones will change (DIGG, 2023, p. 12). This puts pressure on developing new kinds of skills. First, every employee in Sweden will need to have basic digital skills, which means that they must be able to use digital tools in their everyday work. Second, there will be a need for people having specialized skills in order to keep developing, implementing, and running new technology. Third, there is a need for supplementary non-technical skills, such as being good at problem solving, thinking critically, communication, leadership and being creative, in order to integrate the digital technology in the best way (DIGG, 2023, p. 12). It has also been found that even though people in Sweden have good digital skills compared to other countries, a profound amount of the Swedish citizens still lacks basic digital skills (DIGG, 2023, p. 8). This results in organizations facing challenges when finding employees with the IT skills they need (DIGG, 2023, p. 8). Besides the fact that a profound amount of the Swedish citizens is lacking digital skills, there is also challenges regarding skills being outdated in the development of the Swedish society (DIGG, 2023, p. 13). Therefore, these skills need to consistently keep developing.

To summarize the Swedish context and the applicability of this section, Swedish project management professionals see the need for digital transformation and to start using new technologies and systems in project management (KPMG & PMI Sweden Chapter, 2020, p. 8). Moreover, Sweden is seen as a digitalized developed country (European Commission, 2020). From this is can be argued that the field of digitalization of project management is of interest to study in the Swedish context. But even though Sweden is seen as a digitalized developed country compared to others, the digital development requires new skills and new ways of working (DIGG, 2023, p. 8,12-13). This can lead to, for example, challenges in finding competent employees and developing employees. Another challenge mentioned by Swedish project management professionals is that the majority say they lack abilities to manage change (KPMG & PMI Sweden Chapter, 2020, p. 8). This shows that even though Sweden is a highly developed country from a digitalization aspect, there are challenges related to it, both in general and in project management.

1.2 Problem Discussion & Research Gap

As mentioned, project-oriented work and project management has been described as becoming more popular in organizations (Anderson Economic Group, 2017, p. 3-4;6; Metasysinc, n.d.). Furthermore, digitalization has had a big impact on society lately (Pegulescu, 2023, p. 207). Since digitalization is affecting all of society, project management is also highly relevant in the field (Narayanan et al., 2022; Marnewick & Marnewick, 2022, p. 9). Research on the field of digitalization of project management from multiple aspects and perspectives is needed due to this field being fairly new and unexplored (Narayanan et al., 2022; Marnewick & Marnewick, 2022, p. 9; Kozarkiewicz, 2020, p. 246; Varzaru, 2022, p. 12). This to provide insights and knowledge.

Due to the fact that both project-oriented work, project management, and digitalization are described as important for the future, and that digitalization of project management is in fact affecting project managers, their processes, project management functions, and so on, we believe that there is a need to better understand this field. Specifically, we argue that there is a need to better understand perceived challenges and how to handle these related to digitalization of project management. These can be related to both hard and soft perspectives, as both are said to be of importance to include (Kozarkiewicz, 2020, p. 246). As digitalization of project management is described to affect project managers (Wu, 2022, p. 325; Hallin, 2018; Langley referred to in PMI, 2018, p. 1), and because project managers are described to be somewhat responsible for actions to handle these challenges, we see the need to understand this from the project manager's perspective. Getting insight and knowledge from a group of project managers based on their perceptions will give in-dept, relevant information on the subject. By providing insights and knowledge into challenges and actions to handle them, it can help in understanding how to better be able to benefit from the opportunities with digitalization of project management. By learning from these insights, some challenges could possibly also be avoided. We see that project managers' perceptions are of key interest due to them being the ones in charge of projects which are affected by digitalization of project management. We further argue that challenges with digitalization of project management are important to understand to be able to learn about it. This can lead to a better understanding of how to handle challenges, and what is needed to ensure successful project management in this new digital environment. Moreover, we believe that project managers may perceive different challenges and actions to handle them. Due to this a variation in perceptions will give a more in-dept understanding of the phenomena.

As has been presented, there is research on what types of challenges can come from the separate fields of project management and digitalization. There are also some empirical and theoretical insights into some challenges related to digitalization of project management and actions to handle these. But these are either not scientific or not based on project managers' perceptions. For example, Handojo (2023), Hallin (2018), and Langley (referred to in PMI, 2018, p.1) are not scientific. Wu (2022), and Korherr et al. (2022), are scientific, but do not focus on the project managers' perceptions. Kozarkiewicz (2020) studies project managers perceptions, but focuses on the process, change, and impact of digital transformation on project management, not on challenges and actions to handle them. Hence, there is a lack of how these challenges are actually perceived and handled by project managers. Based on this, the identified research gap is in how challenges related to digitalization of project management are perceived by project managers and how they perceive that these are actually handled

1.3 Research Question

Based on the problem background and discussion the following research questions has been formulated:

- ***How do project managers perceive challenges related to digitalization of project management, and how do they perceive actions to handle these challenges?***

1.4 Purpose

The purpose of this study is to explore challenges with digitalization of project management, and how these challenges are perceived to be handled. More specifically, we aim to study these phenomena from the project manager's perspective based on their perceptions. A variation in perception relating to the mentioned phenomena aims to contribute with in-dept knowledge. This is because we believe that there is an inherent subjectivity of the phenomena which leads to it being better described by presenting a variation of perceptions, instead of a common perception. By providing a variation of perceptions, more aspects are included, providing more insights which can be learned from. The study further aims to show how project managers in Sweden perceive challenges and how they perceive to actually handle and work with these perceived challenges to overcome them. Furthermore, it aims to generate knowledge and insights from project managers from different organizations where project-oriented work is present, by studying the variation in perceptions regarding the phenomena. The study is intended to provide research within the field of project management connected to digitalization. It also aims to serve as support and insights to learn from for project managers, project members, and organization, who are working with digitalization of project management or are ongoing a process towards it, as well as to present ideas and directions for future research.

1.5 Contributions

Through a literature review reading peer-reviewed articles on subjects such as project management, digitalization, digitalization of project management and so on, we have found it to be relevant to further look into the fairly new field of digitalization of project management. Platforms such as EBSCO and Emerald Journals have been used to conduct the literature review. Alongside the theoretical research gap, we have looked for empirical support from websites, articles, and reports to ensure the empirical relevance of the field. Based on this research, we found that there is a need for further research both from a theoretical and empirical perspective. This study can therefore be argued to contribute to the research field of digitalization of project management.

The study aims to show how challenges of digitalization of project management can be shown in organizations who work with projects, by gaining project managers perceptions of challenges. It also aims to show how project managers perceive them to be handled. By providing information regarding perceived challenges and how these are handled, others might learn from this to be able to prevent these challenges. By studying how project managers in a highly digital country, such as Sweden, works with challenges related to digitalization of project management, a practical contribution can be made to other countries, companies, and project managers who either currently work with, or will have to implement digitalized project management in the future. It gives an insight into what works, what is needed by project managers, and what might be missing, for others to learn from it. This can lead to others minimizing the risk of facing these challenges, which helps in both saving time, and other resources. Secondly, our study could also provide project managers with knowledge on how to manage these challenging situations of digitalization of project management, which can be useful when managing projects in the future. Thirdly, our study will provide practical contributions to project workers who will get a better understanding

of project management's actions. Lastly, this study also provides future research ideas and directions to gain further insights and knowledge into the field of digitalization of project management.

Digitalization is, as mentioned, important for organizations survival and cannot be overlooked. The European Commission (2020) has set several digital goals for 2030 where one of the aims is that 75% of all organizations will be using disruptive digital technologies. We therefore see that it is important to make sure it is done the right way for both people, organizations, and society. By studying perceived challenges and how to handle them, the chance of successful implementation of digital, disruptive technologies might be higher. Furthermore, project management has been shown to be growing and expanding into more and more industries and sectors (Andersson Economic Group, 2017, p. 3). According to Anderson Economic Group (2017 p. 2) there will be around 87,7 million individuals working in project management-oriented roles in the eleven countries included in their study. They state that there will be an estimated shortage of qualified talent which could result in an economic loss of US$207.9 billion in GDP through 2027. This is due to retirements and increased demand for project managers and talent in both new economies and industries (PMI, 2018, p. 1). Moreover, the future of project management will be affected by digitalization (Marnewick & Marnewick, 2022, p. 9). Digitalization puts pressure on the project managers in both needed skills, change management, and in adapting the project management process to new technology and tools (Hallin, 2018; PMI, 2018). When predicting the future for project management both AI and data literacy are mentioned as important aspects (PMI, 2023). Based on this, we believe that our study will contribute to the possibility of minimizing the economic loss related to the talent gap through highlighting important aspects to overcome challenges perhaps like these, as well as to show what is perceived to be required from project management in the future.

2. Theoretical Frame of Reference

In this chapter the two main areas of project management and digitalization will be further analyzed. Project management will be described, and different approaches will be presented to create a deeper understanding of what these might entail and how they affect project management. For digitalization, the process, different types of technologies, and challenges will be elaborated upon. Lastly, these areas are combined in the third main area, which is digitalization of project management, to present the area more in dept, as well as to show what exists within the field.

2.1 Project Management

One of the main areas for this theoretical framework is project management. Projects have been widely recognized in society and the economy (Jensen et al., 2016, p. 21), and project management exists, and keeps on growing, in all types of organizations (Palčić et al., 2013, p. 251). There are different types of project management methodologies and approaches (Špundak, 2014, p. 946). The two main ones are known as traditional and agile. The traditional methods of project management are said to not be as fitting in projects that are uncertain, very limited in time, and are complex in structure (Williams, 2005, p. 506). When these are the characteristics of the project, newer methods like agile might be more appropriate. Both approaches have their own advantages and disadvantages, resulting in the selection of appropriate approach for a project to be something that should be handled seriously, and based on the surrounding characteristics of the project and the organization (Špundak, 2014, p. 946). There is also a possibility of combining the two approaches. As project management is a relevant field in this study, and because of the fact that the different approaches applied in project affects the process in different ways, the upcoming paragraphs will present different types of project management approaches and methods. This is in order to provide more knowledge and understanding of the context related to these.

2.1.1 Traditional Project Management

In general, project management helps people to improve people's ability to reach specific objectives by planning, implementing, and managing activities (Larson & Gray, 2021, p. 3). The traditional manager is for example responsible for managing the project workers and other stakeholders, making sure they are motivated to deliver on time and within budget (Wu, 2022, p. 325). They are also responsible for facilitating project meetings, handle and manage resources, developing and being responsible for project milestones, as well as the experiences of future customers, and to make sure that project goals are fulfilled within the success metrics that were agreed on. Based on project managers perceptions and previous research, Thesing et al. (2021, p. 747; 749) describes traditional project management, which is plan-driven with a waterfall process, as characterized by upfront planning of the whole process and project, a long-term perspective, stability, and a clear scope from the beginning. The work in a traditional project is then structured around the project plan. Fernandez & Fernandez (2008, p.15) refers to traditional projects as being based on well understood and documented requirements, features, and functions. The traditional project manager focuses on managing projects related to the defined scope, the planned schedule, and the budget. They want to keep the project within the constraints of time and money. Moreover, a big focus is on managing risks.

Herrera et al. (2020, p. 134- 136) refers to a guide by the Project Management Institution, stating the five phases of the project management process being initiating, planning, executing, monitoring, and controlling and closing. Within this process, there are 49 processes that the project manager is expected to perform for a successful project. Planning processes are said to make up 48 percent of all processes that a project manager should

perform during a project life cycle. The focus areas for a project manager are stated to be integration, scope, schedule, cost, quality, resources, communication, risks, procurement, and stakeholders. Planning is said to be important to reduce or eliminate the uncertainty inherent in projects, to improve efficiency, and to gain a better understanding of the objectives for the project. It also acts as a base for monitoring and controlling the project (Herrera et al., 2020, p. 146-147). According to Badewi (2016, p. 775), developing and using a communication plan and time plan are important factors and tools when it comes to achieving project success. For the time plan, the project manager needs to be able to review it and follow up during the project (Badewi, 2016, p. 775). When it comes to the communication plan, it addresses questions such as what information is needed, when it is needed, how it will be communicated, and who will give and receive the information (Larson & Gray, 2021, p. 124). It is usually the project manager that is responsible for developing this communication plan.

Thesing et al. (2021, p. 750-751) presents perceived disadvantages, which are then backed up by previous research, for the traditional approach. One of the biggest challenges described is related to understanding initial requirements. Misinterpreted and misunderstood initial requirements lead to a big disadvantage in the way that it affects the planning process as well as the whole project process. The planning could be uncertain both because of this, and because of the pressure that is put on the customer to be able to specify detailed requirements up front. Ruuska & Teigland (2008, p. 323) mentions that a large number of projects are cross-sectoral where partners from multiple organizations are included. Due to the risk of them having different goals, resource scarcity, and interdependence of task, conflicts can occur which can cause challenges when it comes to developing collective competence. When talking about collective competence, Ruuska & Teigland (2008, p. 324) refers to the definition that collective competence is about the group's ability to work together towards a set common goal, where the outcomes could not be accomplished by a single team member, but only by the creation of the collective outcome. To make sure that this collective competence is created to be able to handle and overcome this challenge, there is a need for a project leader that possesses strong knowledge broker skills. Further, all parties need to work together when it comes to developing the project charter in order to make sure it is clear to everyone. The parties should also focus on continuous open and balanced communication in order to make sure that everyone understands the big picture of the project (Ruuska & Teigland, 2008, p. 323). The importance of communication when it comes to developing collective competence is also strengthened by Melkonian & Picq (2010, p. 84).

2.1.2 Agile Project Management

Agile project management is more flexible, step-by-step, and the work process is more dependent on communication and short feedback cycles (Thesing et al., 2021, p. 749). The framework of agile project management has four core values (Agbejule & Lethineva, 2022, p. 126). These are: individuals and interactions over processes and tools, working software over comprehensive documentation, collaboration with customers over contract negotiation, and responding to change over sticking to a plan. Agile project management has spread widely in the software development industry (Conforto & Amaral, 2016, p. 1). This is due to its focus on managing time, market constraints, and changes during the life cycle of software development (Cao et al., 2009, p. 332).

Known methods in agile project management are for example time-boxed sprints, daily stand-up meetings, scrum meetings, and early demos and retrospectives (Cooper & Sommer, 2018, p. 17). In each sprint, which typically lasts between one to three weeks, a specific feature is developed, tested, redefined if necessary, and documented (Batarseh & Gonzales, 2025, p. 50-51). The testing can be different depending on the context of the

project but after every sprint, the development and outcomes are evaluated in order to decide the next step of the project. Because of these sprints, the process and states of the project can be flexible and modified based on the completed work and the current context after each sprint. Furthermore, the daily scrum meeting is what defines the sprints. In these meetings, the self-organized teams, the product owner, and a so-called scrum master are participating. The scrum master can be seen as the supervisor and is the one that facilitates the relation between the self-organized team and the product owner, drives features, and establishes plans. Scrum is one of the most used agile methods due to the fact that it emphasizes simplicity, flexibility, team coordination, customer involvement and productivity (Adnan & Afzal, 2017, p. 25994). A common tool that is often used in agile project management is visual boards which are said to be critical tools for communicating and supporting the team when it comes to planning and controlling tasks (Conforto & Amaral, 2016, p. 12). Also highlighted is the importance of project management software tools where both physical and virtual tools are combined to ensure that all important information is registered and communicated.

There are some challenges specifically related to agile project management which are discussed by Hoda & Murugesan (2016, p. 256). The biggest challenges described are delayed or changing requirements from customers, achieving effective cross-functional teams, individuals asserting autonomy and self-assignment on tasks they are comfortable with instead of priority tasks, and that they face lack of acceptance criteria and dependencies when it comes to the tasks. The authors mention that several of these challenges occur due to the fact that the role of the project manager in the self-organizing teams is a bit unclear, compared to what it would have been if they were managed by a traditional project manager. This is due to the fact that the project manager would have been responsible for handling these issues in traditional project management, such as changing requirements from the customer for instance. Instead, when it comes to agile project management, the project manager can find it hard to balance between giving autonomy and empowering the team on one hand and assisting them on the other (Hoda & Murugesan, 2016, p. 256). Furthermore, Thesing et al. (2021, p. 750-751) also describes disadvantages with agile project management. According to the authors, the challenges are partly related to the iterative nature of it which might not fit in the culture of the organization, as well as the project success being almost fully dependent on the team members, their skills, and ability to organize. According to Adnan & Afzal (2017, p. 25993) there is also a challenge when it comes to the scrum master and project stakeholders, where they gain experience and tacit knowledge with the help of lessons learned, which then is beneficial for future projects. The challenges come from this tacit knowledge being lost if the one that possesses the knowledge leaves the organization.

To handle these challenges, Hoda & Murugesan (2016, p. 255) describes what can be done. First, to handle the challenge of delayed or changing requirements, they recommend a holistic approach to planning. It is important to establish a common product vision between the team and the customer so that there are no changes within sprints. Second, the team should share knowledge and reflect on their individual strengths and weaknesses with the help of a scrum master or expert consultant. This is in order to overcome the challenge of not achieving effective cross-functionality since it would make them better equipped in the project. It would also lead to better communication and more trust within the team. Third, in those cases where team members choose their own assignments based on comfortability, a solution could be that the scrum master or project manager delegate tasks, until the individuals are comfortable performing a variety of tasks. Fourth, organizations should invest in technical tools that facilitate and support rapid iterative development, and the team should be trained in how to use these tools in the best way. Another recommendation on how to handle challenges with agile project management in general is to make sure to have

effective communication between the stakeholders involved in order to do better estimate tasks. Last, Hoda and Murugesan (2016, p. 256) recommend that organizations should clarify the role of the project manager in the context of self-organizing teams when hiring and forming the teams. By doing this, the team and the project manager will be able to execute project management activities more effectively and collaboratively. Furthermore, when practicing agile methods, lack of business involvement is also a big challenge according to van Waardenburg & van Vliet (2013, p. 2169). This is also said to be a challenge when combining agile methods and traditional methods.

2.1.3 Hybrid Project Management

As mentioned, there is a possibility of combining the traditional and agile approaches of project management. This combined approach is called hybrid project management (Papadakis & Tsironis, 2018, p. 739). The majority of projects that are using the agile approach are software projects, but some of the agile methods are used in other domains than software as well (Papadakis & Tsironis, 2018, p. 745). This is due to the project's inherent risks and complexities. This new hybrid approach is said to be a better alternative when it for example comes to changed customer needs, project team communication, and when developing productivity (Papadakis & Tsironis, 2018, p. 745). An example of an activity from the agile process that is starting to become more included in traditional projects is scrum. However, in order for the hybrid project management to effectively work the combinations of the two approaches must be feasible and necessary for the specific project (Papadakis & Tsironis, 2020, p. 134). Boehm & Turner (2003, p. 62) highlights the need to determine whether the risk of agile or a more plan-driven type of approach dominates the project. The risks of the traditional method that can be handled by the agile methods are for example the rapid changes and the need for rapid response. At the same time, the risk of the agile method such as scalability can be handled by the plan-driven traditional method. However, it can be challenging to balance these two approaches in a way where their strengths can be taken advantage of at the same time as their weaknesses can be avoided (Boehm & Turner, 2003, p. 57). Another challenge with this mixed approach, just like for agile methods, is that there can be a lack of business involvement according to van Waardenburg & van Vliet (2013, p. 2169).

The different project management approaches presented above come with different types of processes, ways of working, and challenges (Špundak, 2014, p. 946; Thesing et al., 2021, p. 749). Based on this we believe that depending on the different approach used, people's perceptions of other aspects may differ. For example, challenges related to digitalization of project management and actions to handle them, might differ depending on if the approach is traditional or agile since the working process, challenges, and disadvantages of them are different. Moreover, the normative descriptions of how to do things, for example how to handle challenges with agile project management by Hoda & Murugesan (2016, p. 255), are included to give context, and perhaps play a part in the analysis of this study, to evaluate and analyze the empirical data collected in this study. Conclusively, since we want to study how project managers perceive challenges when it comes to digitized project management, and how these are perceived to be handled, it does not matter which approach our respondents are using, but we believe it might affect their perceptions. Therefore, we argue that it is of relevance to include these different approaches in the theoretical framework to give context, and for the possibility to use the information in the analysis of this study.

2.2 The Digitalization Process

Another main area of this theoretical framework is digitalization. Digitization, digitalization, and digital transformation are three terms which are relatively vague and can therefore be confusing (Vrana, 2021, p. 2). Some languages do not even differentiate between them, even

though they are not the same. Because of the fragmented understanding of digitization and digitalization, Gradillas & Thomas (2023) have proposed definitions of them. They describe digitization as a technical process in which digital artifacts are created (Gradillas & Thomas, 2023, p. 17). Digital artifacts are for example digital services, processes, products, etc. The technical process consists of three elements: converting the analog or physical into digital form, enhancement of the analog or physical by for example putting sensors on a physical object, and the representation of something real in digital form, like a digital model of a planet. Digitalization is described as a bigger transformation, affecting the social and the economic environment through the adaptation, implementation, and utilization of digital artifacts (Gradillas & Thomas, 2023, p. 17). When people and companies decide to start using digital tools and technologies it leads to a change in both socioeconomic structures and practices. Relating these two to one another, digitization is the start, leading to digitalization. According to Vrana (2021, p. 2), digitalization is not possible without digitization. Verhof et al. (2021, p. 895) defines digitization, digitalization, and digital transformation as phases following each other in the stated order. Each phase requires different resources, growth strategies, organizational structures, metrics and goals. Like Gradillas & Thomas (2023, p. 17), Verhof et al. (2021, p. 892) relates digitization to turning something analog into something digital, and digitalization to the introduction of digital distribution and other digital technologies.

Baier et al. (2022, p. 326) refers to improving business processes with digital transformation as process digitalization projects. Digital transformation can be used to both innovate and improve business processes. Digital transformation is then described as introducing new business models which are based on digital technologies and solutions such as data-driven business models, working with digital platforms, etc. (Verhof et al., 2021, p. 892). Schallmo et al. (2017) discusses digital transformation and its definition, specifically related to digital transformation of business models, but also in general. By doing a literature review they present another definition of digital transformation. According to Schallmo et al. (2017, p. 4), digital transformation is applying new technologies which requires new skills especially related to data, data analysis and turning data into information. This information is then to be used for decision-making and initiation of activities, to improve performance and reach of a company. To succeed, digital transformation involves both business models, processes, relationships, companies, and so on. Another definition based on a literature review made by Vial (2019, p. 121-122), is that digital transformation is a process with the goal of improving, by triggering change through different types of technologies. By using digital technologies, organizations can change the way they create value to remain competitive, but they have to make sure that structural changes are implemented and that challenges related to the transformation are overcome.

Based on the discussion on digitalization and the different aspects, stages, and outcomes of it, we conclude this section with defining digitalization as a process starting with digitization, followed by digitalization, and then digital transformation (Verhof et al., 2021, p. 892). Further, digitalization is a form of transformation in the organization that affects how work is done (Gradillas & Thomas, 2023, p. 17; Verhof et al., 2021, p. 892), while digital transformation takes it a step further, affecting the whole process, business model, and value creation path of companies (Verhof et al., 2021, p. 892; Schallmo et al., 2017, p. 4; Vial, 2019, p. 121-122). We aim to study the two later parts of the digitalization process, more specifically from digitalization and forward. The reason being that these phases are said to lead to bigger changes, affecting both structures, ways of working, business models, etc. Next, we will further explain how these digital and disruptive technologies, and the digitalization in general, potentially could affect organizations.

2.2.1 The Development of Digital Technologies and its Effects

Vial (2019, p. 137-138) states that organizations in today's society are working in a complex environment due to the development and implementation of digital technologies. The author presents a framework based on present knowledge about digital transformation, showing that digital technologies play a big role in disruption of society and industries (Vial, 2019, p. 122). These technologies which disrupt the status quo leads to strategic responses from organizations which create efforts of transformation in their value creation to remain competitive. This then requires structural changes, and challenges hindering the transformation need to be overcome. Applying the digital business strategy, or digital transformation strategy relies on digital technologies like platforms and ecosystems, Internet of Things, analytics, and so on. These then enable changes in value propositions, value network, digital channels, etc. Positive impacts from this are related to performance, efficiency, and full industry and society improvements, but the negative impacts mentioned are related to privacy and security. Moreover, this transformation requires structural changes related to, for example, leadership, roles and skills needed, and organizational structure and culture, and the barriers to overcome are, for example, resistance and inertia.

Big changes in industries that stem from development of technology and disruptive technologies are sometimes referred to as revolutions (Schiele et al., 2022, p. 158). The first industrial revolution replaced craft production with water and steam power. The second one was dependent on the electrical motor, and the third industrial revolution was driven by digitalization and robotization. The new and ongoing revolution, also called industry 4.0, I4.0, or the fourth industrial revolution, is characterized by merging the physical and the digital worlds (Schiele et al., 2022, p. 159-164). Disruptive innovations and technologies like these have helped humans throughout history to extend both influence and power (Majumdar et al., 2018, p. 1247 - 1248). The fourth industrial revolution is built on the third one, and they are powered by the internet and digitalization. The disruptive technologies that characterize the new revolution powered by the digitalization and the blurring lines of the physical and digital are for example Artificial Intelligence, Internet of Things, Cloud, Analytics and Big Data, and Robotics, among others (Majumdar et al., 2018, p. 1248). Schiele et al. (2022, p. 159-164) present five different technologies which are believed to shape this revolution. These are AI, cyber-physical systems, blockchain technology, digital twins, and three-dimensional printing. They state that the revolution does not come from technology alone but from when business models are altered towards benefiting from these technologies. When business models are changed and upcoming technologies are implemented in them, it changes society. Also, Schiele et al. (2022, p. 159-164) states that the digitalization of workplaces affects people. New skills are needed, especially boundary-crossing ones, and more self-management is needed. Majumdar et al. (2018, p. 1248) also mentions both the social, economic, and political world being disrupted by these new technologies. It is said to have an effect on the working population, and that there will be a need for upskilling (Majumdar et al., 2018, p. 1252).

To summarize, new disruptive technologies are said to have an effect on both society, organizations, and humans (Vial, 2019, p. 121-122; Schiele et al., 2022, p. 159-164; Majumdar et al., 2018, p. 1252). The emerging ones coming from the third and fourth industrial revolutions put pressure not only to adapt to stay competitive, but it also creates new types of needs on ways of handling them. Since we want to study perceived challenges with digitalization of project management, and how these challenges are handled, we argue that it is relevant to include a paragraph consisting of what has been found to be challenging with digitalization and with adapting to new types of technologies, as well as how it can be handled. Therefore, this will be elaborated in the upcoming paragraph.

2.2.2 Challenges with Digitalization and Ways to Handle Them

With digitalization comes challenges for organizations and managers. Majumdar et al. (2018, p. 1253-1254) mentions cyber-security, and which role humans will play in this digitalized future. They also mention that even the most developed countries are vulnerable to threats of, for example, hacking of viruses. Baier et al. (2022, p. 337) highlights that there is a lack of knowledge on how companies actually can implement digital transformation successfully in process digitalization projects. Due to this they present success factors for process digitalization projects across seven categories: strategy, structure, culture, people, process, project, and technology (Baier et al., 2022, p. 335-336). For example, when it comes to strategy, there should be clear goals and the strategy should be integrated and aligned with the organization's business (Baier et al., 2022, p. 335). When it comes to culture, it's more about how the attitude is towards innovation and risks, if the organization has, and is willing to sacrifice resources, if the management is willing to cope with new conditions, and so on. Furthermore, when it comes to process digitalization projects, success factors such as customer integration, employee support, internal communication, project preparation and monitoring, top management support, and more are considered as important (Baier et al., 2022, p. 336).

According to Korherr et al. (2022, p. 8), one of the biggest challenges related to digital transformation for companies is the one towards incorporating analytics. This transformation requires a shift in management, and both employees and the organization need to be led through this change. It is therefore important to correctly manage the digital transformation towards the adaptation of analytics and usage of big data in decision-making processes (Korherr et al., 2022, p. 5-7). The authors present different managerial skills and archetypes that are important for this digital transformation to be successful. Four archetypes are seen as extra important. One technical, one with a coaching focus on employees and human resources, one with expertise related to the company, leading, and the market who can act as a guide, and lastly one with a visionary and strategic mindset. These archetypes offer an insight into managerial behavior that is needed to avoid challenges that are common related to digital transformation towards analytic-based processes. Furthermore, to handle challenges regarding the transformation of digitalization, Bencsik et al. (2022, p. 1) highlights the need of making sure that the employees have trust for it, since trust has been shown to play a big role in the transformation. Furthermore, factors that have a great influence on this trust in technology are shown to primarily be dependent on the role of management and how supportive the manager is. Being a supportive manager involves communicating the importance of adopting new technology to the employees and being open to receiving opinions and ideas from the employees (Bencsik et al., 2022, p. 14). It is also about providing employees with the opportunity to gain necessary competences through training.

To conclude, in this paragraph there are both challenges described related to digitalization, as well as normative research on what should be done to overcome these challenges (Baier et al., 2022, p. 335-336; Korherr et al., 2022, p. 5-7; Bencsik et al., 2022, p. 1). Digitalization leads to change in multiple aspects. As mentioned in previous parts, these new tools, and technologies changes both societies, the way people work, and organizations (Gradillas & Thomas, 2023, p. 17; Verhof et al., 2021, p. 892; Vial, 2019, p. 122; Schiele et al., 2022, p. 159-164; Baier et al., 2022, p. 337). This change also needs to be managed. Just as for the section about project management, these are described to give context relating to what previous research states and what theory says could or should be done. This will then also play a part in the analysis of this study, to evaluate and analyze the empirical data of this study. We see it as necessary to include some normative theories and research to provide an

understanding of the field and showcase the previous research to be able to argue for the gap we aim to study, and to be able to position our study compared to the existing ones.

2.3 Digitalization of Project Management

Now we will present the two parallel fields presented above in combination. As we have already mentioned, digitalization impacts both project management in itself, as well as how projects are managed (Marnewick & Marnewick, 2022, p. 9). Digitalization is described as being driven by trends in technology. In project management, technologies are used as tools, impacting the project management process to some extent. According to Wu (2022, p. 324) the digital part of project management can entail different aspects. It can be the adoption of digital technologies in project activities such as communication, problem-solving, and collaboration. It can also be working digitally, virtually, or remotely. But the digitalization of project management is often more than just introducing digital tools, it shifts organizational strategies and cultures towards a fully digital work process. Yang (2024, p. 7) mentions project management activities and objectives in enterprises, and states that digitalization of these makes it more effective, optimizes and innovates the process, helps in seizing opportunities, as well as makes the enterprise more competitive. The areas mentioned related to project management are cost and quality management, human resource management, risk management, time management, and scope management. Varzaru (2022, p. 12) also mentions that digital technologies can improve project management. According to project team members, some activities in the project management process that could benefit the most from digitalization are risk management, activities related to calendar programming, and analyzing the financial accounting of the project. When relating this to previous discussions of the digitalization process, the digitalization of project management described by these authors can be seen as being in the digitalization phase or further, as it affects ways of working and structures in a more extensive way than just transforming analog to digital (see paragraph 2.2).

Digital transformation is stated as a crucial factor affecting project management (Kozarkiewicz, 2020, p. 246-247). It affects both social and economic contexts, as well as processes and methods in project management. Changes toward digital project management were shown to lead to both positive and negative outcomes. Kozarkiewicz, (2020, p. 247) presents a model based on the qualitative empirical research conducted in the article, showing the process, change, and impact of digital transformation on project management based on perceptions of project managers. This is focused on the effect of digitalization in the form of e.g. new technologies and new ways of working in project management. The disruption is for example, new technologies, competitive landscape, and data and analytics. This leads to implementation of new technologies, new structures, process automation etc. which in project management can be for example online communication, agile methods, IT tools, optimization of project processes, and so on. It then says to lead to positive effects like creativity, the possibility to be quick at responding, and overall effectiveness. The negatives impact related to it are risks related to loss of data, hacking, a lot of information to handle and information overload, increased costs, and the need for new competence (Kozarkiewicz, 2020, p. 245).

Liu et al. (2024, p. 9) argue that digital transformation in project management is affected by how the organization identifies and value skills of new talents. The authors argue that organizational talent support and how they precise requirements of digital skills in the organization, will significantly affect the development of personal digital skills. Instead of attracting new talent to the organization, it is recommended to develop and train existing talents since this would enhance the performance of these individuals in project management in a bigger way. This is due to the fact that it has been shown that digital management

function correlates more with personal project competence than with personal digital competence (Liu et al., 2024, p. 10). Therefore, in order to leverage the full potential of these people, there is a need for robust organizational support and development programs (Liu et al., 2024, p. 11).

Furthermore, digital tools enabled working virtually, digitally, or remotely, and to work from different places, digital tools for managing work need to be adopted (Wu, 2022, p. 324; 329-330). Due to this, virtual teams and digital project management interrelates. The author highlights challenges with working remotely, digitally, or virtually at project level. The mentioned ones are virtual collaboration, managing project performance and tasks, communicating clear goals, hindered of productivity due to differences in time zones, challenges related to culture and language, and developing and maintaining trust. Wu (2022, p. 325-326) also mentions that the requirements of the project manager in digital project management differ compared to project managers in traditional projects. Not necessarily in what function they have, but in how to act as a change agent and how to approach project manager tasks. Digital project management results in new ways of working, it requires new types of leaderships styles, the project manager needs to advocate the digital change and tools, and they need to change the culture of the organization. Moreover, digital project management can be used in all different projects and project management approaches, but according to Wu (2022, p. 327), it tends to work better on flexible and agile methods, and projects with digital deliverables, due to the nature of digital project management.

Digitalization of project management can include different aspects (Wu, 2022, p. 324). It can for example entail using different digital technologies in project management prosses and activates, or working remotely, digitally, or virtually. Digitalization of project management comes with benefits, such as efficiency (Yang, 2024, p. 7). But there are some stated risks and challenges with it, related to for example information overload, handling of data, virtual collaboration, etc. (Kozarkiewicz, 2020, p. 245; Wu, 2022, p. 329-330). Some actions to handle these challenges are presents, such as the need for the project manager advocate the digital change and tools, change in culture of the organization, and development of digital skill of existing employees (Wu, 2022, p. 325-326; Liu et al., 2024, p. 9). But as mentioned earlier in the thesis, digitalization of project management is a new research field where there is a need for more research, insights, and knowledge (Narayanan et al., 2022; Marnewick & Marnewick, 2022, p. 9; Kozarkiewicz, 2020, p. 246; Varzaru, 2022, p. 12). Due to this there are not a lot of existing theories within this field, especially related to project managers' perceptions of challenges and actions to handle them. Here we have presented the main ones that we see as important to give an understanding of the field, the subject, and what it could entail. Moreover, there are some normative descriptions and empirical studies included. Again, as for the other fields, we see that it is important to include some normative and empirical theories as they give an understanding, as well as to be transparent about what research there is within the field to be able to position this study.

2.4 Summary & Applicability of the Theoretical Frame of Reference

Digitalization of project management consists of three main fields which have been introduced in the introduction and further explained in the theoretical framework. The fields, project management and digitalization are what influences the new field of interest in this thesis. Therefore, we have, with the help of the theoretical frame of reference, created a deeper understanding of these two separate fields, to then be able to explain how they are combined when describing the field of digitalization of project management. The theoretical frame of reference provides a deeper understanding and knowledge of project management and its different approaches and methods that could be used, together with potential challenges related to these. Furthermore, it includes the digitalization process, how it has

developed over time and how it affects both society, organizations, and humans. Topics such as challenges with digitalization, and ways to handle these are also described. Lastly, a paragraph describing the field of digitalization of project management is presented. This is to show what the area entails, as well as possible challenges and ways to handle them. It is also to describe what research there is within the field right now. This theoretical framework is primarily to provide context and understanding of the fields related to this study. Although, some aspects are also included in other parts of the thesis. Project management methods have been included when collecting data and analyzing it as they are, as stated, believed to possibly affect how project managers perceive challenges and actions to handle them. Moreover, the digitalization process lays a basis for how digitalization is defined throughout this study, affecting for example which respondents to include in the study. Some theories are also connected to the results of this study, showing similarities and differences between existing theories and this thesis results. This is both to support found results, and to show what new insight has been provided related to existing ones.

Another thing we find worth mentioning is that multiple theories presented in the theoretical frame of reference, especially in the paragraphs about digitalization and digitalization of project management, are based on empirical and qualitative studies. As stated by critics, which is discussed later in paragraph 4.1, these types of studies are not appropriate to generalize to other contexts (Bryman & Bell, 2017, p. 393). This would mean that some of the results presented above would not necessarily be suitable to apply to, and for describing, for example the Swedish context in this study. However, we still argue that these are suitable to present in this study since the theories presented do not aim to describe the context which we are studying in this thesis, but rather to give both a general and specific understanding of the fields and what research there is. Moreover, multiple literature reviews and quantitative have also been included. This means that the theoretical frame of reference gives both general and specific knowledge regarding the different fields.

3. Methodological Point of Departure

In this chapter we will present the methodological point of departure of this study. First, the choice of subject will be further elaborated upon. After that the inductive and phenomenographic research approach, and underlying assumptions, will be discussed. Furthermore, the research design of this study will be presented. We will also present how the literature review has been conducted, as well as a critical discussion of included sources.

3.1 Choice of Subject

As the two of us are currently studying for our master's in management there is an inherent interest in perceptions and actions related to managing organizations from different aspects. Alongside that, the growing interest in projects and project management in society leads to it being an interesting field to focus on. Moreover, the increased focus and pressure on organizations to conform to digital processes and tools also makes this a relevant and interesting field to include. With the knowledge that digitalization is going to affect all aspects of management, including project management, we wanted to examine what challenges come with the digitalization of project management and how these are handled from the project manager perspective. Especially since it is likely that we will be affected by this in our future. We have some knowledge within the separated fields of project management and digitalization as we have taken courses related to them previously within the master's program. One of us has also worked in a project-oriented organization alongside studies. That both of us have some experiences of project management and digitalization, and that we find project management and digitalization interesting subjects, influenced our decision to study digitalization of project management as a field in this thesis.

3.2 Research Approach

3.2.1 The Inductive Approach

The starting point of this study derived from the areas of project management and digitalization, showcasing a new field of research, digitalization of project management. This laid the basis for the introduction, which then led to the areas being further elaborated on in the theoretical frame of reference. A framework is said to be an important part in all research to show significance and importance of the work, regardless of research approach (Lederman & Lederman, 2015, p. 596-597). The theoretical frame of reference in this study is not intended to be tested, or to steer the rest of the study, since the main field of interest is new and fairly unexplored. Instead, the theoretical framework gives understanding of existing literature on the themes related to the main subject of interest in the thesis. It is then used in the analysis of the empirical material, showing this study's findings in context with existing findings and areas. Due to this, we argue that the research approach for this study is an inductive one.

As we want to study what challenges project managers perceive when it comes to digitalization of project management, and how these challenges are handled, we are interested in people telling us about their perceptions, where their perceptions and what they answer guide the questions. This is so that we can present findings related to the phenomena and situation of challenges and actions. An inductive research approach is defined as the process of studying something with the purpose of telling something about the situation (Kvale & Brinkmann, 2014, p. 238-239). It is further about letting the empirical decide which questions are relevant to search the answers on. This approach is normally used to identify patterns and to formulate potential answers on the reasons for these patterns. Moreover, a theoretical frame of reference has been developed. But as mentioned this is mainly used to give understanding of the context and existing literature on themes such as project management and digitalization.

Another approach where the theoretical framework is used differently is the deductive approach (Collis & Hussey, 2021, p. 7-8). This approach aims to proceed from theory with the goal of testing existing theories in reality. With the help of the existing theories which are presented in the theoretical framework, hypotheses are conducted and later tested by data collecting to find out if they can be confirmed or rejected (Bryman & Bell, 2017, p. 42-43). As stated, a theoretical framework has been developed for this study, but the aim is not to test it. This is because the main field of interest is new and fairly unexplored. A deductive approach is therefore not suitable for this study. Moreover, besides the inductive approach, there is another approach that could be suitable for this study. This approach is called abductive approach. The abductive approach can be used when trying to understand or explain something (Kvale & Brinkmann, 2014, p. 239), which is what we aim to do. If we were to use this approach, we would have started with observation of project managers on the challenges and how these are handled, and conduct a preliminary hypothesis based on this (Saunders et al., 2019, p. 155-156). We would then build up our theoretical framework and thereafter test our preliminary hypothesis. If it ends up being rejected, we would have reformulated our hypotheses and then test it once again. In other words, it would be a more iterative process, where we as researchers would move back and forth between induction and deduction multiple times during our research (Saunders et al., 2019, p. 155). Due to our limited timeframe, we chose to not use the abductive approach in this study.

3.2.2 The Phenomenographic Approach

Further, this study also takes a phenomenographic approach. This is because we aim to study variations in perceptions of our stated phenomena. The phenomena are challenges related to digitalization of project management, and actions to handle challenges related to digitalization of project management. Larsson & Holmström (2007) explains the phenomenographic approach and compares it to the phenomenological one. They conclude that both of these approaches aim to study a phenomenon based on people's understanding, but from different aspects (Larsson & Holmström, 2007, p. 62).

From a phenomenographic approach the researcher's purpose is to study how a group of people understand or perceive a phenomenon, whereas from a phenomenological approach the aim is to explain the phenomenon in itself and the essence of it (Larsson & Holmström, 2007 p. 62). They use an example from a study on anesthesiologists and their work, explaining that the phenomenographic analysis leads to insights into how different aspects of their work is understood by anesthesiologists, and the phenomenological approach shows how the anesthesiologists describes what it is like being an anesthesiologist, and what the phenomenon entails (Larsson & Holmström, 2007 p. 61). Cousin (2009, p. 183-185) states that the purpose of phenomenography is to gather information from a sample of a group regarding their different understandings of a phenomena. In this study, this is a group of project managers. An underpinning thought in this approach is that we as humans construct what we perceive about a phenomenon based on personal and social impacts (Cousin, 2009, p. 183-185). It is about different ways of understanding, which is a result of a person thinking intentionally, interacting with the phenomena, and striving to create meaning (Larsson & Holmström, 2007, p. 56). Only a limited number of understandings will remain in the meaning-creating process, although the phenomenon theoretically can be perceived in an unlimited number of ways. Further, the goal in this type of research is not to present a generalized answer, but to show different people's perceptions so that learning can be supported, and responses can be formulated (Cousin, 2009, p. 183-185). If we instead would have wanted to study the phenomenon of challenges with digitalization of project management, and the essence of this phenomenon as it is, the phenomenological approach would have been more appropriate, as this approach focuses more on describing what the

phenomenon is (Larsson & Holmström, 2007 p. 59). The phenomenological approach also focuses on similarities, since the essence of a phenomenon is thought of as what unites the perceptions of the phenomenon (Starrin & Svensson, 1994, p. 116). In our study that would have for example entailed that we would have focused on exploring what the challenges and actions are and what they entail for project managers to present the conjoined essence of this phenomenon, which is not the case. Instead, the phenomenographic approach aligns with the nature of the research and purpose in this study.

There are some critical aspects related to phenomenography (Starrin & Svensson, 1994, p. 131-132). One important aspect is that the presented perceptions of respondents need to reflect the actual content in the interview, and therefore it is important to explain both the process of the analysis, and how the researchers view the analysis. We have made sure to, as transparently as possible regarding ethical considerations, present perceptions that reflect the respondents' answers, as well as have described our relation to the analysis and how we as researchers affect it. These aspects will be further elaborated on in later chapters of this study, as well as in chapter 9.

3.3 Philosophical Assumptions

3.3.1 Ontology

As one underpinning thought in the phenomenographic approach, which is underpinning this study, is that people construct their own meanings of something based on social and personal impacts (Cousin, 2009, p. 184), we see reality as socially constructed. Hence, our ontological assumption is more towards interpretivist assumptions than positivistic assumptions. Ontology is about how the researcher/s view reality (Collis & Hussey, 2021, p. 43). It can be viewed from an objective perspective with a so-called positivistic assumption, or it can be viewed from a more subjective perspective, which is referred to as interpretivism (Collis & Hussey, 2021, p. 42). The assumption of interpretivism believes that reality is subjective since it is socially constructed (Collis & Hussey, 2021, p. 43). In this study we are interested in project managers' individual perceptions on challenges they face with digitalization of project management. We also want to know how they perceive to handle these challenges. We do not see reality as objective as we believe that challenges with digitalization of project management are socially constructed and maintained. In the phenomenographic approach, people have different ways of seeing and understanding the world depending on what they have learned (Dahlgren & Johansson, 2019, p. 179). This learning is something that is happening all through our lives and our view will therefore change from time to time. We see that without human perceptions and interactions these challenges and actions to handle them would not exist. Further, a challenge for one individual might not be a challenge for another. Due to them most likely facing different kinds of challenges based on their perceptions, they might also handle these challenges differently or have different views on how challenges should be handled. They will also all work in different organizations, have different experiences from work, life, and so forth. We believe that all of these factors will affect how the notion of challenges is perceived as people have learned differently. Therefore, we do not believe that everyone has the same objective view on challenges and actions to handle them, as people's perceptions, feelings and actions will differ depending on subjective factors. Hence, the phenomena are more socially constructed.

3.3.2 Epistemology

Further, the phenomenographic approach sees valid knowledge as something that can be gained through speech and actions (Larsson & Holmström, 2007, p. 56). The results are then based on the researchers' reflections regarding the different ways of understanding the phenomena. Epistemology is about the researchers' assumptions on what they view as valid

knowledge (Collis & Hussey, 2021, p. 43). In other words, it's the relationship between our findings as researchers and existing science. The philosophical assumption of positivism and interpretivism exist in epistemology as well, where positivism is, as mentioned previously, a more objective kind of view, while interpretivism is based on more subjective views (Collis & Hussey, 2021, p. 42). To be able to gain relevant and deep insights into perceptions and thoughts in this study we see it as more useful to interact with the respondents. Since we as researchers will participate when gathering this information through speech, the valid knowledge we present is thus built on how we understand and interpret the project managers' answers. Moreover, the knowledge we gain from them is also built on perceptions and interpretations of challenges and actions. Since our respondents, from their subjective view, describe their perceptions of challenges and how they manage these challenges, we will view valid knowledge from subjective evidence. The result in this study will, in other words, be based on our understanding and interpretation that we have gathered by listening to project managers' subjective thoughts and behaviors. Hence, the view on knowledge in this study can be connected to the epistemological assumption of interpretivism (Collis & Hussey, 2021, p. 42-43).

3.4 Research Design

This research aims to better understand the challenges related to digitalization of project management, as well as to see how these are, or can, be handled practically. This is done by understanding project managers perceptions, thoughts, and actions. Hence, we want to study "how", to be able to understand the phenomenon of perceived challenges and actions related to digitalization of project management. Moreover, due to the field being new, there are few studies on the subject, and none have been identified that present what this study aims to research. The nature of this study is therefore exploratory, in the sense that we aim to explore a field that is fairly new to provide an understanding of it and its challenges from the project manager's perspective. The purpose of this study goes in line with how Collis & Hussey (2021, p. 5) describes exploratory studies, as these studies aim to gather insights into a fairly unexplored phenomenon, and that ideas are developed instead of tested. It also goes in line with how Saunders et al. (2019, p. 186-187) presents explorative studies, as they want to know "how" or "why" and are useful if the purpose is to further understand a problem, phenomenon, or an issue.

Other than research being designed to explore, they can also be explanatory, descriptive, and evaluative (Saunders et al., 2019, p. 186). The other options are not as appropriate related to this thesis. Explanatory studies aim to explain relationships between variables, usually to explain why something is happening (Saunders et al., 2019, p. 188), which does not align with the nature of this thesis research. Evaluative studies aim to study, for example, the effectiveness of something, and how well something works (Saunders et al., 2019, p. 188), which is also not in line with what this study aims to do. Descriptive research design also aims to create understanding through descriptions to get an accurate profile of situations (Saunders et al., 2019, p. 187). Here, it is important to have a clear understanding of the phenomena that data is collected about through prior data collection, to then be able to describe the phenomena. This type of research design is the one that we see as being the second most appropriate, except for the exploratory design. This is because it can also be seen as useful to understand a phenomenon by describing it. It can also be argued that we aim to describe the challenges that our respondents describe to us. But, as the field of digitalization of project management is fairly new, and challenges have not been researched from the perspective of project managers perceptions before, we think that the nature of the research is more explorative than descriptive. Moreover, Collis & Hussey (2021, p. 5) states that descriptive research goes beyond exploratory research by aiming to provide arguments based on empirical evidence. We do not aim to provide a basis for arguments and conclusive

answers to the phenomenon, but instead just to present results which give an understanding and ideas for future research. Therefore, the aim does not fully align with the descriptive research design.

3.5 Literature Review

In order to gain understanding of the relevant fields of this study, the subjects of project management, digitalization, and digitalization of project management have been analyzed. This was done in order to be able to decide the research questions, as well as to decide which theories and factors that could be seen as relevant to present and discuss for this study. We have mostly used peer reviewed articles since this is said to be important when writing an academic paper according to Saunders et al. (2019, s. 94). To find literature, we have used different kinds of databases, such as Google Scholars, Umeå University library's website, Emerald Journals and EBSCO. Our introduction also includes information gathered from websites and reports such as PMI, Forbes, DIGG, McKinsey & Company, KPMG, and more. These have been used since they consist of empirical information related to the research field and presented problems today, that peer reviewed articles do not include. These sources have given us a solid background to our chosen research topic and have been used as a basis for our argumentation on our research gap. We have also used methodological and non-fictional literature in this study. These types of literature have together been helpful when it comes to gathering both broad and specific information about fields like project management, for methodological discussions, and so on. Some of these chapters that include information gathered from non-fiction literature have, as far as possible, also been supported with peer reviewed articles and methodological literature, since we believe this makes the information more specific. We will discuss the relevance of these sources more in paragraph 3.6.

Furthermore, to find literature, several keywords have been used. We have chosen to use both keywords in English and in Swedish. We experienced this to be necessary in order to find all the information we believed was needed. For example, information on what project management and digitalization looked like in Sweden was difficult to find when only using English keywords, and Swedish keywords where therefore used. However, keywords in English have been primary since there is more information and literature on the relevant fields in English, and therefore we think that it resulted in more relevant results. Searching the fields of project management and digitalization resulted in a lot of information, as these fields are more researched than digitalization of project management. This led to us having to sort out what aspects of these fields were relevant to include in our thesis. Since our theoretical frame of reference primarily aims to provide understanding, we decided to focus on including basic aspects of the fields which we saw were related to our thesis. For example, definitions, characteristics, what the field entails, challenges, and actions. We did this by using firsthand sources as far as possible. Keywords used for the literature review in this study, which resulted in sources used for construction this thesis, are presented in the table below.

Table 1. Keywords for Literature Review

Research Field	**Keywords: English**	**Keywords: Swedish**
Project management	- Project management - Project managers - The future of project management - What is agile project management - Challenges agile projects - Agile methods scrum - Traditional projects - Waterfall method - Hybrid project management	- Projektarbete i Sverige - Vad är projektarbete - Projektledning

Digitalization	- Digitalization benefits - Digital transformation - Challenges with digital transformation - The fourth revolution - Disruptive technologies	- Digitalisering Sverige - Digitalisering
Digitalization of project management	- Digitalization of project management - Digital transformation of project management - Digitalization projects - Digital tools in project management - AI in project management	- Digitalisering av projektledning - Digitaliserad projektledning

3.6 Criticism of Sources

The chosen sources discussed in our literature review have been related to the four criteria of reference criticism. These four are authenticity, time, dependency, and tendency (Thurén & Stratchal, 2011, p. 13-18).

We have carefully examined our chosen sources in order to make sure that the stated information is trustworthy and thereby reduce the risk of not fulfilling the authenticity criterion, which focuses on making sure that the gathered information is not falsified or distorted in anyway (Thurén & Stratchal, 2011, p. 13). As mentioned in paragraph 3.5, we have mostly used peer reviewed articles, which strengthens this criterion. We have also tried to include peer reviewed articles in those chapters and paragraphs where we have used non-fiction literature, as mentioned, to strengthen these sections. Although non-fictional sources can indicate reliability, since they are reviewed before they are published, we still believe it is necessary to view them critically. We have therefore only included them when we felt it to be necessary. In chapter 1, we have also used websites to present the fields of project management, digitalization, and digitalization of project management. This is because they included statistics and other relevant information of a more empirical nature that we could not find in peer reviewed articles or non-fiction literature. However, we believe our study fulfils the authenticity criterion due to the fact that peer reviewed literature has been dominating.

Furthermore, we have tried to use as many newly published sources as possible in order to fulfill the time criterion, since the more recent in time a source is published compared to the event, the more trustworthy it becomes (Thurén & Stratchal, 2011, p. 14). However, some of our sources are old. A few sources are for example published in 1994 1995, 1997, 1999, 2001 and 2003. The majority of these are focusing on project management or methodological aspects. As newer sources are referring back to these sources, we argue, in line with the criterion of dependency, that they are reliable since they are the original sources. Furthermore, we have used these sources even if they were published further away in time, to also ensure authenticity. Due to this, even though the time criterion might not be met regarding these sources, we argue that they still are relevant to include. Furthermore, since digitalization and digitalization of project management are newer fields, the sources discussing these topics are published closer in time. The majority of our sources have been published between 2016 and 2024, which increases the chance of them including the most relevant information. The source from 2001 discusses digitalization, but this source is also supported by other sources which are from 2017, 2018 and 2023. Due to all of this, we argue that we meet this criterion.

As mentioned, we have chosen to use the original sources as far as possible, which also indicates that we fulfill the dependency criterion. This is because our information has not undergone several steps and been quoted by several authors before reaching us (Thurén &

Stratchal, 2011, p. 17). In a few cases second-hand referencing has occurred, but it is only when the original source of information is not available. For example, in the introduction we refer to a Langley who has been referred to in a report by PMI. This person is the CEO of PMI according to the report, and the information provided by Langley which we have used is only published in this report. Moreover, this is a personal statement based on experience and perceptions. Hence, we still see it as relevant.

In our study, we have also tried to fulfill the tendency criterion, which relates to the authors not having any economic, political, or personal interest in presenting the information in a misleading way (Thurén & Stratchal, 2011, p. 18). We as authors of this thesis do not have any economic, political, or personal interest when it comes to presenting the information in a misleading way. Although, we cannot guarantee that the authors of the sources used in this thesis fulfill this criterion. This is because it can sometimes be difficult to separate the information from a source and our own perception of the information (Thurén & Stratchal, 2011, p. 19). However, we have tried to be as objective as possible when analyzing information in sources, and compared different sources that discuss the same topics in order to prevent this risk. Furthermore, for each of our chosen fields, we have chosen several different authors to discuss the phenomena. Moreover, we see that the information still is relevant even though there might be a tendency. This is because the information is used for different reasons. One example is Forbes. Forbes can be viewed as having a commercial purpose with their published information. However, we would still argue that this source is relevant to include in the first chapter of this thesis, since it discusses the phenomena of digitalization today. It does not provide any crucial information for this study more than showing the relevance of the field in today's society, nor is it used as a theoretical statement in any way. Conclusively, we have used sources according to what the information is.

4. Practical Method

In this chapter a description of the chosen practical methods for this study is presented. First, we will provide an explanation of the qualitative method, followed by the chosen data collection method which is interviews. We will also present the interview guide and describe how it has been constructed, including a discussion of the use of a pilot interview. Further, the process of finding potential respondents is discussed, as well as ethical considerations for this study. In the end of this chapter the process of conducting the interviews will be explained, and the method of analysis is presented.

4.1 The Qualitative Method

The phenomenographic approach is related to a qualitative method (Cousin, 2009, p. 183), and since that is the approach underpinning of this thesis, a qualitative method has been used. This also goes in line with this studies purpose, which is to gather information based on project managers perceptions of challenges as well as perceived actions regarding challenges with digitalization of project management. We want to gather detailed information regarding these subjects to give insights into how the respondents actually think, feel, and act, with the purpose of exploring present ideas. These are all characteristics of qualitative methods (Bryman & Bell, 2017, p. 395). The qualitative method is said to be a better method for understanding and recognizing the perceptions of respondents (Kozarkiewicz, 2020, p. 240), which is what we aim to do in this particular study. Qualitative studies are based on interpretations and understanding the social world and reality based on how it is perceived (Bryman & Bell, 2017, p. 372). We believe that in order to gather the knowledge needed to answer the research questions in this study, a qualitive method is needed.

Qualitative methods meet criticism on multiple aspects. We see some of these areas of criticisms as worth discussing in this study to justify some choices made. The ones we will discuss are those of lack of generalization, being too subjective, the lack of transparency, and sample size (Bryman & Bell, 2017, p. 393-394; Roald et al., 2021; Boddy, 2016). First, generalization is a common topic in research as it is hard in most cases to investigate all events and happenings of a phenomenon (Roald et al., 2016, p. 69). Instead, generalizations are made based on the identified occurrences, both in qualitative and quantitative studies. Although, it is said that generalizations based on qualitative methods are more convincing. Doing generalizations based on qualitative methods with small samples is more or less impossible according to critics (Bryman & Bell, 2017, p. 393). This is because qualitative methods are more interested in researching a few instances, with the focus of maintaining as many of the aspects of the phenomena as possible. In this case generalization is not the purpose, and we therefore do not claim that generalization is possible, which we see as important to mention. The purpose is instead to provide knowledge and insights based on individuals' perceptions, as well as directions for future research. Since we do not claim to present results that are to be generalized, the criticism towards qualitative research not being fitting for generalization is not applicable for this study. Instead, this knowledge could possibly be used in other contexts as it aims to be used for learning. Hence, the knowledge can be transferred in a sense, but not generalized.

Another aspect of criticism is that qualitative methods are too subjective in what is important (Bryman & Bell, 2017, p. 393). Results are said to build too much on the researcher's subjective notion and experience of what is important, and on the relationship, they build with respondents. This also goes together with the criticism about lack of transparency, as the subjective part makes it hard to follow why some themes and information is presented over others. Moreover, it can also be hard to follow how qualitative researchers draw conclusions, why some people have been chosen as respondents, and so on (Bryman & Bell, 2017, p. 394). This is also mentioned regarding phenomenographic studies, as it is important

that the presented perceptions of respondents need to reflect the actual content in the interview (Starrin & Svensson, 1994, p. 131-132). Our philosophical assumptions recognize subjectivity as valid knowledge, and due to the nature of this study some subjectivity will occur. To make sure that it is still valid, transparency of the process is highly important, and we have throughout the whole thesis shown what grounds our decisions and choices by explaining our reasoning and showing why other options are not chosen.

Lastly, sample size in qualitative research is something being questioned by critics (Boddy, 2016). Both that sample is small and the question of how big of a sample is needed for qualitative findings to be seen as valid, and how sample size is justified, is questioned. This is also a concern related to the phenomenographic approach, as you need to make sure that you include enough respondents to cover a range of understandings, and that they should come from different backgrounds (Cousin, 2009, p. 192). In this study the sample size is seven, and even though it could have bigger to make sure no new perceptions appear, we argue that this sample size is justified for the research purpose, the underpinning approaches, and the timeframe and resources available. Boddy (2016, p 428; 430) states that even single sample and case studies are said to provide indications that are both reliable, valid, informative, and which give direction for future research (Boddy, 2016, p. 428). The only exception to this is when the qualitative study is built on positive approaches. But in the case of this study, as this study is based on in-depth perceptions by respondents to explore a new field and provide insights, knowledge, and ideas for future research, Boddy (2016, p. 430-431) states that the smallest acceptable sample size is one, as it still can provide in-depth insights and be very instructive.

4.2 Interviews

As stated above, we want to gather in-depth information, based on respondents' perceptions, feelings, and thoughts about challenges and actions. Moreover, due to the digitalization of project management field being new we want to be able to ask questions based on respondents' answers and go into themes and subjects which we might not be able to plan and know upfront. Therefore, interviews have been conducted. In-depth interviews are a common way to collect qualitative data (Bailey, 2014, p. 169). The method gives the researchers the opportunity to gain detailed information about a respondent's experiences and lives (Kaiser, 2009, p. 1639), while still being an adaptable method to the researcher's timeframe (Bryman & Bell, 2017, p. 451). It is also a common method to gather data in an exploratory study (Saunders et al., 2019, p. 187), which goes in line with the research design of this study. Further, due to the restriction in time and access to respondents in our close surroundings the interviews have been held through video calls. This has given us the chance to interview respondents all over Sweden. Alternatives to face-to-face interviews like video calls or telephone interviews are said to be both trustworthy and valid options (Saarijärvi & Bratt, 2021, p. 394; 396). We also believe that conducting the interviews by video instead of telephone has made it easier to both be personal and to make sure that questions are understood right, as an advantage with video is that the researcher and respondent can see each other's facial expression. Although, when conducting video interviews some things need to be considered both before and during the interviews. These will be further discussed later in paragraph 4.5.

There are other options and methods to gather qualitative data. One of them is observations (Saunders et al., 2019, p. 378). This is a useful method if the purpose of the study is to see how people interact or what people do. In this case, we argue that observations are not appropriate since we cannot study our respondents' perceptions by observing them. Observation would have been a suitable option for this study if the purpose was to understand what the project managers do in practice to handle the challenges. But due to

the fact that we want to know their perception of challenges and their perception of how these are handled, it is not a relevant method.

Another common data collection method is to use focus groups (Cousin, 2009, p. 51). The focus group method is based on the principle that group interactivity is what provides rich data. If we were to conduct a qualitive study using the focus group method, we would gather a number of project managers at once, and in the group let them discuss their perceived challenges and how these are perceived to be handled. This could be a fitting option for collecting data in this study, mostly due to the limited time frame, since it means that only one interview is conducted instead of several individual ones (Cousin, 1999, p. 53). Furthermore, we believe that this method could lead to valuable insight and knowledge related to research questions, since an interview is conducted where we can ask relevant questions. This would lead to us understanding how the project manager themselves perceive challenges and could help in identifying differences and similarities regarding perceived challenges, and how these are handled, as focus groups are described to be a good way to gather this kind of data (Cousin, 1999, p. 52-53). Further, using focus groups is also a good method to gather common perceptions and experiences. However, this is not the purpose of this study. Instead, we want to see what each unique respondent perceives as challenges and how these challenges are handled. When using the focus group method, there is a risk of the shared knowledge being co-constructed (Cousin, 1999, p. 52). We do not want to risk that our respondents are adapting their expressed perception based on what other project managers are saying. This we believe could be the case when expressing perceived challenges in a group, since it may be a sensitive subject to some individuals. Especially when doing it to others that work in the same role since it might be easier to make comparisons. Due to all of these aspects, we decided to not use focus groups as a data collection method in this study.

4.2.1 Semi-Structured Interviews

Multiple qualitative studies related to the subjects in this thesis are partly based on semi-structured interviews (Thesing et al., 2021, p.749; Melkonian & Picq, 2010, p. 83; Baier et al., 2022, p. 326; Hoda & Murugesan, 2016, p. 247; Cao et al., 2009 p. 335; etc.). According to Cousin (2009, p. 71), semi-structured interviews are the most common type of interview used in qualitative studies. They are also the most common data collection method in phenomenographic studies (Cousin, 2009, p. 192). They allow the researchers to develop more in-depth experiences and perceptions with the respondents (Cousin, 2009, p. 71). Semi-structured interviews are also flexible in nature since it gives the researcher room to adjust the questions based on the interview, while still keeping some structure with the help of an interview guide consisting of set themes and questions (Bryman & Bell, 2017, p. 454; Cousin, 2009, p. 71-72). As mentioned, we want to be able to understand the specific challenges mentioned by the project managers and therefore want to give room for follow-up questions to be able to go deeper into what the respondents think is the most important. The same goes for actions to handle these challenges. But we also want to make sure that we discuss aspects that have been inspired by the theoretical frame of reference, such as project management methods and digitalization phase.

The two other interview options are structured or unstructured interviews (Cousin, 2009, p. 71). Structured interviews are common in quantitative research as surveys for example (Bryman & Bell, 2017, p. 215). A structured interview is not relevant for this study as it does not leave room for us to go deeper into certain questions depending on the situation. The unstructured interview is close to a naturally occurring conversation guided by the researcher (Cousin, 2009, p. 71). This method could have been relevant as it also gives room for follow-up questions and for important topics that occur to be further developed (Bryman & Bell, 2017, p. 453-454). But an unstructured interview is usually done using only a few themes as guides. Due to us not being experienced interviewers we saw a risk in missing

out on important information, and for the interviews to end up handling topics not related to the research questions. We believe that some structure is important to gain the best possible information from the interviews, therefore, the interviews conducted in this study have been semi-structured.

4.2.2 Interview Guide

According to Kallio et al. (2016, p. 2961), an interview guide for semi-structured interviews raises the trustworthiness of the interviews. The authors have developed a framework for the process of developing a semi-structured interview guide, consisting of five interrelated phases, where each phase contributes to the preparation and success of the upcoming phase. The five phases are to identify the prerequisites for using semi-structured interviews are retrieving and using previous knowledge, formulating the preliminary semi-structured interview guide, pilot testing the interview guide, and lastly presenting the complete semi-structured interview guide. These are the phases we have used to construct our interview guide

The first phase aims for evaluating whether a semi-structured interview is appropriate as a data collection method and if so, how (Kallio et al., 2016, p. 2961). This we have argued for in paragraph 4.2.1. The second phase, which is to retrieve and use previous knowledge, aims at gaining a comprehensive and adequate understanding of the subject, which we gained with the help of the conducted literature review and constructing the theoretical framework. Furthermore, Kallio et al. (2016, p. 2961) mentions that when formulating the preliminary guide, which is what the third phase represents, there are multiple things to consider and keep in mind. For example, it is important to make sure to have balance between the main questions and the follow-up questions and make sure that the questions do not harm the respondent in any way. We therefore had this in mind when formulating the preliminary guide. The fourth phase, pilot testing, was also something we conducted to make sure the guide was developed to work in practice. This will be further discussed in paragraph, 4.2.3. Lastly, the fifth phase aims at having a clear, finished, and logical guide to use (Kallio et al., 2016, p. 2962). With the help of these steps, we created a guide which we saw as both logical, clear, and useful. As mentioned in 4.2,1, a semi-structured interview is known for consisting of a few themes. The themes we based our interview guide on are project management, digitalization process, digitalization of project management, challenges, and actions.

Moreover, when conducting a study from a phenomenographic approach the preferred data collection method is open-ended, in-depth interviews (Larsson & Holmström, 2007, p. 56). What is important in the interviews is that the respondents can speak about their perceptions and experiences freely. This has been kept in mind when constructing the questions, as we have only included open-ended questions regarding their perceptions of challenges and actions, with the intention to let them freely explain and only ask follow-up questions to go deeper.

4.2.3. Pilot Interview

An important part of successfully conducting a semi-structured interview is to test the interview guide (Kallio et al., 2016, p. 2961-2962). This is to make sure that relevant questions are asked and that they cover the areas of interest. If it does not, it is a good way to see what questions need to be reformulated to make sure they are relevant for the study. Due to this one pilot interview was conducted with a junior project manager. The reason why we chose a junior project manager for our pilot interview was mostly because of convenience and the timeframe for this study. Since we had to conduct this interview with short notice, we decided to do the interview with a person in our network, who had less work to do than the senior project managers we could contact. We chose to go with this person since we believe that a junior project manager still would be able to answer our

questions based on own experiences better than someone who does not work as a project manager at all. It was also because the purpose of this interview was not to gather empirical information, but to test the interview guide, hence, the quality of the answers was not the focus. With the help of this pilot interview, we could distinguish that even though the main themes of project management, digitalization process, digitalization of project management, challenges, and actions, could be used, some questions had to be revised in the interview guide to make sure relevant questions were asked. For example, the questions regarding digitalization's effect on project management were a bit repetitive, and not really connected to the research question, and we therefore decided to remove some of those before conducting the real interviews. We also learned that we might not be able to follow our interview guide in chronological order fully since the respondent might unintentionally answer an upcoming question in advance, and that we had to adjust follow-up questions depending on the situation. In general, the pilot interview went well. It helped with both developing the interview guide, to give an estimation of time, and helped us as interviewers to feel more comfortable in future interviews. The finished and revised interview guide which was used when conducting the interviews can be seen in appendix 1.

4.3 Sample & Access

Since we are studying how project managers from different organizations perceive and handle challenges when it comes to digitalization of project management, a non-random sampling method was needed. This is because it is important that the individual fulfils the criteria of working as a project manager and works with digitalization of project management in different organizations to be able to answer the questions. Moreover, the respondent needs to work as a project manager right now or have been working as a project manager within the last six months. This is to make sure they are working, or recently have worked, with digitalization of project management that is up to date with the digital tools and technologies. Furthermore, the organization that the respondent works for needs to incorporate project-oriented work in some way. Lastly, the projects that the respondent manages need to work in a way that is equivalent to, or more than, the digitalization phase in the digitalization process (see paragraph 2.2). All of these criteria are to make sure that the respondent can answer questions related to this study's research question. To make sure respondents fulfill these criteria this was asked in the initial stage when reaching out to potential candidates or to our network. Hence, our sample needs to have a direct connection to our research question and a generic, non-random sampling method is therefore appropriate (Bryman & Bell, 2017, p. 405). This type of sample is common to use in qualitative studies, as it can be more or less impossible to utilize a random sampling in these studies. For us it would not be possible due to the fact that we would then not be able to make sure we incorporate a diverse group of respondents exactly related to the research question. It is important in phenomenographic studies to make sure the sample comes from different backgrounds (Cousin, 2009, p. 192). This, as mentioned, also leads to the sampling method being non-random, as we need to make sure that, as best as possible, reach out to project managers not only from different organizations, but also from different cities and industries, as well as different genders and ages, etc.

Due to the fact that we have had limited time to conduct our study, we further chose to use a convenience sampling approach. Convenience sampling approach refers to selecting participants that are easily available (Bryman & Bell, 2017, p. 203). We have better knowledge of existing project-oriented organization in Sweden, and we also have a more extensive network here, leading to it being more convenient to look for respondents in Sweden. To access our potential respondents, we initially used our network and contacted people that we know work in project-oriented organizations, to see if they knew a project manager in their organization that we could contact further. By doing this, we can also argue for using the snowball sampling method. This method refers to using potential participants

who then recruit other suitable participants for the study (Bryman & Bell, 2017, p. 412). However, we believe a snowball sampling method can contain some confidentiality issues since the respondent would not be anonymous to the one that recruited him/her. This could potentially lead to a risk of answers not being fully honest as it might be sensitive to explain your honest opinion, knowing that another person later might be able to connect answers to you. However, we still choose to perceive with this sampling method due to our limited timeframe. Furthermore, we do not consider the subjects which will be discussed in the interviews to be overly sensitive, except maybe some of the perceived challenges. But in order to make every participant more comfortable in being honest with their answers, we let every participant know how we work with anonymity. Besides reaching out to contacts in our personal networks, we searched online for suitable candidates. By looking at LinkedIn, Google, and other different webpages of organizations, we could identify potential candidates that we contacted through e-mail.

To describe the sample in general, the ages of our respondents were mixed. We have also included both men and women in this study, although the majority have been women. Furthermore, we have included project managers from different industries such as construction, IT, sales, and business development. The respondents come from different organizations, different sizes of the organizations, and cities, working with different types of projects, project methods, internal and external project teams, etc. There are some aspects which could have been more diverse. For example, even more industries could have been included, a more balanced sample with different project methods could have been included, and since the majority of the respondents were women, more men could have been included. This could have led to an even more diverse group of project managers, possibly leading to more variations in perceptions, which is important in phenomenographic studies (Cousin, 2009, p. 192). But we argue that even though the backgrounds could have been more diverse, it is still diverse enough to be able to provide relevant insights and knowledge to this study.

4.4 Ethical Considerations

When conducting research there are some ethical considerations to discuss and follow (Bryman & Bell, 2017, p. 141). These ethical considerations are especially important to discuss in qualitative research related to interviews due to the nature of interviews and the power relationship that might be present between interviewers and respondents (Kvale & Brinkman, 2014, s. 113). The main ones that are important to consider from a Swedish perspective regards information, consent, confidentiality and anonymity, the utilization of the information, false pretensions, and that no harm should be done (Bryman & Bell, 2017, p. 141). Moreover, in qualitative research there are some specific ethical considerations regarding how the rich data that is gathered is to be disseminated (Kaiser, 2009, p. 1639). We have grouped these topics together in accordance with Kvale & Brinkman (2014, s. 105), and will now discuss the four ethical considerations of informed consent, confidentiality, do no harm, and the researchers role.

4.4.1 Informed Consent

One ethical consideration is informed consent (Cousin, 2009, p. 22; Saarijärvi & Bratt, 2021, p. 395; Kvale & Brinkman, 2014, s. 107). Informed consent is about ensuring those that are participating in the study that they are aware of the purpose of the study and their role within it (Cousin, 2009, p. 22-23). Some aspects that should be addressed are brief details of the study, contact details, the expected contribution of the participants, their right to withdraw consent and how the researchers work with confidentiality and securing data. Informed consent could be problematic, especially in those cases where the knowledge and/or power between the respondent and the researcher/researchers is uneven (Cousin,

2009, p. 24). We have informed our participants about the purpose of our study and their role within it, as well as how we will handle their personal data, and that they have the right to cancel their participation at any time during the conduction of the study. This has been informed both through email communication, through a consent form that has been sent to every respondent, as well as at the beginning of the interviews. Each participant also had to sign a written consent which should be sent to us before the start of the interview. Alternatively, the respondent had to read through the consent form beforehand and give us an oral consent on video before the actual interview. The information communicated to the respondent handled every factor presented above, like making sure to present the purpose of the study, how we are handling their information, their rights, etc.

4.4.2 Confidentiality

Another aspect that needs to be considered is confidentiality (Saarijärvi & Bratt, 2021, p. 393; Cousin, 2009, p. 21-22; Kaiser, 2009, p. 1639). Confidentiality is about making sure that the respondent's identity is protected and that it is not possible to link the results to the respondent, making the individual anonymous. The questions are therefore about what information is to be shared with who (Kvale & Brinkman, 2014, s. 109). Moreover, Kaiser (2009, p. 1639) discusses another dilemma in qualitative research related to these aspects. In qualitative research, the social world is important, but the authors discuss how accurately that can be conveyed while still making sure that the individual in the perceived social world is protected. Within this aspect we also believe it's important to include the topic of handling data, which is said to have become more important lately due to the larger amount of data being gathered and stored today (Bryman & Bell, 2017, p. 156-157). We argue that we are aware of, and handle, this ethical consideration as well. The first reason for this is that we have carefully considered and reviewed whether our collected data can be identified and linked to the participants or not. In this study, none of our respondents have been mentioned by name, nor have we mentioned which organization they belong to or in which city they live. We have only presented information that is relevant for the research questions in the study, for example what type of project methods they work with and what digital tools they use. We then make sure to convey the respondent's social world as closely as possible, without mentioning very specific details that might be shared. For example, the perceptions of a respondent will be conveyed, as we argue that perceptions alone are not enough to identify a person. But if this person mentions information like city, organizations name, name of project, and so on, this will be altered to a more general term. This is because we do not see that this type of information is necessary for the research question. This will not be enough information for the public to identify the respondents. All other information that is related to the respondent, like name and email-address, is only available to us as researchers and our supervisor, and this data will be stored and handled according to rules of the university.

4.4.3 Do No Harm

The principle of doing no harm is about ensuring that the research intervention does not disadvantage a group or unduly privilege to a group (Cousin, 2009, p. 25). The researchers are also to consider possible consequences for the individual who is participating (Kvale & Brinkman, 2014, s. 110). The ethical principle is that the risk of harming the individual should be as small as possible. In qualitative research this can be an issue due to the closeness between the researcher and the respondents. The openness that usually surrounds interviews for example might lead to respondents sharing things that they later regret, which also might lead to emotions and reactions which the researcher might not know how to handle. Therefore, the researchers need to be cautious about how far the questions go. By making sure that we follow the interview guide as closely as possible we keep the questions related to the research question. Moreover, we are aware of the fact that perceived challenges and actions might be sensitive subjects as they might include other people. For

example, a perceived challenge might be related to a specific project team member which might be sensitive to talk about or might be something that the respondent mentions and then might regret later. Due to us being aware of this risk we monitor for it, and if this occurs, we make sure to steer the interview towards the research questions and invite the respondent to talk about the subject in a more general manner by not for example mentioning names or position. In combination we are also making sure that we are following the confidentiality requirements correctly. By doing this we argue that we are handling this ethical consideration sufficiently.

4.4.4. The Role of the Researcher

In interviews, the researcher's integrity is of great importance since the researchers are the ones through which knowledge is obtained (Kvale & Brinkman, 2014, p. 110). There needs to be research of high quality, meaning that the published knowledge needs to be as representative and correct as possible related to the field of research. This also means that the procedures need to be transparent, although this raises ethical questions. Hence, ethical and scientific interests need to be weighed against each other. Moreover, this is also a question of the researcher's independence and not favoring any side, leading to a reflection of the balance between professional distance, and personal relations and friendships. In our study we have carefully considered these aspects to make sure that it meets both ethical and scientific requirements. We are making sure to be as transparent as possible in our process by explaining all of our procedures and decisions. We also do this without conveying information that is not relevant, like personal information regarding the respondents. This is to make sure that we also consider the above presented ethical considerations. We are also keeping a professional distance from respondents by making sure that, first, we are aware of the risks related to these aspects, but also by both of us attending the interviews and being a part of the whole analysis afterwards. This has made it easier to keep the interviews professional as we could monitor each other.

4.5 Conduction of Interviews

Saarijärvi & Bratt (2021, p. 395) presents a list of considerations that the interviewer should keep in mind before and during video interviews. Before the interviews the respondents have to get information about the interview as well as to give consent. During video interviews, it’s for example important to conduct the interview in a calm environment, to make sure the video quality, sound, and connection is stable, and that the purpose, interviewers, and previously sent information is presented and repeated. We therefore started with presenting ourselves, the purpose of our study and how the interview will go by. Before starting with the questions, we also explained the respondent’s rights when it comes to ethical considerations (see paragraph 4.4), such as their anonymity and how their answers are to be handled, for example. We also made sure to test the connection and recording beforehand and were always conducting the interviews in a quiet room. We conducted all interviews in Swedish as it was every participant’s native language. We did this because we believe that it is easier for the respondents to, more in-dept, describe their perception in their native language, leading to more developed answers.

Moreover, it is also important to be aware of the fact that respondents are to talk about their perceptions and experiences with someone they don’t know (Kvale & Brinkmann, 2014, p. 170). Due to this it is important, as the one interviewing, to listen, show interest in what is being said, be respectful and understanding, be clear about what is being asked, and so on. This we kept in mind during the interviews. We also made sure to let the respondent speak freely as much as possible, in line with the phenomenographic approach (Larsson & Holmström, 2007, p 56). We started with a few introductory questions in order to make us get to know each other and build up and understanding for the respondent's context related to project management and the digitalization of it (see Appendix 1). After that, we started

our in-depth, theme-based questions where every respondent got asked the same initial questions. However, depending on their unique answers, our follow-up questions could differ, which is common when conducting semi-structured interviews (Bryman & Bell, 2017, p. 454; Cousin, 2009, p. 71-72). Although, all the questions aimed at deepening the understanding for the respondents' perceptions relating challenges and actions to handle them.

The interviews held to gather data for this study were held between 23rd of April and 2nd of May. All interviews were held online via Microsoft Teams, where they were recorded. The duration time varied between 35 to 56 minutes. This variation was mostly due to the fact that some people were perceiving more challenges and actions of handling them than others. We have chosen to not specify aspects such as gender, age, etc. of our respondents due to ethical consideration, but a brief description of the sample can be found in paragraph 4.3. When we had conducted seven interviews, we realized that even though we had a fairly diverse group of project managers as respondents, a lot of the aspects related to their perceptions of challenges and how to handle them were quite similar. Due to the timeframe of this thesis, and other aspects related to sample size discussed in paragraph 4.1, we decided not to conduct any more interviews and therefore moved on to the analysis which will be described next.

4.6 Method of Analysis

4.6.1 Transcription

When doing qualitative research, interviews are usually recorded (Bryman & Bell, 2017, p. 465-466). This is since it is important to be able to go back and make sure that interpretations are correct, and the analysis can be done more accurately based on exact words. Due to this, we recorded all of our interviews, with the approval of the respondents. We then transcribed all this audio-collected material into writing with the help of Microsoft Teams. This is also an important part of phenomenographic studies, as all phenomenographic studies are recorded and transcribed word-by-word (Starrin & Svensson, 1994, p. 124). We transcribed one interview at a time, and we did it as soon as possible after each interview was conducted, wish is recommended to do (Bryman & Bell, 2017, p. 466). After the transcription was done, we listened to the audio-collected material once again and compared it to the written text from the transcription tool in order to make sure that everything was correctly transcribed. It was also to make ourselves even more familiar with the data. Although this is a process that creates more work and takes time, we argue that the benefits outweigh the bad. The transcribed material is of great importance in qualitative and phenomenographic research. If we would not have recorded and transcribed but instead would have taken notes during the interviews, there is a risk of us missing important information and statements provided by the respondents (Bryman & Bell, 2017, p. 465).

Moreover, the transcribed material was in Swedish, as the interviews as mentioned were conducted in Swedish. Next, we started the actual analysis, which will be described in the next paragraph. The whole analysis was also conducted using material in Swedish and was discussed in Swedish. It was only when presenting the material in chapter 5 and 6 that the material was translated to English. There are some aspects of this which could be questioned, as the quotes and material are not exactly presented word-by-word and are translated by us. This could for example be related to criticism already mentioned, like being too subjective or lack of transparency (Bryman & Bell, 2017, p. 393), or to the importance of making sure that the presented perceptions of respondents reflect the actual content in the interviews (Starrin & Svensson, 1994, p. 131-132). Although we argue that our level of English is good enough to make sure that we can describe the results in English without distorting the meaning of it. Hence, the underlying meaning of what is being stated would be the same in both Swedish and English. Also, we have as far as possible translated all

quotes word-by-word. The only time we changed the sentence was if the grammar of the Swedish sentence and the English grammar did not correlate.

4.6.2 Phenomenographic Analysis

As mentioned previously, this study aims to gather in-dept information on individuals' perceptions of the phenomena of challenges with digitalization of project management, and how these challenges are handled. We study this with the basis that project managers subjective thoughts and behaviors matter, and that we want to focus on the various perceptions, instead of finding one common way of seeing something. Due to this we have conducted a phenomenographic analysis. This also aligns with the phenomenographic approach in this study. Focusing on various perceptions of a phenomena is a part of the phenomenographic analysis (Larsson & Holmström, 2007 p. 62; Starrin & Svensson, 1994, p. 126, Dahlgren & Johansson, 2019, p.185). Another part in the analysis is to recognize the similarities and differences in each statement. We see that with regards to the purpose of this study, this was the most suitable analysis to conduct.

Another common method for analysis in qualitative studies is thematic analysis (Bryman & Bell, 2017, p 556). Just as for the phenomenographic analysis, it looks for aspects such as similarities and differences, and creates themes based on repetitive motive from the data collection (Ryan & Bernard, 2003, referred to in Bryman & Bell, 2017, p. 557). However, the results of thematic analyses do not focus on variation in perceptions, but more on repetitive motives, metaphors etc. Hence, we believe that it will not highlight unique perceptions, similarities, and differences as we which to present. Instead, it combines what is being said by all respondents into overarching main themes and subthemes (Ryan & Bernard, 2003, referred to in Bryman & Bell, 2017, p. 557). Therefore, we argue that thematic analysis is not the most suitable in this study.

When conducting a phenomenographic analysis there are a number of steps to go through. Starrin & Svensson (1994, p. 125-128) mentions four phases. First, it’s important to get to know the data and create a holistic impression, to then observe similarities and differences in the statements, followed by the creation of categories of description. The last phase is then to study the underlying structures of the categories of description. To be even more specific, Dahlgren & Johansson (2019, p. 184-190) presents seven steps to conduct the phenomenographic analysis. These are the phases and steps which this study's analysis has been based on.

The first step is to get to know the data and make initial notes (Dahlgren & Johansson, 2019, p. 184-190). We did this by reading and listening to the interview's multiple times. We made initial notes if we felt it was needed. Our initial thoughts were mostly related to what type of project management methods they work with, what digital tools they use and how it affects them, as well as if it was something we felt like the person was especially specific about or mentioned a lot. After this the actual analysis starts (Dahlgren & Johansson, 2019, p. 185). Step two is to look for the most significant and meaningful statements in each interview. The authors recommend cutting out these passages or paragraphs. The goal with this step is to give a short but representative description of the interview and the phenomenon (Dahlgren & Johansson, 2019, p. 185). As we did not want to waste any paper by printing out all of the interviews we did this step in a word document. We copied the whole interview and pasted it into a new document to make sure we still had a copy of the exact interview word by word. We then marked all significant sections with different colors depending on if they were challenges or ways of handling these challenges. After that we summarized our initial thoughts from step one, and then removed all text that was not marked or important to understand the context around the perception. We both did this separately at first then we compared our marks and kept all passages and paragraphs which we felt were significant to be able to move on in the analysis. When we only had sections

and paragraphs related to perceptions of the phenomena left in the documents, we printed them to be able group and compare them more easily. Each of us got an individual copy as we are first doing the analysis individually to then go through the process and our separate categories of descriptions together. This is a way to validate the results in a phenomenographic analysis (Dahlgren & Johansson, 2019, p. 188-189).

In step three, we started the comparison. The comparison step is about finding similarities and differences in the different passages and paragraphs (Dahlgren & Johansson, 2019, p. 186). Even though the goal with this approach is to study variations in perceptions, it is still important to look for similarities. The fourth step is grouping the found similarities and differences (Dahlgren & Johansson, 2019, p. 186-187). When conducting the analysis, we noticed that the third and fourth step were very similar in practice, hence, we did both these steps at the same time. So, after we had marked each section and paragraph with the corresponding respondent's numbers, we started to separately compare all of them, grouping them together based on similarities and differences. We said beforehand to separate the perceptions of challenges and actions as we see them as separate phenomena. Other than that, the only rule was that we had to be able to explain to the other person why we felt they were comparable or not, and why they were grouped in the way that they were. Step five is to state the categories (Dahlgren & Johansson, 2019, p. 187). In this step the similarities are in focus, where the aim is to find the core of the similarities in the different categories. In this step it is critical to decide how big of a difference there can be between perceptions for them to still fit in the same category, or if a new category is to be articulated because they are too different. If the similarities outweigh the differences, they are put together in a category. Moreover, step four and five usually have to be done multiple times in order for the categories to appear (Dahlgren & Johansson, 2019, p. 187).

We did step three, four, and five separately at first. When comparing our categories and how we had come to our conclusions, we saw that some thoughts were similar, and some were not. The ones we found to be similar got stated as categories at first, for example challenges related to human factors and organizational actions. This was because when we discussed these, we had included similar paragraphs and passages, describing the perceived challenge and actions in similar ways. We then had to go through step three, four, and five together multiple times to come up with categories which we both felt gave the fairest image of the perceived challenges and actions to handle them. For example, both identified guidance to be a perceived action to handle challenges, but we had different ways of portraying this. One had separated this into communication and instruction, while the other one had to included guidelines. After comparing and discussing these back and forth we decided that we kept guidance as a category of description, as both had identified this to be a perceived action. But the passages and paragraphs were compared again, and then the fitting ones were grouped into support and communication instead.

The sixth step is to name the categories (Dahlgren & Johansson, 2019, p. 187). While naming them we made sure to follow the directions of keeping them short, and really tried to describe the perceptions (Dahlgren & Johansson, 2019, p. 187). The last and seventh step is to examine all passages and paragraphs to see if they could fit anywhere else by comparing them (Dahlgren & Johansson, 2019, p. 187-188). The categories are meant to be exclusive and therefore the passages and paragraphs should not match multiple categories. This step usually results in categories being brought together since they are not exclusive. In our case, since we did this analysis multiple times, first by ourselves then together, we altered the categories multiple times, removing categories like digital meeting, involvement, and so on, as we felt that they could be included in other categories like change ways of working, support, etc.

These steps, which make up the analysis in this study, resulted in us identifying three categories of description related to perceived challenges, and three categories of description related to perceived actions to handle challenges. The once related to challenges were named challenges related to digitalization of project management as: technological, human factors, and leadership complexities. The three categories of description showing the variation in perceived actions to handle challenged related to digitalization of project management were named actions to handle challenges related to digitalization of project management as: organizational, guidance, and adapting. These make up the outcome space of this study. The result of a phenomenographic analysis is referred to as an outcome space (Dahlgren & Johansson, 2019, p. 188). When presenting the outcome space, it is described and supported by shorter and descriptive quotations from the passages and paragraphs. We will present the outcome space in chapter 6. Moreover, the outcome space will also be further analyzed in paragraph 6.3, discussing interrelations between the categories, as well as in chapter 7, by discussing underlying similarities and comparing the results with existing theories and research presented in the theoretical frame of reference.

Moreover, during the analysis we, as mentioned, reviewed each category of description several times. Another reason to why we did that was to see if there could possibly be any connections between certain categories and the project management methods that the respondents were working with. This ties back to the argument that previous experiences affect perceptions (Cousin, 2009, p. 184), and that certain methods might work better with digitalized project management (Wu, 2022, p. 327). We asked initial questions regarding project management approaches and methods in the interviews. These were then marked as initial thoughts which we kept in mind when reading through each paragraph or section again. As we had marked each paragraph or section to be able to separate which respondent it belonged to, we tried to see if any category was made up out of sections and paragraphs which related to respondents who had similar project management approaches and methods. For example, if all paragraphs making up the perception of challenges as technological would have been discussed by project managers who work with traditional project management methods and approaches. When doing this we did not find any category that was exclusively discussed by project managers who worked with similar methods. All categories of description are supported by paragraphs and sections related to project managers working more traditionally, more hybrid, or working more agile.

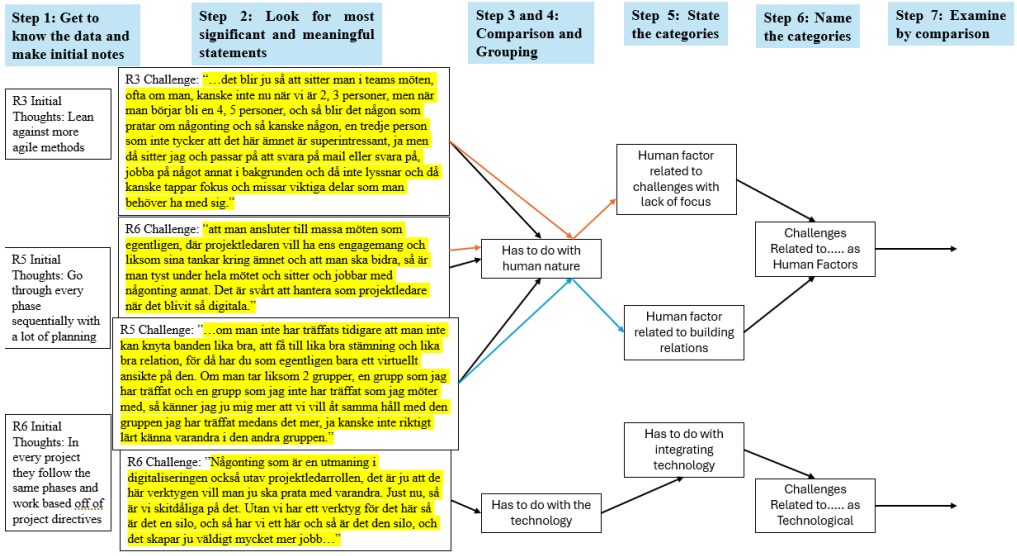


Figure 1. Example of Analysis Process

5. Empirical Data

Here, the empirical data gathered is presented. As the process of analyzing the data starts with handling each interview individually, this chapter will present each interview individually. This is mainly to be as transparent as possible regarding the material which lays ground for the analysis. Although, some aspects which have been asked will not be presented since these don't play a role in the analysis, for example questions relating to how long they have worked as project managers. A summary of each respondent's interview, with focus on their perceptions of the themes project management, digitalization, challenges, and actions to handle them, is therefore presented.

5.1 Respondent 1

Respondent 1 (R1) works with external projects as a consultant. Depending on the customers, the project processes and tools vary. However, in general, the project teams are working with upfront requirements and tasks in sequential order. When it comes to digitalization, R1 mentions that they are moving towards digitalization. In project management R1 mentions that they are working with digital tools such as project platforms, cloud solutions, and CRM-systems. They constantly work in these digital technologies to share information, produce documents, for economic aspects, etc. R1 mentions that the culture and structure has not changed fully due to the digitalization of project management, and that it depends on the context and the customer. However, s/he states that the business model has changed a bit since they need to pay for licenses for these digital tools.

When it comes to challenges, R1 expresses challenges with the digital tools not being anchored to those who actually use them, and that a consequence of this can be that people do not use the tools and instead work in their own ways. This can further lead to consequences if one of the team members is absent since it can be hard to get access to that person's work.

"It is very easy to develop tools that are not anchored with those who are actually going to use them... The result of that is usually that people don't use them, and then you completely miss out on why you even created it from the very beginning, and then people start to come up with their own solutions."

To handle this challenge, R1 expresses the need of involving them in the process of implementing these new digital tools and understanding their work.

R1 further expresses that people are "animals of habit". Therefore, it can be hard to make them change their ways of working. To handle this challenge, R1 expresses that it is important to be prepared that it can take some time in the implementation phase. It is also important to be clear about the benefits, and why they should be using these tools. Moreover, R1 states the importance of the project team deciding, early on in the project, how they are going to work, in order to make sure the way of working is clear to everyone. For example, that it is clear how they will store and share documents. Further, R1 express that this can sometimes be difficult when being a consultant, as their customers might work in different ways. They might not have any power to influence this. Due to this, communication is an important aspect according to R1 in order to make sure everyone is on board on how they are going to work digitally on that specific project.

"But the most important thing, as I see it, is communication. That everyone works equally, knows how to think in that project, above all when working digitally."

Another mentioned challenge related to the digitalization of project management is not having everything in the same place due to different types of digital technologies, which can lead to the consequences of not knowing what has been told, decided, etc. There is also

a challenge with project team members not saving discussions, emails etc., that is of importance, which can cause problems later in the project. To handle this, R1 mentions the importance of communication again, and the need to be overly clear as a project manager early in the project on how the project team is expected to work. It is also important to understand what the customer expects.

" ...you have to be very clear about how you want it...so that you do the right thing from the beginning so that there are no unpleasant surprises that come towards the end."

Furthermore, R1 expresses that although there are challenges with lack of communication, the things that are actually communicated can sometimes be overwhelming due to the increasing number of messages and emails. This can result in it being difficult to know what is actually relevant to you. To handle this, people can use tags in messages, but that might not work in every situation. R1 mentions that if someone changes something, it can be difficult for that individual to know who it will affect, and thereby it can be difficult to know which ones to reach out to. Due to this, the information might need to be shared to everybody instead. Another way to handle this challenge as a project manager according to R1 is to appoint someone as being responsible for keeping track of which changes that affects who. When it comes to written messages and emails, R1 also expresses that there is a challenge of getting everyone to read every message. To handle this, the project manager needs to follow up through, for example a phone call.

Digitalization also enhances the possibility of working from home. This can cause challenges such as it being more difficult to ask quick questions according to R1, who states that it usually is good to sit physically with those you work with. To handle this challenge, R1 believes that it is a great idea to make sure that at least some parts of the working week should be at the office in order to be able to meet those you work with physically. Thanks to digitalization, meetings can also be held digitally which R1 believes makes it easier in a way, but it also results in a lot of inefficient meetings due to it being easier to hold meetings this way.

R1 believes that AI and ML could possibly be implemented and used in the future. For example, s/he believes that AI could be used to help with descriptions of different things due to its excellence of formulating. A mentioned challenge related to this is the aspects of competence. When reviewing this description, R1 state the need of having basic competence and knowing what is important to be included in these AI generated descriptions, how much to include etc., and that this can be viewed differently depending on which consultant you ask.

"...people who review or develop this must have good basic competence. Because we already see that, as if I ask 10 consultants who produce these documents, they all have different views on what it should contain. So, it is very broad what is considered important, where the boundaries are drawn, how much to write in such a description."

R1 also mentions that overall, it is important to be prepared for the change and the importance of keeping up, otherwise you will become inefficient and lose customers.

5.2 Respondent 2

Respondent 2 (R2) states that all of their projects are based on a project model that includes different phases, steps, and requirements. The five phases go in sequential order from initiating to closing, where each phase is approved by a steering group. For digitalization, they work in a project portal, a project hub, Microsoft Teams and its tools, digital forums, etc., and have been adding new things step by step, which R2 also thinks that they will continue to do. Digitalization has changed both the structure and the culture, as a whole new

process regarding project management has been implemented. They are currently working with these new tools and technologies, trying to benefit from all of them.

Although, these changes were made only a few years ago which means that they are currently in the change process, adjusting to working more digitally in project management. This leads R2 in to one of the challenges discussed:

"We have just started this journey, and it is a challenge to stand with one foot in the old ways of working, and one in this change process, and it is a big challenge to store data on multiple places."

R2 also mentions a challenge related to managing the change. That the new project model is digital leads to the process being more visual and clearer than before. This leads to pressure since it is easier to visualize everything that needs to be done in a project.

"It is a challenge to see something like that. Then it is easy to jump to conclusions that this is a lot, God that's heavy. So, I would say that the biggest challenge is not digitalization itself, but rather changing people, and that is a big challenge when there is still a possibility to work in the old ways."

Moreover, s/he talks about one of their biggest challenges, which is to actually get people to use digital tools and technologies. Even though the project manager uses them, the project will not be successful if they are the only ones utilizing the tools. Project management includes multiple stakeholders, and everyone needs to realize their role and take responsibility to use these tools and technologies as decided, which the project manager needs to push for. Otherwise, this can lead to consequences related to communication.

"If you start to take shortcuts and run projects where half of the members are in full agreement how they are working now, and half are not, then it's easy to understand that, communication is the most important part of a project, and if communication is happening on different levels there will be consequences. It can lead to irritation within the team, delays, that certain things are not done accordingly, and so on."

To handle this, R2 says that it is important that each manager, top-down, is involved and pushes for this new way of working. Moreover, as a project manager R2 shows the new ways of working to educate. But the main thing to implement the change and get everyone to work accordingly is for top management to be involved.

"A lot of times top management are included in the projects, as a sponsor, project owner, in the steering group, and then it is even more important that they follow up, push, and challenge project managers to follow the project model, and to not leave rooms for them to take shortcuts. I think that top-down is the only way to manage a change."

This is mentioned multiple times, again at the end of the interview, where R2 states that when adding new tools and technologies you want everyone in the project to be equally involved and use it. It is important to get the whole team to work with the digital solutions and update them. Moreover, it is a challenge to get everyone to see the value, and that s/he works as a helping hand in doing this, as well as being someone to remind members to use the tools and educate throughout the process.

Another challenge mentioned is related to how they are to handle and archive documents and information when a project is closed, as everything is tied to Teams. When working in Teams, only a limited amount of people has access to information which might be helpful

in the future for other projects. Related to this is also the challenge of rights to the information if the owner of the Teams group quits.

"Before we had a project folder on the server which everyone could access no matter their role in the organization, besides from a few people maybe. But in Teams it is very limited to a small number of people."

To handle this, a routine is needed that will lead to an extra task for the project manager. R2 mentions that the organization is currently working on establishing this routine. R2 states that this is just another routine that needs to be done to make sure important and useful information is saved.

Another aspect that R2 mentions is generations. Older people might not be as used to digitalization as younger people are for example. But they work with support functions to everyone who wants it, and R2 thinks that inspiring and telling everyone why this change is done is important.

5.3 Respondent 3

Respondent 3 (R3) states that depending on the project they work on, the project management process and its method can vary. But they lean against an agile project management approach in general, especially in projects related to IT and software. However, longer projects are usually hybrid, and some also follow a more traditional approach. Some project management methods that R3 mentioned that they are using are the SAFE-framework, Kanban-boards, and Scrum. The organization that R3 works for started going more digital a few years ago and s/he expresses that it has affected the culture and structure in the organization. But their business model has always been built on digitalization. Digital tools they are using in project management are for example specific project management tools, Microsoft Teams and SharePoint, digital kanban-boards, and AI. These tools are used more or less in every project.

When it comes to digitalization of project management, R3 expresses challenges such as it being more difficult for the project manager to monitor and control when people are working from different places, which digitalization provides the opportunity for. For example, R3 perceives that people have an easier time with opening up to him/her in person compared to when meeting digitally. This also goes for project team members when expressing risks or challenges in their work. When working digitally, s/he needs to drag the answers out of the project workers, leading to it being harder to know what is going on. To handle this, R3 argues that there is a need to follow up with people individually on another level than before.

"So, it leads to you having to, it's not enough to chat on Teams. Instead, you really have to call them and check, how is it going, how is the situation? You have to act a bit as a parent sometimes."

Another challenge R3 mentions is that when having digital meetings, there is a risk of participants losing focus and instead working on something else. This can result in consequences, such as people missing important information. This risk increases as there are more participants in the meetings, due to less focus. Therefore, R3 tries to minimize the number of participants and makes sure to only include the most relevant people in each meeting. This has also been appreciated according to R3 due to the fact that most people's calendars are filled with meetings, due to it being easier to invite participants when the meetings are held online. However, R3 is still sending out the information to those who have not been participating in order to decrease the risk of them feeling frustrated or excluded.

"But it is important to still get the information out to those who may not be involved in what has been concluded at the meeting. If they don't get the information, then you can sometimes notice that a form of frustration can occur, or that you feel that you don't get involved, that you don't have a clue of what is going on."

As mentioned, digital kanban-boards are included in the project process. R3 expresses that some project workers are really good at using these and updating new versions etc., while others are not. That results in more work for the project manager who needs to remind them and make sure that they are updating the boards. Sometimes R3 also needs to update the board for them. To handle this R3 argues the importance of making them understand the value of the tool and why they have it. R3 further expresses that this is both up to him/her as a project manager, but also to the organization itself since this way of working needs to be a part of the organizational culture.

"You have to explain why you have it. It's a big deal overall, but when there's some form of change, it's about explaining why we're doing something. Not just that yes now we do this, but okay, why? Why should we use this tool? Why should we work this way?"

They also work a lot with Teams, both when it comes to communication but also to share documents and other things related to the projects. R3 explains how they have different teams for different projects and customers. They also have internal teams for their organizations. This results in them being a part of a lot of different teams which leads to challenges such as it being more difficult to know where to upload certain things and where to look for information. To handle this, R3 discusses the need for him/her to make it clear from the beginning what information the project team should share where.

"It is that there will be even more places to keep track of, both for me as project manager and for those who work on the project. They don't always know where to upload things, so you have to be clear from the start."

Other challenges R3 mention are that new digital tools are developed all the time and that it can be difficult to know how they can be used. Currently, they talk a lot about AI and how they can use AI more in their projects since they believe it could be a great tool for the project managers, since it can make a lot of the administration more efficient. But R3 expresses challenges related to this:

"You cannot trust AI too much. AI is not always right. It is important to also read through what material you get and really check that it is correct and reasonable in this situation. So, you can't just use AI."

R3 expresses that some people can find it more challenging towards implementing and learning new digital tools. In those cases, it is important to show support, understand what the actual problem is, provide them with extra training if needed, and adapt.

5.4 Respondent 4

Respondent 4 (R4) says that as the projects and customers differ, the methods differ too. Although, in all projects they work with project plans, resource plans, communication plans, risk matrixes, etc. s/he also mentions sprints, daily meetings, etc. The digital tools and technologies utilized in project management is mostly Microsoft solutions and Teams with all that it entails. They work with folder structures, chats, planner, etc. But this also differs depending on the customer, since they sometimes work on the customer's project platform. R4 also mentions that s/he is starting to include AI in the project management process, and that they have an internal AI solution like Chat GPT in the organization, although just at an exploratory stage.

R4 mentions challenges related to not meeting in person and working from the same place due to digitalization of project management. This then leads to people being more anonymous and that the "coffee talk" disappears.

"The challenge with working digitally is that you don't get the coffee talk, and you don't catch what is said in the corridors. You can't just stop a colleague and ask a quick question."

To handle this R4 make sure to be in the office or at the customer's office to ensure that members do not just see him/her digitally. This is perceived to have helped. R4 mentions that as soon as you start meeting people everything gets easier.

Another challenge is related to prioritizing. R4 mentions that due to the digitalization of project management there is a higher risk of people not giving their input and prioritizing the specific project. Instead, they do not answer the meeting invitations, and they wait for things to pass. Here, she mentions that it is important to talk about this with both project team members and customers.

Moreover, s/he perceives that digitalization of project management leads to an expectation of people working more. At the same time, more time is spent in meetings and there is no in-between time. This leads to it being harder to get focus time.

"There is a challenge in the expectation of doing more work, doing more, creating more value."

To handle this, R4 mentions that utilizing the Teams chat instead of booking meeting or calling will let the other person be able to answer when there is time. S/he also mentions that they are trying to move away from e-mails to chats.

Another challenge related to working digitally in Teams, even though Teams is mostly seen as good, is that there is a risk of material being deleted or that it can be hard to find in the structure. To handle this, R4 mentions open communication between colleagues where they can ask each other for the material or information. Also, tagging material makes it easy to search for, and that is something R4 promotes. In general, it can be hard to know where to look for information or material as there are a lot of documents on the different digital solutions. Also, since everyone has their own Teams group with material that might be useful for others, it can be hard and time consuming to find these documents.

"Templates and experiences and stuff like that can be hard to find, since everyone is on their own separate Teams, which we cannot access, and you don't get invited. So, then it is hard to be able to find templates fast and easy for example."

Today they have a Teams channel where they can ask colleagues for this kind of information, but people usually send this directly to the individual who asked for it. R4 thinks that it would be easier to make sure that all templates and material are uploaded in the channel, and if it is tagged correctly, it will be easy to search for it.

Regarding AI, R4 thinks that it can help in project management in the future but that there are challenges related to it. For example, to find the right AI and being able to utilize it properly. S/he also mentions safety precautions. Due to this they have their internal AI, but as this is not learning to the same extent as Chat GPT, there is a risk that it provides the wrong information.

"Still, I will always have to ensure that what has been done is correct"

Lastly, R4 mentions that there can be a challenge in separating what the different digital tools are meant for and how they are used. An example is that the older generation still

shares information in one system, while the younger colleagues do not. However, R4 sees this as a challenge related to humans instead of digitalization, and that it needs to be handled top-down for the project manager to then be able to pass it along and adjust.

5.5 Respondent 5

Respondent 5 (R5) mentions that every project they work with goes through the same phases, with a lot of planning, moving from one phase to another in sequential order. Throughout the whole project management process, digital tools are used such as tools to build 3D models, question boards, Microsoft Teams and more, and they are currently implementing a new digital system as well. In the future, R5 believes they will start to use AI. Digitalization has changed their organizational structure, culture, and their business model. For example, they now have new roles such as "digital leaders" which they did not have before they started to digitalize their projects.

Starting with Microsoft Teams, R5 expresses that although it is a fantastic application, you are losing the human touch when meetings are held on Teams. It is not possible to read body language in the same way as it is in physical meetings. This can result in it being more difficult to build connections and relations in the group and there is a risk of the group members not going in the same direction.

"If you take like 2 groups, a group that I have met and a group that I have not met, that I meet with, then I feel that we want to go in the same direction more with the group that I have met."

To handle this, R5 states the importance of mixing it up, holding both types of meetings. In the beginning of a project, R5 believes that it is of extra importance to meet physically, since you cannot get to know each other and make connections the same way digitally.

Another challenge that R5 mentions is that it can be difficult to get everybody on board with the development of digitalization. To handle this, R5 can get support from a digital leader, who is assigned to help with making sure that the technology is working the way it is supposed to do. R5 also mentions that s/he works a lot with setting the baseline early in the project and explains what s/he expects of the project workers when it comes to digitalization. If project members still use old working methods during the project instead of new ones, R5 explains that s/he usually handles this by emailing or calling them to talk to them, making sure that they understand how they should work in the projects.

R5 also faces challenges due to the organization continuously implementing new digital systems. This can result in frustration, both among him/herself as well as among the project members. It creates a feeling of having to keep up and learn yet another system or program, even though you just learned the last one.

"Yes, but it's always the case that once you've learned a system, a new system comes along. And it's a bit of that thing, that you don't really get to settle into that system, but they constantly innovate things. In one way that is super good and super nice, the fact that it is making it even easier. But you might feel that I have just learned this, and then suddenly, you are supposed to stick to a new system or program. So, there I can feel some frustration from some project members, me included."

To handle this challenge, R5 expresses the need to be updated at all times and understand what it is that brings value with the new systems, and to focus on the positive aspects to get everybody along. According to R5, the project team also get access to training and education of these systems. For example, on their intranet, they have short video tutorials of how to use the system, and there is always someone regional that gets additional education in the system, which the project team can contact if questions arise.

As mentioned, R5 believes they will start using AI more in their projects in the near future. However, s/he believes that a challenge with this is that some might trust it too much and mentions that AI can make mistakes. To handle this, R5 believes that it will be important to be clear and inform what it can result in. You will also have to weigh the pros and cons of using or not using AI and decide based on what you believe will be the best for the group.

Another thing that R5 perceives as a challenge with their way of working with digitalization of project management is that smaller parties might not be able to work with them due to them not being as digitally developed. This can lead to the company that R5 works for losing customers who do not have the resources and money to work as digitally as they are. Furthermore, if they are working with parties that are not as digitally developed as they are, it can result in the risk of them understanding things differently, since it is not as easy to visualize the work without the help of digital tools. In these situations, R5 argue that they might need to explain everything a little bit more, have more meetings, and follow up more.

"It is likely that they have had to explain a little more, and that we have had more meetings with them, and followed up more, which we might not have done otherwise if we would have had this digital model to work with."

5.6 Respondent 6

Respondent 6 (R6) mentions that every project follows the same phases. They work based off of project directives such as limited budgets, or time, and create a project plan. The phases go in sequential order, moving forward from initiation towards closing, where certain decision-points need to be approved by the steering group. This method works in every type of project. Their project method is available online. Moreover, they work digitally in Microsoft Teams, and they have a digital project tool where they create their timelines, manage risks, track, and predict budgets, etc. The digitalization of project management has affected both the business model and how they work cross-office in projects, and the culture and structure in the organization is therefore also affected. In the future they are planning to incorporate more tools step-by-step depending on the project manager's needs.

R6 describes that they have been digitalized for quite a while but recently changed the way they worked in project management related to digitalization, and new systems and tools were implemented. Earlier, the tools were not optimal to use and therefore people did not use them. This was a challenge which R6 mentions that they learned from when implementing new digital tools and techniques.

"It was important that we did not look at the last tool and said that we want the same functionality, because it was obviously not right, it was not used...With the last tool there was no development for 5 years. It was just implemented, and they said here is a project tool...Now we are saying that this is one version...We want project managers to feel like they are a part of developing the tools..."

Another challenge mentioned is that Covid-19 led them to start working cross-offices more, where there were different ways of working, and also that certain offices wanted to keep their project managers. So, implementing the new digital tools and similar ways of managing projects led to having to change people's behaviors and getting people to work in other ways. To handle this, R6 mentions that s/he gathers small groups to look at the tool and learn from each other, and s/he has also started to do meetings with individuals who maybe did not participate in these gatherings, or that did not say anything while meeting.

"It really is about being at the individual's level to get them to understand that this creates value for me."

R6 perceives that this is helping, but s/he highlights that change-work takes time and that it is important to be humble towards people not being as accepting in the beginning.

Another challenge that R6 mentions is managing to get the same team-feeling in meetings on Teams compared to in person. Due to them working on different types of projects most of the time, there are usually always new people in the projects working together. Due to this it can be hard to create a team-feeling digitally. R6 mentions that s/he usually likes to get straight to the agenda for the meeting, but when digitalizing project management, it has gotten more important to actually take time and do check-ins in the beginning of a meeting, talk about the weekend, and to share why these check-ins are important and included.

"We no longer walk together from one conference room to another where this would be the natural conversation. Now it is from online meeting to online meeting, back-to-back."

Moreover, R6 mentions the challenge with project members not focusing on the meeting. Project managers can no longer see if someone works with something else during the meeting, where the project manager would have wanted the person's commitment. It is explained to be more common now that people sit quietly and work with other things, which is hard to handle as a project manager. To handle this R6 says that it is important to clarify beforehand what is expected, and state in the beginning what the rules are, that we do not work with other things, that everyone is to participate and contribute. R6 states that very clear communication is vital, and the one who is in charge of this work is the project manager.

Another aspect that s/he mentions is the challenges regarding hybrid meetings. It is very easy to feel excluded if multiple people are in the same room and one is online. To handle this R6 has been very clear beforehand both in the agenda, when booking the meeting, and perhaps in chats, to make sure to inform everyone to bring their own computer, do not book a conference room, etc. But this could also be improved by looking into how rooms are structured to create a better environment for hybrid work.

Further, some customers are more open to working digitally than others. This also creates a challenge which is growing with the digitalization of project management. Now, this is mostly related to customers not being comfortable with having a project manager which is not physically there. To handle this, it is important to support the customer and push them to try. R6 also mentions that it is preferred to meet physically at least once in the beginning, or once in the beginning, once in the middle of the project and then in the end to celebrate together.

R6 further mentions the integration between different digital tools and technologies. When digitalizing project management there is a challenge when the different solutions are not integrated, as it creates more work.

"It creates way more work for project managers, to report information here, and then also having to report it here. That is something that is frowned upon, and it leads to people not doing it instead".

This is something that needs to be handled top-down, and project managers just have to make sure to speak up about it.

In the future, R6 mentions that certain solutions are planned to be implemented, but these solutions will lead to new task assignments for project managers as they will have to repost time in a different way. R6 also related this to the role of project managers in general, and that a challenge lies in more digitalization leading to the questions if roles are changing, which is a sensitive question. Here, it is important to include people in the process of digitalization. Contribution to these decisions from affected people is very important.

The last aspect which R6 mentions is that there might be a difference in how comfortable people are to work with digital tools and technologies. People need different types of support and education. R6 handles this by sitting down with these people to show them how to do things and helps them to feel confident.

"As a project manager you are there to lead the project towards the goal. To do that you have to get your project group aboard. This requires a lot from us in the beginning. We have to be clear with them. How do I want you to report time? How do I want you to report to me? How do we show progress on the project?"

5.7 Respondent 7

Respondent 7 (R7) states that they work in many different kinds of projects and adjust the way they work based on for example the customers, when they enter the project, if they are consultants or if they are leading the whole project, etc. Although the general project follows the same basic method, starting with initiation with project specifications, to planning, implementation, monitoring and controlling, and closing. They have worked with digitalization of project management for a while, and right now R7 mentions that they are implementing AI and Chat GPT in the project management process. Moreover, on projects they work almost exclusively with Microsoft Teams and all its tools and solutions like digital whiteboards, planner, etc. If the customer requires it, they work on their project platform. Digitalization has affected the whole organization, and the structure and culture in project management due to a change in how to work in the project team, how to reach out to project members, etc.

When it comes to challenges related to digitalization of project management, R7 first mentions the challenge to get everyone aboard with the digitalization. It is very hard when someone is falling behind and is not at the same place mentally when it comes to digitalization as the rest. This puts new requirements on project managers to lead the change and make sure that they possess the right competence to get everyone aboard, at least to a basic level to be able to utilize what is required. R7 says that it is important to find the right level for these people who are not as digitally developed, which also is a question of generations, and make sure to go in and educate and let it take time.

"It created a fragmentation, the collaboration wasn't as, it got worse. It has also been harder to realize that the collaboration got worse, because you don't realize and notice right away. It was later when realized God, how did you not get this information"

Moreover, as people started to work from home it created hybrid meetings. But the access to digital tools came faster than the possibility for the physical offices to be able to provide enough capacity to use them. This created a big challenge, and it took years to handle. Also, both related to collaboration and availability.

R7 describes that s/he had to change the way s/he worked as a project manager to handle the challenges with getting everyone aboard and collaborating. A part of being a project manager is to solve problems so that was already a part of the role, but it also required more competence.

"You cannot be lazy and just hope that someone else will explore all the digital tools and figure out how to solve this. It was in my interests to reassure that I had the right competence to be able to use everything, as well as to help within the project so that it does not stop."

More specifically for hybrid meetings, R7 describes that the increased amount of hybrid meetings has led to people being less focused. A lot of people were just participating without contributing. This has been handled by making sure to set a clear agenda beforehand, and to make sure that the meeting is actually relevant for the ones participating. The purpose

and which ones are participating has gotten more important to think about. In these meetings R7 also states that it is more important to do check-ins to make sure that everyone gets to say something, say hello to each other, to get to know who's in the meeting and why, etc. All of this is perceived by R7 to be appreciated by project members.

Another challenge that R7 mentions is the one related to change. But R7 describes that this is handled by being a project manager, as it is a part of the role to handle change.

"It is not so much the challenge related to the digital tools that has been present. The challenges are more related to how prepared you are for taking on the digital tools and that it can be hard to know what you are to prepare."

But it is also handled by looking more into the future, and making sure to be updated on what might come, and how it is possible to adapt to that. Now it is more common that new digital things are coming all the time, so it is more a part of the role now compared to before. R7 mentions that s/he is attending lectures regarding digitalization inspiration, and that they have a continuous discussion about what is new and relevant for digitalization for project management.

A current challenge R7 mentions is having enough time to be able to understand everything that comes out today and is implemented in project processes. There is so much coming which will affect project management, and even though they are not utilized by project management, R7 mentions that you need to be aware of it to be able to lead the project and support it.

"If the ones you are managing are using it, then you need to have a basic understanding of it. Right now, there is a lot happening, and if you are a consultant project manager then you never know...Then it might be a completely different digital tool which you at least have to have some basic knowledge about."

This is handled by making sure that you create time for yourself. R7 mentions that it is important to schedule both competence- and reflection time and think about what you might need to develop, to then bring this forward with the organization.

"The only one that can find this knowledge gap is you, and you will only find it if you take time to think about it."

R7, and the organization, utilizes AI and an internal Chat GPT. R7 sees some challenges regarding this, as it is important that it is not utilized in the wrong way, letting AI do the work without controlling and changing it. R7 is using AI in a supporting way, making sure to still control everything.

6. Outcome Space

This chapter consists of the analysis of the previously presented empirical data. In line with the phenomenographic approach and analysis, the outcome space consisting of the identified categories of description will be explained and supported by quotes from the interviews. The summary of this chapter will also present the categories of description in relation to each other.

6.1 Perceived Challenges of Digitalization of Project Management

As mentioned in paragraph 4.6.2, three qualitatively various perceptions of challenges were identified from the gathered data. These categories of description are challenges as technological, challenges as human factors, and challenges as leadership complexities. The differences between the categories lie within how the respondent describe the challenge. They either describe something to be challenging because of technology in itself, because of humans in itself, or because of the fact that this new environment which is created by digitalization leads to challenges for the leadership. Moreover, within each category of description, it is possible to distinguish different perceptions of the characteristic of the category. In the upcoming paragraphs, these categories of description, with underlying sub-categories, will be presented.

6.1.1 Challenges Related to Digitalization of Project Management as Technological

In this first category of description, challenges related to digitalization of project management are perceived as technological. The distinctive feature of this category is that what the project managers describe as challenging is at first hand related to, or stems from, the technology utilized. Here, they describe the challenge with integration of technologies resulting in dissatisfaction and more work. New technology utilized is also perceived to lead to more work related to the need for new routines, tasks, and ways of handling the technology.

<u>Integration</u>

First, R1, R2, R3, R4, R6 and R7 perceive challenges with the different types of technologies not being integrated or integrating them in their work. R1 and R6 mention the challenge of getting the different technologies and tools to actually interact with each other. R3 and R4 mention integrating AI into work processes, and R2 and R4 focus on challenges with integrating every aspect of Microsoft Teams. Furthermore, R7 mentions the challenge of integrating new technologies when it comes to the need for having capacity to utilize the technology. We see these perceptions as a technological challenge as the challenge is explained to be that integrating these stems from the technology itself. When discussing the integration between digital technologies, having multiple tools and technologies that are not integrated is described as negative for both people and the organization, perhaps leading to tools not being used.

"Looking at the digital tool we have, there is a challenge of getting everything integrated" - R1

"A challenge of the digital project management is that you want the digital tools to talk to each other, but currently we are really bad at that." - R6

When discussing integrating the disruptive technology of AI, they discuss the inherent technological challenges related to it such as it not always being right, or that an internal AI does not learn in the same way as for example ChatGPT, leading to challenges with implementing it in existing processes. R4 also relates integrating AI, and digitalization in work processes, to a pressure on creating more value.

"AI is not always right...So, you can't just use AI." - R3

"...we are using an internal Chat GPT... There is an aspect of security in this, but the challenge is that it does not learn." - R4

The aspect of managing to integrate every aspect of Teams is mentioned as a challenge since the technology in itself is designed to only include a limited amount of people. This leads to R2 mentioning the challenges of archiving and making sure valid information is being taken care of for the whole organization to benefit from it, while R4 mentions the aspect of getting access to supporting documents which are only uploaded in certain groups, or the issue with delated documents or presentations which you then can't access.

"The problematic part is when you end a project, how will it be archived?" - R2

Another challenge discussed is having enough capacity to be able to integrate all these new digital tools and technology into work processes. The capacity of the VPN, audio and video equipment are mentioned. The technology that is being integrated creates a need for increased capacity relating to these areas, which can be challenging.

"The access to digital tools developed faster than us having the opportunity to get enough capacity to use them, it has been a really big challenge getting enough capacity on VPN, or to like, get access to servers" - R7

More Unnecessary Work

The second aspect of this is the perception that the different technologies lead to an increased amount of unnecessary work. R1, R2, R3 and R4 perceive that due to digitalization of project management there is an increased number of tools and technologies used. This leads to it being hard to know partly where to look for information, and partly where to upload information. This also includes having to upload information on multiple platforms. This can further lead to consequences of having less time with customers according to R6.

"There are even more places to keep track of. Both for me as a project manager, and for project team members" - R3

"...what is actually being communicated becomes overwhelming. There are so many messages and therefore it's really hard to sort out what is relevant for me." - R1

R4 also experiences an increased time spent in meetings which sometimes can be perceived as unnecessary. This is due to digitalization of project management since it is easier to book and have meetings online. This results in less time for doing actual work and focus time.

To summarize, one category of description is that project managers are perceiving challenges as technological. When describing this perception, we identified the underlying notion to be that due to the technology in itself, consequences arose. It is because of the fact that technology needs to be integrated, and that multiple new tools are being used and need to be handled.

6.1.2 Challenges Related to Digitalization of Project Management as Human Factors

The second category of description is based on the distinctive feature that respondents perceive that human factor are what is actually challenging with digitalization of project management. It stems from the respondents describing the need humans have and our human nature as being what is challenging, compared to the previous category which focused on the technology in itself and what that leads to. Included in this category are four different characteristics of human factors which have been identified based on the respondents' discussed aspects of human factors. These four are resistance, building relations, barriers to collaboration, and lack of focus.

Resistance

To get people to actually start using the new tools and technologies and working in new ways, when they still have a choice to do what they always have done, is a big challenge due to human nature. R1 describes that humans are naturally resistant to change and expresses that it is common that people do not see the value in the tools that are implemented and therefore not using them. The tools need to be better than the ways people are currently doing tasks and work. R1, R2 and R4, experience this challenge of resistance to be more related to the older generation, since they do not have the same understanding and experience of digital technologies. Furthermore, even though the new tools are better, people tend to stick with what is comfortable according to R1 and R2. Moreover, R3 and R5 argue that the constant change that is happening, with new tools and technologies being implemented continuously, leads to people feeling frustrated. R2 also describes that resistance to change and working in new platforms increases. This is due to the digital platform creating a clearer visualization of all work tasks that are included in a project, leading to people becoming discouraged and therefore resisting.

"There is a fear for change" - R1

"It's hard, when you just started to learn this, and now I have to learn something new" - R3

Building Relations

The human aspect is also related to building relationships between colleagues and within the team. R1, R4, R5 and R6 describe that they perceive challenges with creating a team feeling, for people not to feel excluded, and that the relationship between people becomes more anonymous. This comes from the perception that it is easier for people to build relations when meeting in person. As digitalization of project management entails working digitally, the perceptions are based on the fact that the team is not meeting physically in the same way anymore. If people are not physically there, they tend to miss information, do not have time for everyday conversations that builds a more personal relation, and due to this the feeling within the team is not as good.

"To get them to become a team and get to know each other, it is way easier when you meet physically..." - R6

Barriers to Collaboration

Another mentioned challenge is the collaboration between people and the fact that there are some barriers to collaboration which stem from human factors. R7 mentions that since people are not gathered physically in the same way anymore it is harder for humans to collaborate. R5 and R2 discuss that some people and parties are more digitally developed than others, leading to communication and collaboration being affected, as there is a risk for miscommunication creating frustration. Digitalization of project management has also increased working with other countries, which creates a challenge with language according to R6, as well as leading to more work being done across offices, which has created a feeling of us against them.

"We need to learn to cooperate in a completely different way than we have been doing" - R6

Even though there is a difference in why collaboration is challenging, for example due to language barriers or differences in competencies, the underlying notion described is that the challenge is related to the actual collaboration. Hence, it being an identified sub-category. The barriers that hinder collaboration stem from humans' factors such as language,

differences in competencies, and that people naturally work better together when meeting physically.

Lack of Focus

R1, R3, R4, R6 & R7 describe that structures in meetings have changed. With the increased digital meetings which are held due to digitalization of project management, project workers tend to lose focus more. This leads to them not listening, resulting in them missing important information, affecting the project work. R3, R6 and R7 also perceive that it is more common within these digital meetings that project team members are working with something else, instead of contributing with their opinions and thought regarding the topics discussed in the meetings.

"I experience challenges with many inefficient meetings" - R1

"You connect to a lot of meeting, where the project manager wants your effort, thought and inputs about something, but then you are quiet during the whole meeting and work with something else" - R6

To summarize the category of challenges as human factors, it is based on the described perception that these challenges do not lie withing the digitalization itself, but in us as humans and our way of being. This was the identified common notion for this category which we identified. Multiple aspects of human factors were discussed, resulting in the underlying sub-categories, but the perception is that all of this stems from human factors.

6.1.3 Challenges Related to Digitalization of Project Management as Leadership Complexities

In the third category of description, challenges related to digitalization of project management are perceived as being related to leadership. The distinctive feature of this category is that, compared to the previous categories, these do not stem directly from technology or human factors, but instead from the fact that leading and managing in this new environment is challenging and more complex in certain aspects. Included in this category are three underlying aspects of leadership which have been identified as challenging. These are managing change, monitor and control, and developing competence.

Also, we see that some aspects described here can be thought to relate to, for example, human factors. For example, the underlying reason for it being complex to managing change as a leader could be that humans resist change. Although, we identify that the respondents discuss human factors to be one challenge in itself, and leadership being more complex as being another challenge, even though it might be related to human factors. Therefore, these are identified to be separate perceptions even though they might interrelate. A discussion relating to how different categories interrelate to one another will be included in 6.3.

Managing Change

R1, R2, R3, R5, R6, and R7 all mention the aspect of managing the change related to leadership. Leadership got more complex as a challenge was to get people to actually start to use the tools and technologies. To get everyone to actually take the time to learn, to have to show the value in this new way of working and leading by example, and to have to change not only a few people but a lot of people, has led to leadership being more complex than before. This has created challenges as it is a challenge to get everyone aboard according to R2, R5 and R6.

"The challenge as a project manager is to get everyone to take their responsibility and be involved" - R2

"All of a sudden you're also supposed to get people to actually put data there work with it actively" - R6

Managing the change so that everyone actually works in the same way and making sure that people are following new rules and guidelines is discussed by both R1, R2 and R3. It is discussed that some people are great at utilizing these new tools. R2 mentions that some start doing it, to then stop because their closest manager is not pushing for it. R1 describes that when the tools and technologies are used in the way they are supposed to, they are great, but that is not always the case, creating leadership complexities relating to managing this change.

"People don't take the time to fill out things and that is a challenge" - R1

"The tools are not functional, they do not fulfil their purpose, if only the project manager is the one using them" - R2

Knowing how to prepare for the change that comes from the development of digitalization and how to then manage it is discussed by R7. S/he expresses the difficulties of knowing both what kind of capacity the development and changes will require as well as how it will affect social aspects.

Monitor and Control

R3 and R7 perceive that the digitalization of project management has led to it being more difficult to follow up on, and have control over, the project and how everything is going. This is mainly described as being because of the fact that project members are increasingly working from different places. This new structure leads to it being harder to ask quick questions and do follow-ups on how people are doing and how the work is going. R3 describes that a potential consequence of not being able to monitor as easily can result in unaware delays if the project workers are not honest and transparent on how their work is going or how they are feeling.

"It is more difficult to get the quick and easy follow-ups and ask questions, and to see how the person is doing and how it is going" - R3

Developing Competence

Another aspect of this is the competence that people need in order to be able to work in, and handle, digitalization of project management. Here, R3, R5, R6 and R7 discuss that people's competence is related to challenges. There is a need for developing competence related to new technologies in order for digitalization of project management to work. R7 describes that the project manager needs to stay updated to make sure that they can support projects. The constant development of digital tools and technologies creates a knowledge gap where project managers perceive a challenge in leading and supporting the project.

"You need enough information about digital tools which you will encounter in your projects" - R7

There is also a challenge discussed by related to making sure that people related to the project have relevant and needed competence. Since people have different experiences of technology, this human aspect creates challenges in making sure that technologies are utilized in the best ways possible according to R3 and R7. One example is being able to utilize AI without risking security, or misusing it, or making sure that people develop in their digital usage.

"We have different experiences of digitalization and therefore need different types of development...Some people find it more difficult than other" - R6

6.2 Perceived Actions to Handle Challenges of Digitalization of Project Management

Further, three qualitatively various perceptions of actions to handle challenges related to digitalization of project management were identified from the gathered data (see paragraph 4.6.2). These categories of description are actions as organizational, actions as guidance, actions to as adapting. Here, the variation lies within how the actions take place and who is responsible for them.

6.2.1 Actions to Handle Challenges Related to Digitalization of Project Management as Organizational

In the first category of description, actions to handle challenges related to digitalization of project management are perceived to be organizational. The distinctive feature of this category is that what they describe as action to handle challenges, is at first hand related to the organization itself. These are actions that have to be taken from the organizational perceptive and therefore the perception is that that they are organizational. These are separated into the need for the organization to be involved, and for them to having to create new tasks and routines to handle digitalization of project management.

Involved Organization

R2, R3 and R4 describe that there is a need to have organizational and managerial support to implement and manage this change towards a more digitalized project management. It is described that the most important part is that management is pushing for the decisions that have been taken, that it is a part of the organizational culture and that project managers are then to adapt accordingly to what is decided.

"I believe that the key for it to work, is that it is from top-down" - R2

"It is not as much up to me, but more up to the organization itself to really work with implementing this into the culture" - R3

Moreover, R1 and R6 discuss that the tools and technologies that are decided to be implemented need to be connected to their organization as well as integrated with other tools, for it not to result in more manual work. Furthermore, in order to develop and implement new tools and technologies that will be used by people in the organization, R1 and R6 believe it is important to include those who will use the tools in the process. Workshops, interviews and meetings with the project team, all project managers, listening to their thoughts and opinions, are believed to be ways for the organization to handle this. Besides, R6 also believe that it is important that the organization is flexible in the development and adaptation of digital tools and technologies over time, in order to not become inefficient.

New Organizational Tasks and Routines

Other organizational actions that R5 perceived to be ways of handling the challenges of digitalization of project management are offering education and training on how to work with the digital tools and technologies, as well as making sure there is someone in the organization who is specialized and skilled in each tool so that the rest of the organization can turn to someone if needed.

"We get education, and then on our intranet, where there are small video tutorials, you can look at if you have any questions. And then there is also someone at a regional who is extra skilled in each specific system"- R5

Another organizational action the R2 discusses as important, in order to handle challenges related to integrating new technologies like Teams, is the need for creating a routine on how

this should be done. The organization needs to develop guidelines on how project managers are to work, how they should download important data and where they should store it. Developing set ways of working for project managers falls on the organization to develop, in order for project managers to be able to work with digitalization of project management in the right way.

"All important data that potentially could be useful for the future needs to be downloaded and stored somewhere... It requires a new routine." - R2

To summarize, the category of actions as organizational are perceived as being the organization's responsibility. These are actions which the project managers perceive as having to come from higher levels in the organization in order to handle challenges related to digitalization of project management.

6.2.2 Actions to Handle Challenges Related to Digitalization of Project Management as Guidance

The next category of description is related to guidance. The distinctive feature which separates this category from the organizational one is that this one is related to a more personal aspect of how project managers and people involved in the project have to create clarity and guide each other in order to handle challenges. Project managers perceive that communication and support are ways to guide the situation in order to handle challenges. These two characteristics entail different aspects of guidance, as one relates more to intangible actions, and one is more hands on.

Communication

The need for communication is discussed by R1, R3, R5 and R6. Communication is perceived to be needed in order to be able to create clarity and guide involved stakeholders. Getting everyone aboard in new ways of working requires a lot from the project manager in the beginning. What is explained as important here is being clear in communication. R1, R3, R5, and R6 expresses that guidelines need to be communicated early in the project to make sure everyone knows what is expected, how to work, where to upload information, why we work like this and the value it brings, etc. R1 also express that there needs to be an increased focus on communication withing the project team.

"In any type of change there is a need to communicate why we are doing something... Why are we using this tool? Why are we working in this way?" - R2

"Set the frame of reference early in the project... These are the requirements we have related to digitalization." - R5

In other words, clear communication is perceived to guide people, leading to it being easier for people to see the value in the new ways of working, and it decreases the risk for misunderstandings.

Support

Another side of guidance, alongside communication, is the support that people get. R2, R3, R6 and R7 perceive it to be important to support project team members and stakeholders. It is discussed by R2 and R6 that being the helping hand, sitting down with individuals to hear them out, and actually guiding them in how to use different systems and tools, is important. By supporting individuals, R6 describe that they help people to feel conformable in these new ways of doing things. R3 and R7 also discuss the need to ask people how they are feeling, to encourage, and to lead by example.

"It is about supporting, and actually understanding what the issue is" - R3

"Be humble towards others.... You have to meet them where they are, it takes some time, but I think that is a basic factor in succeeding with digitalization" - R6

Summarizing the category of actions as guidance, it was identified based on the project managers perceptions that people involved in the project, both project managers and members, have a responsibility towards stakeholders in the projects to create clarity and guide each other. This guidance is done through clear communication both towards and within the project, as well as through supporting stakeholders in digitalization of project management in order for it to be handled successfully.

6.2.3 Actions to Handle Challenges Related to Digitalization of Project Management as Adapting

The last category of description has the distinctive feature of actually being a change in ways of doing things. It is related to changed ways of working and new ways of developing competence to make sure that the challenges are handled. This differs from the previously mentioned categories as they are more related to broader and tangible actions, which have been taken to adapt to digitalization of project management, such as changing the way meetings are done or how to keep informed on new technologies, compared to it being organizational or limited to be guidance between project managers and project team members.

Change Ways of Working

R1, R3, R4, R5, R6 and R7 agreed that a necessary action in general was that they had to change their ways of working to handle the perceived challenges with digitalization of project management. For instance, R3, R5 and R6 state that they find it important to put in extra effort to making sure that not every meeting is digital in order for people to get to know each other better, build relationships and create a better collaboration. This is argued to be extra important in the beginning of a project. R3 mention that they try to arrange kickoffs together with the whole project team, including the customers, in the beginning due to this. R4 mentions change ways of working from the aspect of personally trying to work more physically from the offices instead of working from home.

"We try to have kickoffs together where we get to know each other. Then the customer will also build up trust in each other. Then it is easier to get in tough later if you have any challenges or problems." - R3

To build stronger relationships digitally and enhance collaboration, R6 and R7 highlight the need to do check-ins to see how everyone is doing and how it is going, as well as to make sure that everyone gets the chance to speak during the meeting. They also instruct everyone to have their video cameras on during meetings in order to create a similar social feeling as if they were sitting in the same room. Besides this, R6 also mention that the project manager could think about rearranging the conference room so that those attending digitally will not feel excluded if the majority are attending physically.

"This thing with check-ins... Making sure everyone gets the chance to speak, so that you can get a community and create a project culture together. You need to put another, maybe focus, on getting to know each other." - R7

To make meetings more efficient, the R3 and R7 have had to adapt their list of participants. They express that they have had to minimize the number of participants in each meeting and only invite those who actually are relevant. This decreases the risk of the participants lacking focus or working with other things. However, the respondents still believe it is important to get the information out to those not included in the meeting, to prevent frustration and make sure everyone still feels included. To make sure new information gets

out in general, R1 discusses the need to appoint someone as responsible for making sure that everyone gets informed, and R7 mentions the need for creating a collective platform.

"You have to look over the agenda and the list of participants in another way." - R7

"But is it important to still get the information out there to those not participating regarding what has been discussed in the meeting." - R3

To handle the challenges of not finding documents etc., due to overwhelming amount of information and systems not being integrated, R4 tries to move away from folder structure and instead puts documents in team-chats, where metadata and tags can be used. Using metadata and tags is something that is also mentioned by R1. Furthermore, R4 states that they reach out to colleagues and ask where to find documents instead of spending too much time looking for them themselves, as well as moving away from writing emails to only write messages on teams, resulting in one less platform to keep up with.

"You need to be able to sort out and see what is relevant and to do this, you can use metadata and tags." - R1

"We also try to move away from emails, so it is more chats" - R4

Specifically related to AI, which is a newly implemented solution for most processes, R3 discusses that this requires changes in ways of working as it is a completely new tool. When using AI, the project managers discuss that they need to review the provided text making sure that the information is correct in another way, as well as adjust the text and work with it differently for it not to sound like it is AI-generated.

"I rewrite it a bit because usually it looks like, you can almost see at the text that AI wrote it." - R3

Keep Informed

Furthermore, R3, R4, R5 and R7 perceive that they are trying to be as updated as possible regarding the digital development and the new tools and technologies that is being implemented, and which potentially could be implemented in the future, as a way of handling challenges of digitalization of project management. R3 and R7 highlight the need to give yourself time as a project manager to get the competence you need. R7 also believes that it is important to reflect about and understand which benefits each tool and technology is providing, and always look ahead in time for what could happen digitally in 3 months, in one year etc., in order to be prepared for it. R7 described how they, once a year, have a digital inspiration lecture where digital strategies and digital tools for project management in the upcoming years are a topic.

"You cannot be lazy and just hope that someone else will explore all the digital tools and figure out how to solve this. It was in my interests to reassure that I had the right competence to be able to use everything, as well as to help within the project so that it does not stop." - R7

"All the time be well-read on what it is that bring value in each particular system" - R5

R4 also believes that it is important to develop competence regarding AI and in which areas of the project management process it can be used. This is to make sure that the process gets more efficient. Being well informed of what is means can further help in the decision-making process since you will be able to weigh the pros and cons against each other according to R5.

"You need to be able to find areas where you can apply AI in order to make it more efficient for yourself and thereby a more efficient project management" - R4

Conclusively, the perceived actions as adapting includes a broader range of tangible actions that the project managers have taken to handle challenges. It is more related to making the digitalization of project management work through adapting than guiding, and it is on the project manager more than on the organization, leading to it being a category of description.

6.3 Summary of Perceived Challenges and Actions to Handle Challenges

In this chapter, six different categories of description have been presented. Three are related to how project managers perceive challenges with digitalization of project management, and three are related to how project managers perceive actions to handle challenges with digitalization of project management. Figure 1 presents the outcome space, showing an overview of the categories of description. These are the qualitatively various perceptions which we identified that project managers had regarding the studied phenomena.

For challenges, the variation lies in what the challenge is focused on. One of the categories is challenges as technological, where the technology in itself creates challenges. The other perceived challenge is the human factor. The human factor is related to resistance, building relations, collaboration, and lack of focus. The last category of description is challenges as leadership complexities. Here, project managers perceive the digitalization of project management as being directly related to leadership in this new context. These might stem from human factors or technological aspects, but the challenge is described to be related to leadership as it is becoming more complex due to these aspects. The project managers perceive challenges with managing change, monitor and control, and the development of competences, due to digitalization of project management.

When it comes to how project managers perceive actions to handle challenges related to digitalization of project management, the variation of perceptions lay within how the actions are perceived to be shown and who is perceived to be responsible for them. One category is the perception that actions are organizational, where project managers and members are secondary, and the organization is responsible for handling the challenge. Here, there is a perceived need for an involved organization, as well as new tasks and routines decided and implemented by the organization. The second category is actions related guidance. This perception is based on project managers seeing that project managers and team members have a responsibility to guide each other through communication and support. The last one is the perception that actions to handle challenges are actual actions to adapt towards digitalization of project management. Here are multiple ways of changing their ways of working as well as keeping informed to stay updated.

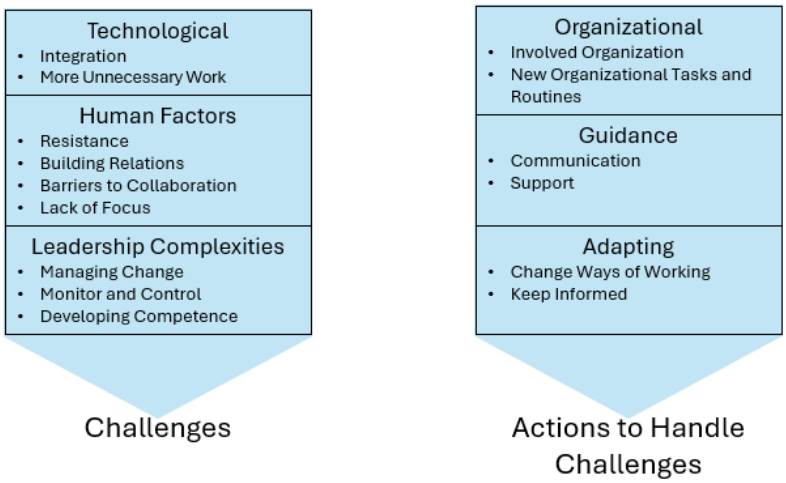


Figure 2. Outcome Space

Moreover, these categories of description, with their sub-characteristics, are more or less related to each other. There are both similarities, dependencies, and differences within and between them. Hence, even though the categories of description describe various perceptions and thereby are different, they are not excluded from each other. They interrelate in different ways. One example, which is already mentioned above, is that human factors and technological aspects may be the reason why leadership complexities are perceived as challenging, showing the dependencies between them. For example, if human factors were not perceived as a challenge, leadership complexities would maybe be perceived differently. Leadership complexities might also be affecting human factors, as the way leaders manage change for example could affect how people react to the change. In that way they might affect one another. Furthermore, the project managers describe that the technologies in themselves create challenges by not being integrated, creating more unnecessary work, being overwhelming etc. Hence, the technological aspects awaken human reactions, which could be related to human factors such as resistance and lack of focus.

Also, some perceived actions are more related to a specific challenge than others, and the challenges are more or less dependent on each other. For example, when it comes to actions as guidance, this category of description is mostly discussed from a perspective to handle challenges as human factors and leadership complexities, like making it easier for people to change, seeing the value in the new ways of working, decreasing the risk for misunderstandings, etc. This is because project managers discuss it as being project managers and other project members responsibility instead of the organizations. Further, organizational actions can be related to all different challenges, as they include both managerial support, new tasks and routines like education and training provided by the organization etc., which is perceived to help both human factor, leadership complexities, and technological challenges. But challenges as technological can be seen as more closely related to the organizational actions than towards guidance and adaption, as multiple aspects of the perceptions regarding the technological challenges are seen as the organization's responsibility, for example to implement tools, technologies, and routines which provides value and works together. Furthermore, actions related to adapting can be seen as closely related to handling challenges such as human factors and leadership complexities. This is because some of the new ways of working, like more physical meetings and check-ins, are handling human factors such as building relations and collaboration. Also keeping informed as a project manager is a way to handle the leadership complexities related to developing competencies and managing change by being able to show the value and get people aboard.

Hence, even though we have argued for the categories of description being various, which they are, they are not separated from each other. Instead, they interrelate and are dependent on each other on different levels. Based on this discussion, it can be argued that one challenge related to technology could lead to other challenges related to human factors and leadership complexity. Also, one category of actions could be applied to multiple challenges, which handles multiple categories of challenges, but they could also just focus on separate challenges. In practice this could mean that multiple aspects would have to be considered before making decisions regarding digitalization of project management, which is worth keeping in mind. Figure 2 shows the interrelation between the categories of description described above.

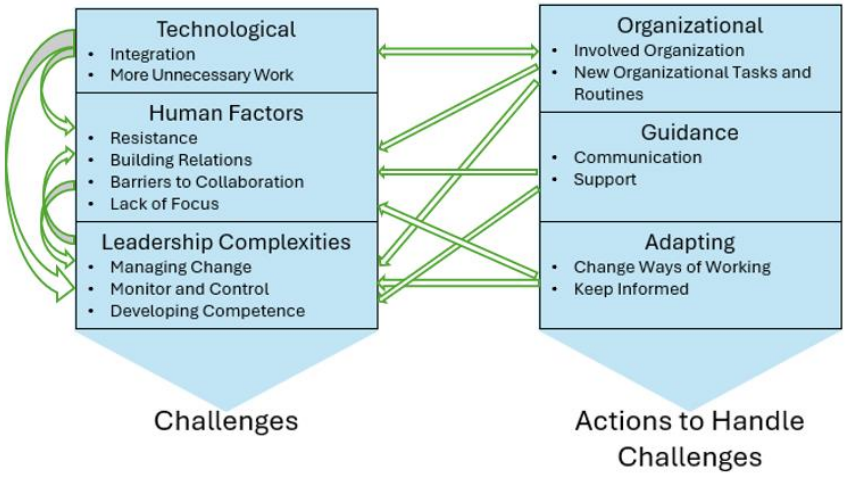


Figure 3. Interrelations in the Outcome Space

7. Discussion

In this chapter a discussion of the outcome space is presented. The discussion includes an analysis of underlying similarities for the identified categories. It also includes connections to existing theories, showing both similarities between this study's results and existing research's theories and results, as well as differences and contradictions which we have identified between the results presented in this study and the results presented in existing research within digitalization of project management.

7.1 Analysis of the Outcome Space

In the previous chapter, various perceptions of challenges and actions to handle them related to digitalization of project management have been presented. These focus on the differences and variations in how project managers perceive these phenomena. However, these categories are interrelated, which have been discussed in paragraph 6.3, and we have also found some similarities tying these categories of description together.

The first aspect which we have identified as being similar across all the perceived challenges and how they are handled is that it all depends on certain things. It is described as depending on the technology itself, the project, the project managers, the individuals and how they tend to react, and on the organization and how they work with these aspects. Hence, there is a similarity across all the categories in the way that the perceptions of challenges and how they are handled are contextual and there is an inherent subjective element within this. This aligns with the underlying notion in this thesis that there are different views of the phenomena depending on past experiences, what people know, and the context in itself. Another similarity we have identified in our gathered data is that the perceptions of challenges and actions all point towards gathering everyone in a common way of working, which is valued by everyone involved, and which helps project management processes. Both the organization, the project managers, project team members, and other stakeholders need to be on the same page regarding ways of doing things in order for digitalization of project management to be efficient and successful. For example, if new technologies are being implemented, everyone needs to use them in order for them to be efficient and helpful. Otherwise, it will take up unnecessary time for project members having to search for information on multiple platforms, and it can also result in important information being missed out.

7.2 Connections to Theoretical Frame of Reference

7.2.1 Similarities

Further, some similarities can be found with existing theories which have been presented in the frame of reference of this study. Although these theories are not tested in this study, nor researched within the same field in some instances, we still see that the similarities are worth mentioning as some of them can be seen as strikingly similar and therefore support each other. Also, due to the fact that the two separate fields of project management and digitalization are parts of digitalization of project management, we argue that even though some similarities discussed are found between these different fields, the similarities are still relevant to be discussed. For example, our collected data shows that some challenges are related to resistance within the human factors category. This is also mentioned to be a challenge described within existing theories of the digitalization process (Vial, 2019, p. 122). Technologies that are disrupting the status quo which then leads to changes related to factors such as leadership, roles and skills needed, are described to lead to new barriers to overcome, such as resistance.

To handle challenges, communication has been showed to be important, both in this study but also in studies within the field of project management (Ruuska & Teigland, 2008, p. 323-324), as well as within the field of digitalization (Baier et al., 2022, p. 336). In this

thesis, project managers describe actions as guidance, where communication is one part of guiding people in the project to handle challenges related to digitalization of project management. Moreover, organizational support as a way to handle challenges with digitalization of project management is also something this study's results convey. Both Bencsik et al. (2022, p. 14) and Baier et al. (2022, p. 336) bring up organizational support as being vital within the field of digitalization. Whereas the organization and managers willingness to cope with new conditions, their way of communicating the importance of new technology, them being open with receiving ideas and opinions from workers, them offering training and education etc. has been showed as ways to show this support, which are ways that the respondents in this study also perceive. Offering training and education is also something mentioned by Hoda & Murugesan (2016, p. 255), saying that the team should be trained in how to use the technological tools in the best way. From the similarities shown here, we see that there are similarities within what challenges and actions are presented in theories within the fields of project management and digitalization, and how project managers in this study perceive challenges and actions to handle them within the field of digitalization of project management.

Furthermore, there are also similarities found within existing theories in the field of digitalization of project management and this thesis results. Some challenges which are shown in this study are challenges connected to remote work due to digitalization of project management. Within challenges as leadership complexities and human factors, project managers perceive that the digitalization of project management tends to lead to more inefficient meetings, difficulties of asking quick questions, challenges to monitor and control, build trust etc., since they work more digitally and remote now. These are also challenges which are mentioned by Wu (2022, p. 325-326), who states that working remotely in projects lead to challenges with collaboration and trust, managing project performance and tasks, communicating clear goals, hindered of productivity, and so on. Another similar challenge is related to the challenge of losing data and the fact that the amount of data can be a lot to handle, which are aspects discussed by Kozarkiewsicz (2020, p. 245). In our study, the respondents perceive these challenges as well, describing it being easier to delete documents when being digital, and that due to digitalization and the usage of multiple platforms, the information can feel overwhelming. Moreover, we can also see similarities within actions in existing theories within the field of digitalization of project management and the result of our study. Wu (2022, p. 325-326) states that digitalization of project management requires that the project manager acts as a change agent, advocation the change towards digitalization. Project managers in this study also perceive this to be important, and it has been identified within the categories of actions as guiding and actions as adapting. Furthermore, Liu et al. (2024, p. 11) recommend developing and training existing talents in digital tools in order to leverage the full potential of these people. This is something that the respondent in this study also perceives as important, and it has been identified within the categories of action as organizational.

7.2.2 Differences and Contradictions

Moreover, this study also contributes new insight which differs from, or contradicts, existing theories within the research field of digitalization of project management. First, Kozarkiewicz (2020, p. 245-247) presents a model based on perceptions of project managers, which brings up some negative consequences related to digital transformation of project management. The results show that the negative consequences of digitalization of project management are new risks and challenges related to data, increased costs, overwhelming information and noise, and the need for new competence. As mentioned, some of the results in this thesis support those results. For example, the one related to challenges with overwhelming information within the perception of challenges as technological, or the one of the needs for competence which has been related to the

challenge of leadership complexities and action as adapting in this thesis. However, increased costs are not mentioned as a challenge by project managers in this study. Also, this study presents more challenges and risks related to digitalization of project management which are not mentioned by Kozarkiewicz (2020). Showing for example that developing competencies is related to challenges as leadership complexities, or that human factors play a role in project managers' perceptions of challenges. Furthermore, Kozarkiewicz (2020) focuses on the impact that digital transformation has on project management, showing the negative impact that digital transformation on project management has after it is done, while our study focuses on showing the perceived challenges that comes with the digitalization process. By this it can be argued that this study furthers the understanding of what the challenges could be during the process, and how to handle them, in order to perhaps avoid negative impacts that it leads to.

Wu (2022, p. 327) states that digital project management tends to work better within certain project methods, specifically in those that are flexible and agile. This was also something that we argued for might be the case since previous experiences possibly could affect perceptions (see paragraph 3.2.2 and 3.3.1). When analyzing possible connections between project methods and perceptions in this study (see paragraph 4.6.2), we could not see that the perceptions differed due to the respondent's project methods. This somewhat contradicts what Wu (2022, p. 327) discusses, since we believe that if this would have been the case, project managers who work with more agile methods would have describes challenges in a different way than project managers who work with traditional methods. But in this study, the categories of description are made up of perceptions coming from project managers working with both traditional, agile, and hybrid methods. Although, this is an aspect which will be discussed in paragraph 8.3, as there are some possible limitations to this discussion. Finally, Liu et al. (2024, p. 11) presented results saying that digitalization of project management requires robust organizational support and development programs. These types of actions are also perceived as actions to handle challenges by project managers in this study, where they have been categorized as organizational actions. However, project managers in this study perceive that actions are not only organizational but also related to guidance and adapting on more personal levels. These are examples of aspects showing the extended information and knowledge which this study presents related to previous research within the research field of digitalization of project management.

8. Conclusion

The conclusion summarizes the analysis and discussion, relating it to the purpose of the thesis. It also presents identified practical, societal, and theoretical implications of this study. Concluding thoughts relating to limitations, and directions and ideas for future research, are discussed as a final part of this chapter.

8.1 Conclusions

The purpose of this study has been to explore how project managers, in different organizations in Sweden, perceive challenges with digitalization of project management, as well as how they perceive that these challenges are handled. The aim of the study has further been to study these phenomena, presenting a variation in perception relating to the mentioned phenomena to contribute with in-dept knowledge. By doing this, the study has the intention of providing research within the field of digitalization of project management, to serve as support and insights to learn from for different stakeholders who are working with digitalized project management or are ongoing a digital transformation towards it, as well as to present ideas and directions for future research.

Seven semi-structured interviews with project managers from different organizations have been conducted in order to gather relevant data to explore these phenomena based on project managers' perceptions. The phenomenographic analysis that we conducted in this study resulted in an outcome space, showing variation in perceptions which give an in-dept understanding of how the studied phenomena can be perceived by project managers. Three categories of descriptions regarding perceived challenges of digitalization of project management are presented: (1) challenges related to digitalization of project management as technological, (2) challenges related to digitalization of project management as human factors, and (3) challenges related to digitalization of project management as leadership complexities. The study also present three categories of description on how these challenges of digitalization project management are handled; (1) actions to handle challenges related to digitalization of project management as organizational, (2) actions to handle challenges related to digitalization of project management as guidance, and (3) actions to handle challenges related to digitalization of project management as adapting. These categories show the variation in perceptions, providing in-depth insight and knowledge.

These are also interrelated which has been shown in figure 2, showing that they could be considered as affected and affecting each other. In practice, this could mean that multiple aspects therefore would have to be considered before making decisions regarding digitalization of project management. Moreover, the outcome space has been further analyzed in paragraph 6.3 and in chapter 7. This discussion partly shows that there are two underlying aspects for all these categories. First, digitalization of project management is contextual and there is an inherent subjective element related to it, which is important to present as it is important to know when learning from the knowledge and insights presented here. Second, involved and affected people like the organization, the project managers, project team members, and other stakeholders need to be on the same page regarding ways of doing things in order for digitalization of project management to be efficient and successful. This is also important to highlight as this thesis aims to provide insights that might help in implementing digitalization of project management. The discussion also partly shows how this thesis, and its results relate to existing theories. Multiple similarities are found which supports discussed results, but some differences and contradictions are also highlighted to show the extended insights and knowledge that this study contributes with. For example, it shows a variation in perceptions which extends what challenges and actions have been discussed within the research field of digitalization of project management previously. It also somewhat questions if a certain project management method plays a part in how the project managers perceive challenges.

Finally, the thesis also shows new insights within the field of digitalization of project management which has not recently been identified or discussed. As has already been stated in this thesis, digitalization of project management is a fairly new field of research (Marnewick & Marnewick, 2022, p. 10). In the frame of reference some theories have been presented (see paragraph 2.3). These discuss what digitalization of project management could entail in practice, related to how new tools and technologies are implemented in different processes, tasks, and practices (Wu, 2022, p. 324; Yang, 2024, p. 7; Varzaru, 2022, p. 12), as well as related to the positive outcomes and effects it can have on project management. As discussed above, there are also some similarities within the results on this study and what Wu (2022, p. 325-326) states within this field. Although, Wu (2022) bases his study on a survey and is describing the results in a more normative manner, not focusing on studying in dept perceptions of project managers, which we are doing. We therefore argue that this study provides a deeper understanding regarding the challenges and actions to handle them in comparison.

8.2 Implications

8.2.1 Practical Implications

Based on the conclusion of this study, practical implications and recommendations are proposed for organizations, project managers, and project members, who are currently working with digitalization of project management, or are ongoing a digital transformation towards it. First, the practical implications and recommendations for organization based on the result of our study are that they should be aware that they play a part in handling challenges. They should contribute with organizational support when working with digitization of project management, such as making sure that the implemented technology is integrated in the organization, integrated with those that will work in them, and integrated with other digital technologies. This is because if digital technologies are integrated, it could increase the chance of having project team members working in the tools. Furthermore, resources should be provided to make sure that the project team members get the training and education that they need, in order to be able to optimize the technologies in an efficient way.

Second, project managers can learn from the result of this study. By learning from the results of this study, we argue that it can help in minimizing the risks of challenges with digitalization of project management, resulting in digitalization of project management becoming an easier and more efficient process. The practical recommendation for project managers is to guide project team members in the same direction by communicating in a clear way, as well as taking extra time to support the project workers, for example by hearing them out and by leading by example. Furthermore, we recommend that project managers adapt their way of working depending on the context. They should also make sure to be informed on technologies that the project team is using, as well as be updated on which technologies might be useful in the future. This is because these aspects have been perceived to be good ways to handle challenges. Third, since project workers also are affected by the digitalization of project management, we argue that they, with the help of the result in our study, can gain a better understanding of challenges and actions. We also believe that, by having them understand their own impact on the project management process and its efficiency, they might be influenced and can thereby affect their own ways of working and thinking. Also, they can push for these actions which are perceived to handle challenges in cases where they feel like actions are needed but are not handled by their project managers or organizations.

8.2.2 Societal Implications

As mentioned in paragraph 1.5, digitization is important for an organization's survival and for society at large. The European Commission (2020) has set several digital goals for 2030

where one of them is that 75% of all organizations will be using disruptive digital technologies. Moreover, project management is included in more and more industries and sectors, at the same time that there is estimated shortage of qualified talent, which could result in profound economic losses (Andersson Economic Group, 2017, p. 2-3). Due to this we see that the future for project management is digitalization. We argue that by learning from the results of this study, the chance of successful implementation of digitalization and disruptive technologies in project management will be higher. This is because this study aims to help in understanding digitalization of project management by highlighting perceived challenges and important aspects to overcome them, showing what is perceived to be required from both organizations, project managers, and project workers when working with digitalization of project management. Hence, societal implications are related to the possibility to prevent economic losses and facilitate digitalization of project management for organizations and society by learning from this study. This could then lead to more effective companies and work processes, which can affect company growth in a positive way. It is stated that companies and their growth have a strong connection to society, by for example providing economic growth that is needed to handle the welfare system (Svenskt Näringsliv, 2021, p. 3). We also think that a more successful implementation of digitalization of project management could lead to positive aspects for humans which might feel better about the ongoing change, creating a better work environment.

8.2.3 Theoretical Implications

Moreover, we intended to contribute to research in the field of digitalization of project management, as well as to present ideas and directions for future research. We have argued for a theoretical gap regarding project managers perceptions of challenges and actions to handle them related to digitalization of project management. Based on that, this thesis further focuses on contributing to filling this gap by providing research on the subject. The research that has been conducted contributes to this field by showing a variation in perceptions related to challenges and actions to handle them related to digitalization of project management from project managers perspective. It provides new insight and knowledge, which has been shown when relating this study to existing research. Moreover, in the next paragraph ideas and directions for future research are presented to further contribute to the theoretical aspect. The theoretical implications are that this study provides an in-depth understanding of project managers perceptions which leads to the possibility to understand challenges and actions to handle them related to digitalization of project management, as well as to provide new directions and ideas for future research.

8.3 Limitations and Proposals for Future Research

The purpose of this study was to explore the variation in perceptions of the phenomena of challenges with digitalization of project management and how these are handled, from the perspective of project managers from different organizations in Sweden. As stated in the conclusion, we see that this study fulfills the stated purpose. Although, there are some limitations inherent to certain aspects of this study. Sample size is one aspect that has been discussed earlier in this thesis (see paragraph 4.1). The sample size in this study is seven respondents in total. Even though we argue that sufficient data was gathered, we cannot say that another respondent would not have contributed with additional perceptions. The timeframe has been a limitation for this study. Hence, for future research, we believe that if time allows it, it could be of relevance to include a bigger sample to see if there are more variations in perceptions. Furthermore, even though our sample has been diverse, it could have been even more diverse, as explained in paragraph 4.3. Since we mainly used convenience sampling, utilizing our own networks to find respondents, it can be argued that the variation in background is not as diverse as it could have been. We also did not make sure to include half men half women, or half traditional project methods half agile project

methods, for example. We argue that it could be of interest to be even more selective when choosing respondents to make sure the sample is even more diverse. This since it might result in more variation in perceived challenges and actions.

Moreover, we relate one of the aspects of future research to what Wu (2022, p. 327) brings up about digital project management tending to work better within certain project methods, specifically in those that are flexible and agile. As mentioned in xxx and xxx, we could not see connections between this in this study. But as different project management approaches are explained to meet different challenges, and due to Wu (2022, p. 327) stating that it might differ, an idea for future research is to focus more on these aspects and look further into if the perceptions differ depending on if the project managers work in traditional, agile, or hybrid projects. This could be done by making sure to include a balanced number of respondents working with traditional and agile methods in a comparative study of some sort, for example. In this study these aspects were secondary, and we have not conducted any comparisons. Therefore, the results showing that the project methods are not related to the different perceptions have inherent limitations.

Another aspect relates to the methodology of this study. A qualitative method has been used in this study where semi-structured interviews were conducted. For future research, we argue that it could be of interest to do a similar study using other data collection methods, such as focus groups or observations. This is in order to study for example how project managers are handling their perceived challenges in practice. It would also be of interest to conduct quantitative research within the field, including a larger sample in order to be able to generalize results related to, for example, challenges. As we could see similarities between challenges perceived within the field of digitalization of project management and challenges described in existing theories related to the field of digitalization, this could be an interesting direction for future research with other methods. In general, due to the field of digitalization of project management being fairly new, we argue that it is of relevance to keep studying the field using different methods in order to get a broader perspective of the challenges and actions connected to digitalization of project management, but also to the field in general.

Furthermore, future research could focus on the same type of study in other countries than Sweden or from other perspectives than project managers. For example, countries are at different levels when it comes to the development of digitalization. Sweden is known for being at the forefront when it comes to digitalization (European Commission, 2020). Studying other countries where the digitalization level is not as high might result in even more variations in how project managers perceive challenges and actions to handle them related to digitalization of project management. Further, project team members might perceive different challenges than project managers as they do not have the same role within digitalization of project management which could be of interest to study. This would also enhance the possibility of comparing how the phenomena are perceived in different contexts.

9. Validation Criteria

To conclude this thesis, this chapter describes how the whole study lives up to qualitative validation criteria by discussing multiple different validation criteria that we see relevant for this study. The different criteria will be described and also related to this study's choices, processes, and realization to show this study's quality.

Underlying views differ between quantitative and qualitative studies, and therefore, validating qualitative studies using quantitative criteria like generalization, reliability, and validity is not suitable (Hill et al., 1997, p. 556). Instead, there are other validation criteria to evaluate qualitative research. Tracy (2010, p. 839-848) states that there are eight criteria to evaluate qualitative research. If the research is marked by having a worthy topic, rich rigor, being sincere, credible, resonant, has a significant contribution, ethics, and meaningful coherence, it is of good quality. Moreover, Graneheim & Lundman (2004, p. 109) states that all research should be evaluated by regarding trustworthiness, and according to Collier-Reed et al. (2009, p. 1), it is especially important for studies with an interpretative epistemology, which this study has. Bryman & Bell (2017, p. 380) presents four sub-criteria for a study to be considered as trustworthy. These four are credibility, transferability, dependability, and confirmability. When looking into all of these different criteria mentioned above, we could see that they entail more or less the same thing, and below we will discuss these in relation to each other to explain how we fulfill these and show that this study is of high quality and contributes to research.

A topic is seen as worthy if it is timely, interesting, relevant, and significant (Tracy, 2010, p. 840). Moreover, worthy topics can derive from both timely societal events, personal events, or disciplinary priorities. We have shown the relevance of the field of digitalization of project management both from societal, personal, and disciplinary perspectives in the first parts of this thesis, hence we argue that this study fulfils the criterion of having a worthy topic. Another criterion which is discussed by both Graneheim & Lundman (2004, p. 109-110), and Tracy (2010, p. 840-841), is that the chosen methods and processes should fit with our focus and purpose of the study, and that we have enough data to fulfil the purpose. Tracy (2010, p. 840-841) refers to this as rich rigor, which concerns the study's theoretical constructs, processes of data collection and analysis, sample and context, data, and time. Moreover, it is also about these being abundant, sufficient, and appropriate. As for procedures and processes related to this study, all choices have been clearly argued for in relation to others throughout the thesis, and from that they are seen as the most appropriate ones. The different theoretical fields have been analyzed and described sufficiently related to the purpose of them giving context and understanding, and both effort and time has been given to all of these aspects. When it comes to sufficient data, as mentioned earlier, we argue that the data collected is enough to answer the research question. As we have included diverse respondents and conducted in-depth interviews, we have managed to gather relevant data which we have used to identify multiple categories describing their perceptions about the phenomena answering the research question.

Sincerity reflects if the study is characterized by transparency and self-reflexivity (Tracy, 2010, p. 840-842). We have all throughout this thesis been transparent with decisions and procedures we have chosen to do, as well as possible drawbacks with these. We have also argued why alternative options are not relevant in this case. Moreover, we have also included discussions of how our subjectivity could affect the research and how we have handled this, showing self-reflexivity. Hence, this study is characterized by both transparency and self-reflexivity. The transparency aspects could also be connected to the dependability sub-criterion mentioned by Bryman & Bell (2017, p. 380), as this is about

being transparent about the research methods and processes. To ensure this, as mentioned, we have been honest and transparent during the process of this study regarding what has been done, and we have motivated for each of our chosen methods, which is said to be important (Bryman & Bell, 2017, p. 382). We have also recorded the interviews and kept a record of each transcript, in order to present all answers correctly. Therefore, we argue that this criterion is met.

Moreover, self-reflexivity could be connected to the sub-criterion confirmability, which is about ensuring that we as researchers have not been letting personal values and opinions impact the study (Bryman & Bell, 2017, p. 382-383). As mentioned previously in this study, we cannot be fully objective when doing a phenomenographic study. When gathering and analyzing collected data in a phenomenographic study, the researchers' thinking and construction of "categories of description" will naturally affect the categories (Cousin, 2009, p. 189-190). However, it will still be trustworthy due to us displaying extracts from the data in a critical and honest way by using supportive quotations. By showing a number of quotes in the report that demonstrate their fit with our generated categories, the readers can by themselves make their own judgement about the plausibility of them (Cousin, 2009, p. 196). We argue that we have acted in good faith, which is an important factor for this criterion (Bryman & Bell, 2017, p. 382-383). This has been done by not consciously letting our personals values etc. affect the conduction or conclusions of the study. Since we want to know the perception of project managers, we have never intended to distort or misrepresent the result of this study in any way. Furthermore, we do not believe our pervious experiences and knowledge have impacted the result in any way since neither of us have any experience of the studied phenomena.

Furthermore, credibility is by Tracy (2010, p. 840; 842-844) related to the trustworthiness and plausibility of the research and the presented findings. The sub-criteria of trustworthiness have been discussed throughout this chapter, and from the definition stated by Tracy (2010, p. 840; 842-844), we believe that this already has been discussed. As mentioned, we have made sure to present information that reflects the respondents' perceptions by making sure to relate the analysis to the recorded and transcribed interviews and support the findings with quotes from the respondents. This is to make sure we interpret their perceptions as closely to their statements as possible. Information presented in this thesis is also usually also supported by multiple sources stating similar facts, or drawing similar conclusions, supporting the credibility of the information. Moreover, to increase the trustworthiness of our analysis even more, both of us researchers looked at the data and made our own categories first before comparing it to each other in order to find similarities, which also is argued to be way to strengthen the trustworthiness (Cousin, 2009, p. 190).

Resonance refers to the effect the researcher has on the audience, and that it should be meaningful, which is fulfilled either, or both, by the study being written in an artistic and expressive way, and by its transferability (Tracy, 2010, p. 840; 844-845). Transferability is also mentioned by Lincoln & Guba (1985, p. 316; referred to in Bryman & Bell, 2017, p. 382) for the study to be trustworthy, and is therefore one of the sub-criteria to trustworthiness. We argue that this study is transferable in a way that the insights and knowledge provided can be useful in multiple different settings, both practically, in theory, and for future research. It could for example be useful for other project managers working with digitalized project management, or an organization that is moving more towards implementing digitalization of project management. Moreover, high quality qualitative research should have significant contribution from multiple aspects, for example theoretically, practically, morally, etc. (Tracy, 2010, p. 840; 845-846). As we have explained in contributions (see paragraph 1.5), and in implications (see paragraph 8.2), we see this

study as meaningful from both theoretical, practical, and societal perspectives. The results will contribute in-depth knowledge and insights which can be useful for all of the perspectives mentioned.

Further, it is important to consider ethical aspects (Tracy, 2010, p. 840; 846-847). Multiple ethical considerations have been underpinning this study, which have been discussed in paragraph 4.4. It has been important to explain how we have taken all of these aspects and principles into account when conducting this study, and we have also made sure to follow these principles. Furthermore, we have also made sure that the respondents are aware of their opportunity to ask questions and see how we have concluded and analyzed their answers before them being published if they wish to. Due to these reasons, we see the ethical criterion as fulfilled. Lastly, meaningful coherence means that the study both achieves the purpose that has been stated, that the methods and procedures are fitting for the study, and that the study in a meaningful way interconnects research question, literature, findings, and interpretations (Tracy, 2010, p. 840; 848). As discussed in paragraph 8.1, we argue that this study answers the research questions and fulfills the purpose. All parts are also interconnected and argued for throughout the thesis.

Reference List

Adnan, M. & Afzal, M. (2017). Ontology Based Multiagent Effort Estimation System for Scrum Agile Method. *IEEE Access*, *5*, 25993–26005.

Agbejule, A. & Lehtineva, L. (2022). The relationship between traditional project management, agile project management and teamwork quality on project success. *International Journal of Organizational Analysis (2005)*, *30*(7), 124–136.

Amit, R., & Zott, C. (2001). Value creation in E-business: Strategic Entrepreneurship: Entrepreneurial Strategies for Wealth Creation. *Strategic Management Journal,* 22(6–7), 493–520.

Anderson Economic Group (2017). *Project Management Job Growth and Talent Gap 2017–2027.* Project Management Institution. https://www.pmi.org/-/media/pmi/documents/public/pdf/learning/job-growth-report.pdf?rev=c304efd38c2a48dc9489a945a8a07614&sc_lang_temp=en [Retrieved March 21, 2024].

Badewi, A. (2016). The impact of project management (PM) and benefits management (BM) practices on project success: Towards developing a project benefits governance framework. *International Journal of Project Management*, *34*(4), 761–778.

Baier, M.-S., Lockl, J., Röglinger, M., & Weidlich, R. (2022). Success factors of process digitalization projects – insights from an exploratory study. *Business Process Management Journal*, 28(2), 325–347.

Bailey, L. F. (2014). The origin and success of qualitative research. *International Journal of Market Research,* 56(2), 167–184.

Batarseh, F. A., & Gonzalez, A. J. (2018). Predicting failures in agile software development through data analytics. *Software Quality Journal*, *26*(1), 49–66.

Bencsik, A., Hargitai, D. M. & Kulachinskaya, A. (2022). Trust in and Risk of Technology in Organizational Digitalization. *Risks, 10*(5), 1-19.

Bloomberg, J. (2018). Digitization, Digitalization, And Digital Transformation: Confuse Them At Your Peril. *Forbes.* 29 April. https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/?sh=20db6f792f2c [Retrieved 2024-03-22].

Boddy, C. R. (2016). Sample size for qualitative research. *Qualitative Market Research,* 19(4), 426–432.

Boehm, B. & Turner, R. (2003). Using risk to balance agile and plan-driven methods. *Computer (Long Beach, Calif.)*, *36*(6), 57–66.

Bryman, B. & Bell, E. (2017). *Företagsekonomiska forskningsmetoder.* 3rd edition. Stockholm: Liber AB.

Burke, R. (1999). *Project management: planning and control techniques.* 3rd edition. New York: Wiley & Sons.

Cao, L., Mohan, K., Xu, P., & Ramesh, B. (2009). A framework for adapting agile development methodologies. *European Journal of Information Systems*, *18*(4), 332–343.

Conforto, E. C., & Amaral, D. C. (2016). Agile project management and stage-gate model—A hybrid framework for technology-based companies. *Journal of Engineering and Technology Management*, *40*, 1–14.

Contreras, R.R. (n.d.). *Covid-19 and digitalization.* Eurofound. https://www.eurofound.europa.eu/en/covid-19-and-digitalisation [Retrieved 2024-04-12]

Collis, J. & Hussey, R. (2021). *Business research: a practical guide for undergraduate & postgraduate students. 5th* edition. London: Macmillan Education.

Collier-Reed, B. I., Ingerman, A. & Berglund, A. (2009). Reflections on trustworthiness in phenomenographic research: Recognising purpose, context and change in the process of research. *Education as Change*, 13(2), 1-12.

Cooper, R. G., & Sommer, A. F. (2018). Agile-Stage-Gate for Manufacturers Changing the Way New Products Are Developed Integrating Agile project management methods into a Stage-Gate system offers both opportunities and challenges. *Research Technology Management*, *61*(2), 17–26

Cousin, G. (2009). *Researching learning in higher education - an introduction to contemporary methods and approaches*. New York: Routledge

Dahlgren, L.O. & Johansson, K. (2019). Fenomenografi. In: A. Fejes, & R. Thornberg, ed. Handbok i kvalitativ analys. 3rd edition. Stockholm: Liber. pp. 179-192.

Deslippe, A. L., Bains, A., Loiselle, S., Kasvis, P., Mak, I., Weiler, H. & Cohen, T. R. (2023). SMART goals of children of 6–12 years enrolled in a family-centred lifestyle intervention for childhood obesity: Secondary analysis of a randomized controlled trial. *Pediatric Obesity*, *18*(1), 1-5.

DIGG (2023). *Digitala Sverige 2022.* Myndigheten för digital förvaltning. https://www.digg.se/download/18.1e68c05518649f2b2eb6a8e/1677659508496/Digitala%20Sverige%202022.pdf [Retrieved March 27, 2024).

Engwall, M. (1995). *Jakten på det effektiva projektet*. Stockholm: Nerenius & Santérus.

European Commission (2020). *Sverige, EU och digitaliseringen: Digitala mål för 2030.* https://sweden.representation.ec.europa.eu/strategi-och-prioriteringar/viktiga-eu-fragor-sverige/digitala-mal-2030_sv [Retrieved 2024-03-21].

Fernandez, D. J., & Fernandez, J. D. (2008). Agile Project Management -Agilism versus Traditional Approaches. *The Journal of Computer Information Systems*, 49(2), 10–17.

Gradillas, M., & Thomas, L. D. W. (2023). Distinguishing digitization and digitalization: A systematic review and conceptual framework. *The Journal of Product Innovation Management.*

Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, *24*(2), 105–112.

Gökalp, E., & Martinez, V. (2022). Digital transformation maturity assessment: development of the digital transformation capability maturity model. *International Journal of Production Research*, 60(20), 6282–6302.

Hallin, A. (2018). *Digitalisering och projekt.* Project Management Institute: Sweden. https://www.pmi-se.org/Artiklar-gammal/Digitalisering-och-projekt [Retrieved 2024-03-21].

Handojo, K. (2023, June 5). Digital Transformation and Its Impact on Project Management. *LinkedIn*. https://www.linkedin.com/pulse/digital-transformation-its-impact-project-management-kenrisen [Retrieved 2024-03-21].

Heavin, C., & Power, D. J. (2018). Challenges for digital transformation - towards a conceptual decision support guide for managers. *Journal of Decision Systems*, 27(sup1), 38–45.

Herrera, R. F., Matus, J., Santelices, C., & Atencio, E. (2020). Interaction between project management processes: a social network analysis. *International Journal of Project Organisation and Management*, 12(2), 133–148.

Hickey, B., Gachon, D. C., & Cosgrove, D. J. (2023). Digital Twin – A Tool for Project Management in Manufacturing. *Procedia Computer Science*, 217, 720–727.

Hill, C. E., Thompson, B. J., & Williams, E. N. (1997). A Guide to Conducting Consensual Qualitative Research. *The Counseling Psychologist*, 25(4), 517–572.

Hoda, R., & Murugesan, L. K. (2016). Multi-level agile project management challenges: A self-organizing team perspective. *The Journal of Systems and Software*, *117*, 245–257.

Jensen, A., Thuesen, C. & Geraldi, J. (2016). The Projectification of Everything: Projects as a Human Condition. *Project Management Journal*, *47*(3), pp. 21–34.

Kaiser, K. (2009). Protecting Respondent Confidentiality in Qualitative Research. *Qualitative Health Research,* 19(11), 1632–1641.

Kallio, H., Pietilä, A.-M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing*, *72*(12), 2954–2965.

Keller. C, Haftor. D, Rapp. B. & Sundberg. K. (2017). Agil projektledning - Något för alla eller bara för några. *Management of Innovation and Technology*, 4, p. 5-.

Khazanchi, D., Mishra, A., & Tripathi, A. (2022). A Proposal for Research on the Application of AI/ML in ITPM: Intelligent Project Management. I*nternational Journal of Information Technology Project Management*, 14(1), 1–9.

Korherr, P., Kanbach, D. K., Kraus, S., & Mikalef, P. (2022). From intuitive to data-driven decision-making in digital transformation: A framework of prevalent managerial archetypes. *Digital Business (Amsterdam)*, 2(2), 100045-.

Kozarkiewicz, A. (2020). General and specific: The impact of digital transformation on project processes and management methods. *Foundations of Management*, 12(1), 237–248.

KPMG & PMI Sweden Chapter (2020). *Swedish Project Review 2020 - Decoding the path to digital adoption*. Project Management Institute Sweden Chapter. https://assets.kpmg.com/content/dam/kpmg/se/pdf/komm/2020/swedish-project-review-2020-decoding-the-path-to-digital-adoption.pdf [Retrieved March 27, 2024].

Kvale, S. & Brinkmann, S. (2014). *Den kvalitativa forksningsintervjun.* 3rd eddition. Studentlitteratur: Lund.

Larson, E.W. & Gray, C.F. (2021). *Project Management: The managerial process*. 8th edition. McGraw-Hill: New York.

Larsson, J. & Holmström, I. (2007). Phenomenographic or phenomenological analysis: does it matter? Examples from a study on anaesthesiologists' work. *International Journal of Qualitative Studies on Health and Well-Being,* 2(1), 55–64.

Lederman, N. G., & Lederman, J. S. (2015). What Is A Theoretical Framework? A Practical Answer. *Journal of Science Teacher Education*, 26(7), 593–597.

Li, Z., Jin, Y., Li, W., Meng, Q., & Hu, X. (2023). Impacts of COVID-19 on construction project management: a life cycle perspective. *Engineering, Construction, and Architectural Management*, 30(8), 3357–3389.

Liu, Y., Zeng, N., Papadonikolaki, E., Maritshane, K. & Chan, P. W. (2024). The future of digitalized project practices through data-savvy talent: A digital competence formation perspective. *Project Leadership and Society*, *5*, 100120-.

Majumdar, D., Banerji, P. K., & Chakrabarti, S. (2018). Disruptive technology and disruptive innovation: ignore at your peril. *Technology Analysis & Strategic Management,* 30(11), 1247–1255.

Marnewick, C., & Marnewick, A. L. (2022). Digitalization of project management: Opportunities in research and practice. *Project Leadership and Society*, 3, 100061-.

McDowell, Z. (n.d.). *Vad är projekthantering?* https://www.planview.com/se/resources/guide/what-is-project-management/ [Retrieved 2024-03-26].

McKinsey & Company (2022). *What are Industry 4.0, the Fourth Industrial Revolution, and 4IR?*. August 17. https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-are-industry-4-0-the-fourth-industrial-revolution-and-4ir [Retrieved 2024-03-22].

Melkonian, T., & Picq, T. (2010). Opening the "black box" of collective competence in extreme projects: Lessons from the French Special Forces. *Project Management Journal*, *41*(3), 79–90.

Metasysinc (n.d). *The future of work is based on projects not roles.* https://www.metasysinc.com/metasys-blog/the-future-of-work-is-based-on-projects-not-roles [Retrieved 2024-03-21].

Narayanan, V., Papadonikolaki, E., Sankaran, S. & Clegg, S. (2022). Special collection in Project Leadership and Society: Call for papers on the role of digitalization in project management. *Project Leadership and Society,* 3, 100067-.

Nilsson, M., La Valle, D., García Pérez, O., Sagay, T., Piiavski, B., Cardenas, J., & et al. (2024). *Artificial Intelligence and Project Management: A Global Chapter-Led Survey 2024*. Project Management Institute Sweden Chapter. https://www.pmi-se.org/Filer/PMI/AI%20in%20PM/Community-Led%20AI%20and%20Project%20Management%20Report.pdf?TS=638451689863069636 [Retrieved March 27, 2024].

Palčič, I., Borut, B. & Lalić, B. (2013). Project-oriented work in Slovenian manufacturing companies. *IJIEM. International Journal of Industrial Engineering and Management*, *4*(4), 251-.

Papadakis, E. & Tsironis, L. (2018). Hybrid methods and practices associated with agile methods, method tailoring and delivery of projects in a non-software context. *CENTERIS 2018 - INTERNATIONAL CONFERENCE ON ENTERPRISE INFORMATION SYSTEMS / PROJMAN 2018 - INTERNATIONAL CONFERENCE ON PROJECT MANAGEMENT / HCIST 2018 - INTERNATIONAL CONFERENCE ON HEALTH AND SOCIAL CARE INFORMATION SYSTEMS AND TECHNOLOGIES, CENTERI*, *138*, 739–746.

Papadakis, E. & Tsironis, L. K. (2020). Towards a hybrid project management framework: A systematic literature review on traditional, agile and hybrid techniques. *Journal of Modern Project Management*, *8*(2), 124–139.

Pegulescu, I.A. (2023). Digitalization in Project Management. *"Ovidius" University Annals. Economic Sciences Series*, XXIII(1), 200–208.

PMI (2023). *5 Predictions for the Future of Project Management*. Project Management Institute. https://www.pmi.org/learning/publications/pm-network/digital-exclusives/5-predictions-for-the-future-of-project-management [Retrieved 2024-03-25].

PMI (2018). *The Project Manager of the Future: Developing Digital-Age Project Management Skills to Thrive in Disruptive Times.* Project Management Institute. https://www.pmi.org/-/media/pmi/documents/public/pdf/learning/thought-leadership/pulse/digital-pm-skills.pdf?rev=234f58d60d0b4451bc3f19f7ddbb92da&sc_lang_temp=en [Retrieved March 22, 2024].

Roald, T., Køppe, S., Bechmann Jensen, T., Moeskjær Hansen, J. & Levin, K. (2021). Why Do We Always Generalize in Qualitative Research? *Qualitative Psychology, 8*(1), 69–81.

Roy, C, B. (2023). Unlocking The Benefits Of Digitalization: Simple Strategies For Rapid Success. *Forbes,* [Online] April 7. Available via: https://www.forbes.com/sites/forbescoachescouncil/2023/04/07/unlocking-the-benefits-of-digitalization-simple-strategies-for-rapid-success/?sh=1b28a5197877 [Retrieved March 22, 2024].

Ruuska, I. & Teigland, R. (2009). Ensuring project success through collective competence and creative conflict in public–private partnerships – A case study of Bygga Villa, a Swedish triple helix e-government initiative. *International Journal of Project Management*, *27*(4), 323–334.

Saarijärvi, M., & Bratt, E.-L. (2021). When face-to-face interviews are not possible: Tips and tricks for video, telephone, online chat, and email interviews in qualitative research.

European Journal of Cardiovascular Nursing: Journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology, 20(4), 392–396.

SAP India. (2022). *11 Benefits Of Digitalization Which You Cannot Ignore.* SAP. https://news.sap.com/india/2022/04/11-benefits-of-digitalization/ [Retrieved 2024-03-22].

Saunders, M.N.K., Lewis, P. & Thornhill, A. (2019). *Research Methods for Business Students.* 8th edition. United Kingdom: Pearson Education Limited.

Schallmo, D., Williams, C. A., & Boardman, L. (2017). Digital transformation of business models-best practice, enablers, and roadmap. *International Journal of Innovation Management*, 21(8), 1740014-.

Schiele, H., Bos-Nehles, A., Delke, V., Stegmaier, P., & Torn, R.-J. (2022). Interpreting the industry 4.0 future: technology, business, society and people. *The Journal of Business Strategy*, 43(3), 157–167.

Starrin, B. & Svensson, P.-G. (1994). *Kvalitativ metod och vetenskapsteori*. Lund: Studentlitteratur.

Svenskt Näringsliv. (2021). *Företagens avgörande roll för en hållbar utveckling och genomförandet av Agenda 2030*. Svenskt Näringsliv. https://www.svensktnaringsliv.se/bilder_och_dokument/rapporter/ptwiwy_foretagens-avgorande-roll-for-en-hallbar-utvecklingpdf_1171496.html/F%C3%B6retagens+avg%C3%B6rande+roll+f%C3%B6r+en+h%C3%A5llbar+utveckling.pdf [Retrieved May 29, 2024].

Svenskt Projektforum. (2010). *Certificeringsboom när allt fler arbetar i projekt.* https://projektforum.se/certifieringsboom-nar-allt-fler-arbetar-i-projekt/ [Retrieved 2024-03-26].

Špundak, M. (2014). Mixed Agile/Traditional Project Management Methodology – Reality or Illusion? *Procedia, Social and Behavioral Sciences*, 119, 939–948.

Teamwork (n.d.) Why is project management important? https://www.teamwork.com/project-management-guide/why-is-project-management-important/ [Retrieved 2024-04-12]

Thesing, T., Feldmann, C., & Burchardt, M. (2021). Agile versus Waterfall Project Management: Decision Model for Selecting the Appropriate Approach to a Project. *INTERNATIONAL CONFERENCE ON ENTERPRISE INFORMATION SYSTEMS / INTERNATIONAL CONFERENCE ON PROJECT MANAGEMENT / INTERNATIONAL CONFERENCE ON HEALTH AND SOCIAL CARE INFORMATION SYSTEMS AND TECHNOLOGIES 2020 (CENTERIS/PROJMAN/HCIST 2020)*, 181, 746–756.

Thurén, T. & Stratchal, G. (2011). *Källa: internet. Att bedöma information utifrån källkritiska principer.* 1st edition, Malmö: Gleerups utbildning AB.

Tracy, S. J. (2010). Qualitative Quality: Eight "Big-Tent" Criteria for Excellent Qualitative Research. *Qualitative Inquiry*, 16(10), 837–851.

van Waardenburg, G., & van Vliet, H. (2013). When agile meets the enterprise. *Information and Software Technology*, 55(12), 2154–2171.

Varzaru, A. A. (2022). An Empirical Framework for Assessing the Digital Technologies Users' Acceptance in Project Management. *Electronics (Basel)*, 11(23), 3872-.

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, *122*, 889–901.

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144.

Vrana, J. (2021). The Core of the Fourth Revolutions: Industrial Internet of Things, Digital Twin, and Cyber-Physical Loops. *Journal of Nondestructive Evaluation,* 40(2).

Williams, T. (2005). Assessing and moving on from the dominant project management discourse in the light of project overruns. *IEEE Transactions on Engineering Management*, *52*(4), 497–508.

Wilemon, D. (1998). Cross-functional cooperation. In: J.K. Pinto, ed. *Project management handbook*. 1st edition. San Fransisco: Jossey-Bass Publishers. Pp. 279-299.

Wu, T. (2022). Digital project management: rapid changes define new working environments. *The Journal of Business Strategy,* 43(5), 323–331.

Yang, L. (2024). Research on the application of big data technology in enterprise project management. *Applied Mathematics and Nonlinear Sciences*, 9(1).

Appendix

Appendix 1: Interview Guide

- **Present ourselves –** Our names are, and we study this where we are writing our master thesis....
    - **Presentera oss –** Vi heter, pluggar master, skriver uppsats.....
- **Present the study –** The aim of this study is to gather knowledge and insights regarding project managers perceptions of challenges, and how these are handled, related to digitalization of project management.
    - **Presentera studien** – Vår uppsats ämnar undersöka projektledares upplevelser och uppfattningar gällande utmaningar med digital / digitaliseringen av projektledning, samt hur projektledaren hanterar dessa utmaningar.
- **Present the interview and its disposition –** We are going to start with some introductory questions about project management in general, then we are going to go on to digitalization and digitalization of project management. After that we are going to ask questions about challenges you have faced and how these were handled, what challenges you are currently facing and hos these are being handled, to the finish with challenges that you think can come in the future and how these should be handled.
    - **Presentera upplägg på intervju** – Vi kommer ha några inledande frågor generellt om temat projektledning, sedan kommer vi gå in på digitalisering och digitalisering av projektledning. Därefter går vi in på utmaningar du har mött samt hanteringen av dessa, sedan fokuserar vi på utmaningar just nu och hur du möter dessa, för att sedan avsluta med eventuella utmaningar du ser framöver och hur dessa kan hanteras.
- **Present the respondents rights in information from consent form –** It is only us and our supervisor that will have access to your personal information, and everything will be anonymized. The information will then be deleted when the report is done and has passed. It is up to you if you want to participate, and you can quit at any time without reason if you would like to. You will be able to read the report this summer via the plattform DivA, or if you would like to read it earlier, we can send you the finished report at the end of May.
    - **Presentera rättigheter och info från samtyckesblankett -** Bara vi och vår handledare som kommer kunna ta del av personliga uppgifter, allt kommer avidentifieras i vår slutliga rapport och allt kommer raderas så fort rapporten är färdigställd och fått ett godkänt. Det är helt frivilligt att delta och du kan när som helst under intervjun avbryta din medverkan, utan att behöva uppge orsak. Du kommer kunna ta del av resultatet via plattformen DivA i sommar, alt om du vill vi skickar rapporten till dig via mejl så kan vi göra det också
- **Ask if they have any questions**
    - Fråga om de har några frågor
- **Ask if it's okay to record**
    - Fråga om det är okej att spela in
- **Ask for oral consent**
    - Fråga om muntligt samtycke
- **Start the interview**
    - Påbörja intervjun

Subject	Question	Purpose of Question
Intro	For how long have you worked where you work right now?	To gather background information on the respondent

	Hur länge har du arbetat där du arbetar just nu?	
Intro / Project management	For how long have you been a project manager? Hur länge har du arbetat som projektledare?	To get an understanding of their experience within the field of project management
Intro / Project management	What types of projects and project method do you usually work with? Vilka typer av projekt och projektmetoder jobbar ni i projektteamet vanligtvis med?	To get an understanding of their experience withing the field of project management
Digitalization of project management	For how long have you as a project manager been working with digitalization of project management? Hur länge har du i din roll som projektledare arbetat med digitalisering av projektledning?	Get an understanding of how much experience they have of working with digital project management
Digitalization of project management	Have you been a part of the change towards digitalization of project management? Har du varit en del av förändringen mot digitalisering av projektledning?	To get an understanding of how involved the respondent is in the change towards the digital project management
Digitalization of project management	How do you work with digitalized project management today? Hur arbetar ni digitalt med projektledningen i projekten idag?	Get an understanding of how they work with digital project management in projects
Digitalization of project management	Can you describe in more detail what digital tools are being used? Kan du beskriva mer i detalj vilka digitala teknologier, verktyg etc. som används?	Follow up, get an understanding of how they work with digital project management in projects
Digitalization of project management	Can you describe in more detail how these tools affect the project management processes? Kan du beskriva mer i detalj hur dessa digitala teknologier, verktyg etc. påverkar projektledningen.	Follow up, get an understanding of how they work with digital project management in projects
Digitalization process	How do you think the digitalization of project management affects project management and project management processes? Hur anser du att digitalisering av projektledningen påverkar projektledningen och projektledningsprocessen?	Get an understanding of how they work with digital project management and in what stage of the digitalization process they are

Digitalization process	Do you perceive that digital techniques and tools have affected the business model in the organization? In what way? Upplever du att digitala tekniker och verktyg har påverkat affärsmodellen? Hur i så fall?	Get an understanding of how they work with digital project management and in what stage of the digitalization process they are
Digitalization process	Do you perceive that digital techniques and tools have affected the structure in the organization? In what way? Upplever du att digitala tekniker och verktyg har påverkat strukturen i organisationen? Hur i så fall?	Get an understanding of how they work with digital project management and in what stage of the digitalization process they are
Digitalization process	Do you perceive that digital techniques and tools have affected the culture in the organization? In what way? Upplever du att digitala tekniker och verktyg har påverkat kulturen i organisationen? Hur i så fall?	Get an understanding of how they work with digital project management and in what stage of the digitalization process they are
Challenges - Then	What challenges do you perceive as a project manager that you have faced regarding the digitalization of project management? Vilka utmaningar upplever du som projektledare att ni har mött kopplat till digitalisering av projektledningen?	To get an understanding of the perceived challenges
Actions - Then	How did you as a project manager handle these challenges? Hur hanterade du dessa utmaningar som projektledare?	Get an understanding of how they handled challenges with digital project management
Actions - Then	Follow-up questions on the challenges and actions mentioned. E.g. “If we start with this mentioned challenge, how did you handle that?.... Okay the next mentioned challenge was xxx how did you handle?”... Följdfråga - “Om vi börjar gå in på den först nämnda utmaningen xxx, hur hanterade du den?....Okej, om vi går vidare till nästa nämnda utmaning xxx, hur hanterade du den?”...	Follow up, to get in-dept information on every mentioned challenge which they have handled.
Actions - Then	Do you perceive that your way of managing these challenges was working? In what way?	Get an understanding of their perception of how they handled challenges of digital project management

	Upplever du att sättet du hanterade utmaningarna på fungerade? Utvärdera hur?	
Actions - Then	Do you perceive that the challenges you have mentioned could have been handled differently in any way? Why / why not? How? Upplever du att utmaningarna du nämnt kunde ha hanterats på något annat sätt? Varför / Varför inte?	Get an understanding of their perception of how they handled challenges of digital project management
Challenges - Then	Is there anything else you want to add related to challenges you have faced when it comes to digitalization of project management? If so, what? Finns det något annat du vill tillägga kopplad till utmaningar du har mött gällande digitalisering av projektledning? I så fall, vadå?	To get an understanding of the perceived challenges
Challenges – Now	What challenges do you perceive as a project manager that you are facing regarding the digitalization of project management? Vilka utmaningar upplever du som projektledare att möter kopplat till digitalisering av projektledningen?	To get an understanding of the perceived challenges
Actions – Now	How do you as a project manager handle these challenges? Hur hanterar du dessa utmaningar som projektledare?	Get an understanding of how they are handling challenges with digital project management
Actions- Now	Follow-up questions on the challenges and actions mentioned. E.g. “If we start with this mentioned challenge, how did you handle that?.... Okay the next mentioned challenge was xxx how did you handle that Följdfråga - “Om vi börjar gå in på den först nämnda utmaningen xxx, hur hanterade du den?....Okej, om vi går vidare till nästa nämnda utmaning xxx, hur hanterade du den?”...	Follow up, to get in-dept information on every mentioned challenge which they are handling
Actions – Now	Do you perceive that your way of managing these challenges is working? In what way? Upplever du att sättet du hanterar utmaningarna på fungerar? Utvärdera hur?	Get an understanding of their perception of how they are handling challenges with digital project management

Actions - Now	Do you perceive that the challenges you have mentioned should be handled differently in any way? Why / why not? How? Upplever du att utmaningarna du nämnt bör hanteras på något annat sätt? Varför / Varför inte?	Get an understanding of their perception of how they are handling challenges with digital project management
Challenges - Now	Is there anything else you want to add related to challenges you are facing when it comes to digitalization of project management? If so, what? Finns det något annat du vill tillägga kopplad till utmaningar du har mött gällande digitalisering av projektledning? I så fall, vadå?	To get an understanding of the perceived challenges
Challenges	Have your perceptions on the challenges related to digitalization of project management changed over time? How? Har dina upplevelser av utmaningarna relaterat till digitalisering av projektledning ändrats över tid? Hur?	To get a holistic understanding of the perceived challenges, and if they are consistent or changing depending on the situation
Digitalization of project management	Do you perceive that the organization has any plans of implementing more digital solutions and ways of working in project management in the near future? Upplever du att organisationen är planerar att implementera fler digitala sätt att jobba med i projektledningen inom den närmsta tiden? Vilka då?	Get an understanding of how they plan to work with digital project management
Challenges	In case of yes to the question above - What challenges do you perceive this will bring? Om svaret är ja på frågan ovan – Vilka utmaningar upplever du att detta kan leda till?	To get an understanding of the perceived challenges
Actions	In case of yes to the question above – How do you think that each of these should be handled? Om svaret är ja på frågan ovan - Hur anser du att var och en av dessa ska hanteras?	To get an understanding how these perceived challenges can be handled
Challenges and Actions	Is there anything else that you feel is important to bring up regarding perceived challenges and actions related to digitalization of project	To invite the respondent to fill in if they feel like we have missed some important areas

	management which we have not already touched upon? Är det något mer du anser som viktigt att ta upp kopplat till dina upplevelser om utmaningar och hanteringen av dessa, relaterat till digitalisering av projektledning, som vi har missat?	

- **Finish up** - Thank the participant for their time and their answers and tell them that they are welcome to contact us via e-mail if they have any questions or if something else comes to mind that they want to share.
    - **Avsluta** - Tacka för medverkan och upplys respondenten om att det bara är att återkomma om de kommer på något annat eller om det uppstår frågor
- **Finish recording**
    - **Avsluta inspelning**

UMEÅ SCHOOL OF BUSINESS,
ECONOMICS AND STATISTICS
UMEÅ UNIVERSITY

Business Administration SE-901 87 Umeå www.usbe.umu.se