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THE IMPACT OF DIGITALIZATION ON
PROJECT MANAGEMENT: METHODOLOGIES
AND PRACTICES IN FINLAND TO SEVERAL
INDUSTRIES

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ABSTRACT

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Technological progress and the trends fueling globalization have paved the way for incredible economic growth, creating opportunities and changes we've never seen before. Organizations are increasingly adopting digitalization to tackle new challenges across all areas of operation. In project management, tools like big data, artificial intelligence, and cloud computing have become more prevalent, especially considering the growing complexity of modern project work.

This thesis examines how digital transformation affects the energy industry, focusing on the challenges it presents, potential solutions, and new opportunities. It also evaluates employees' perceptions of adopting digital technologies within project management. The empirical research includes a survey of 80 participants, out of 120, making 66.67% of respondents, who are working in the energy sector of Finland. In the study, structured, closed, and open-ended questionnaires were asked of the respondents. The study shows a positive correlation between the technology acceptance model (TAM), Resource View, and Digital Transformation Framework.

The findings indicate that widespread digitalization will lead to significant shifts in how both employees and managers perform their jobs. Furthermore, digitalization has enhanced the efficiency and effectiveness of project management, which has a strong positive impact on both the intention to use these tools and their actual adoption, making them more readily accepted. Overall, the thesis aims to offer a thorough insight into the various implications of digital transformation within the energy sector.

Keywords: Digitalization, Project Management, energy sector,
Opportunities, Challenges, decision-making

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Abbreviations

AI = Artificial intelligence

APMF = Agile Project Management Framework

DCIM = Datacenter Infrastructure Management

DTI = Diffusion of Innovation theory

GDPR = General Data Protection Regulation

IC = Intellectual Capital

IoT = Internet of Things

LDTA = Level of Digital Tool Adoption

PM = Project Management

SME = Small and Medium-size Enterprise

TAM = Technology Acceptance Model

1 INTRODUCTION

The global economy is heavily rely on the energy sector, which also helps in sustaining daily living and also fundamental to the world. As the need for energy efficiency rises, energy industries are employing advanced digital technology to fulfill the daily energy requirement. In simple words, the process of integration of digital technology to enhance productivity, and increase efficiency, sustainability, and competitiveness across the energy value chain is known as digitalization. This digitalization helps to sort out the numerous problems and challenges and offers new opportunities for the integration of renewable energy sources to enhance overall performance and simplify daily operations.

1.1 Background

Every day we perform various activities in our daily routine work. During work, we use different types of equipment and tools that enhance and improve our performance and make our tasks easier and more reliable. Innovation and technological advancement have made our lives easier than before.

One of the innovations and technological advancements is digitalization. It has emerged as a promising factor that helps reshape both society and business in the foreseeable future. It has influenced millions of people, who are or are not familiar with it. It is expected to be an influencing and positive transformative impact of the Industrial Revolution. It is justified as not just the conversion of analog data into digital format; it has a much deeper and also fundamental change that goes beyond digitizing existing processes or outputs. It serves as a crucial factor for enhancing internal operations more effectively and efficiently within organizations and provides external opportunities, like introducing new and unique services or products to the customers (P. Praviainen, M. Tihinen, J. Kaariainen& S. Teppola, 2017).

Generally, digitalization brings a systematic change in a company's operational methods, procedures, and functional methods. Despite its complexity, digital transformation has the potential to convert such changes into success. Since, it is the process or method of converting analog information into digital form, with the help of using computers or digital technology. Such as digital tools, technologies, and smooth operations, enhance efficiency, and create new opportunities for innovation and growth of the organization in the competitive market.

Digitalization has brought changes in our work patterns, communication, and interactions with the world around us. At the same time, it also provides a great number of opportunities for innovation, enhanced efficiency, and new business models. However, it also created challenges related to data privacy, cyber security, and digital inclusion. Now, the implementation of digitalization is compulsory for every organization for their longevity and build trust and goodwill among their customer and also builds loyalty in the societies for growth and survival in the increasingly digitized global market.

Digitalization also has some vital aspects, including digitizing data, automating processes, digital platforms, and solutions, and imposing digital channels for better communication and interaction. The main objective is to power up digital technology to transform traditional methods of doing business into digital form.

In the present scenario, digital tools can be advantageous in addressing uncertainty, and the dynamic and complex nature of the business environment (R. Trzaska, A. Sulich, M. Organa, J. Niemczyk & B. Jasinski, 2021). These tools allow organizations to perform their operations more smoothly and efficiently, thereby enhancing overall outcomes. Additionally, they enhance the capability to measure the effectiveness of implemented processes, which is particularly relevant in industries like the energy and business sectors.

Digitalization serves as rectifying data, and later it becomes central to optimizing energy usage and enhancing user experience, maintaining integrity, and safeguarding against unauthorized access, which are most important. Thus, digitalization is such an amazing tool and technique that offers data utilization, fostering customer confidence. Also, due to robust security, it protects against the leakage of sensitive and confidential information prioritizing data safeguarding and facilitating smooth and uninterrupted service. In this digitalization era, it is challenging to balance innovation with data ethics.

Similarly, on the other hand, Smart energy services offer safeguards to customers through advanced data processing, which emphasizes the growing significance of ensuring transparency and security in accessing and handling data (K. Vesikioja et al., 2022). This describes the increasing trust in ensuring transparency and security in data access and processing.

The main aim of this study is to find out the methods and practices that are carried out by the energy industries in Finland. Since the industries have gone through different phases of transformation from manual to digital structure. During the phase of transformation from manual to digital form, industries have faced many hurdles and obstacles. How they have adopted or accepted digital transformation regarding the concern of change in work design and change management?

In the process of digital transformation, energy industries have made different strategies for adoption which rooted in strategic management principles, offer significant advantages amid today's volatile business landscape. Increasing use of digital tools in organizations like energy sectors can effectively navigate uncertainty and adapt to rapid changes. These strategies offer a better operation, fostering by enhancing the efficiency and agility of organizations.

Moreover, the application of digitalization gives a precise measurement and evaluation of implemented processes, empowering companies to upper hand their strategies over competitors and optimize their performance continuously in the future. In essence, digitalization not only empowers organizations to thrive in dynamic and complex environments but also provides insights for sustained growth and competitiveness in globalization. Digitalization possesses the capacity to enhance project management, thereby aiding in the reversal of the downturn in productivity (k. Jahanger et. al., 2021).

1.2 Purpose of Research

Digitalization is inevitable for the development and success of the energy sector which helps in boosting project management practices and strategies. The adoption and practice of various digital tools and technologies such as IoT sensors, data analytics, and AI-driven predictive models can help the energy sector achieve objectives with greater efficiency and optimization of resources (Vuksic, Ivancic & Vugec, 2018). Proactive decision-making helps reduce losses of time and resource wastage which can be monitored immediately (Woodhouse & Brown, 2022). Additionally, it generates large amounts of data that provide extra benefits during decision-making, allowing project managers to predict challenges and help in executing plans accordingly (Varzaru et al. 2022). Digitalization helps in enhancing performance by overcoming geographical barriers and enabling smooth communication. Furthermore, it creates transparency, alignment of goals, and coordination, which are crucial for making sure of success in complex energy projects.

Moreover, digitalization has brought innovation and advancement in the energy sector that regulates the implementation of advanced technologies to improve their reliability and enhance project flexibility. Digital tools and technology such as Artificial intelligence, grid systems, and blockchain can greatly provide new

opportunities for optimal results and enhancing efficiencies in their project work (N. Victor et al., 2023) (Forradellas, & Gallastegui, 2021).

Furthermore, usages of digital tools in energy companies motivate to promote sustainability by reducing carbon emissions and promoting renewable energy integration. Implementing digitalization doesn't mean only improving technology but it also refers to the transformation of project management practices to overcome the challenges and utilize opportunities from the rapidly evolving energy market while maintaining sustainability (Towsend, & Coroama, 2018).

The main purpose of the study is to find the obstacles and challenges faced by the energy industries during the integration and adaptation of digitalization and its transformation. The transformation of digitalization especially in energy sectors has flourished the energy business. However, in Finland, there are still some challenges that the energy industries are facing. While integrating digitalization into project management in Finland faces several key challenges. While implementing new sets of technologies various factors influence their work pattern. The factors that influence industries are:

Objective 1: Internal and External factors.

Internal Factors

- Organizational culture
- Resource availability
- Employee skills
- Organization's structure
- Methods of work
- Willingness to innovate

External Factors

- Market trends
- Technological advancements
- Globalization
- Regulatory changes
- Resource feasibility
- Consumer behaviors
- Societal norm

Internal Factors: Such issues should be addressed by creating a favorable environment for digitalization, fostering agility, innovation, and sustainable growth in the digital age. And government of Finland should negotiate with the organization over such factors and take necessary action and policy to resolve such issues.

External Factors: Organizations should monitor frequently the motion of external factors and adopt various effective strategies against these external factors that can overcome challenges, seize opportunities, and stay competitive in the complex and dynamic digital environment.

With the adoption of digitalization, the project management style in Finland has been greatly influencing the work pattern from traditional to modern. Digital tools and technology have significantly improved project planning, execution, and monitoring processes, which as a result has increased the level of efficiency and productivity. Matching the market trend of rapid technological changes helps organizations to enable the development of flexible power systems (Giraldo et al., 2021). Catching up with the innovation and speed of digital transformation has greatly enhanced smooth coordination among team members, even across different locations.

Objective 2: Perceptions of Project Managers Regarding Digitalization

The perception of project managers on digitalization's impact on project outcomes and efficiency is versatile, often reflecting a combination of optimism, caution, and practical considerations. As organizations increasingly integrate digital tools and technologies into project management, project managers experience significant changes in how projects are planned, executed, and evaluated. Their perceptions can reveal both the perceived benefits and the challenges associated with digitalization.

Digitalization provides a unique experience of advanced monitoring and automation systems, enhances decision-making through data-driven insights, and improves the efficiency of overall performance in project management. It helps increase the collaboration among various departments and teams, and also reduces costs via automation and predictive maintenance, and has improved the innovation and flexibility of projects through AI and blockchain.

Objective 3: To explore the emerging trends in project management practices driven by digitalization.

After the revolution of digital transformation in Finland, many sectors including the energy sector are booming. Every project manager is aware of globalization and global market trends. Those who accepted the change in the pattern of work model and methodologies have achieved great success in their field through digitalization. They have used digital tools like IoT sensors and real-time data analytics to monitor and manage the grid, reducing outages and optimizing energy flow. As a result, they have managed significant operational cost savings and improved their service quality for customers.

Further, digitalization has changed traditional project management methodologies and also increased collaboration and agility, which resulted in greater efficiency and innovation across industries in Finland.

Similarly, the government of Finland has implemented strict data privacy regulations, such as the General Data Protection Regulation (GDPR) which mandate robust security measures when handling sensitive information. Under these regulations, implementing digital tools for project management and data analysis may pose a significant challenge. To cope with such challenges organizations must implement strong data security protocols and invest in cyber security which helps to protect their sensitive data losses.

Likewise, Finnish Organizational culture may pose resistance to change, particularly when digitalization has changed the pattern of workflows and methods. To overcome such resistance project managers must adopt a culture of innovation and adaptability, strategy, and policies for successful digital transformation. Such as effective change management strategies, clear communication, and leadership support project management.

1.3 Research Objectives and Questions

The main aim of the research is to investigate the efficiency of digitalization within project management and the underlying factors contributing to its effectiveness in reaching the research gap. The following are the research objectives of this study.

- To identify and analyze the primary challenges faced by organizations when integrating digitalization into their project.
- To investigate the perceptions of project managers regarding the impact of digitalization on project outcomes and efficiency.
- To explore the emerging trends in project management practices driven by digitalization.

Based on the above objectives, the following questions will be addressed in the study.

- What are the main challenges faced by organizations in integrating digitalization into their project management in Finland?
- How has the adoption of digitalization impacted traditional project management methodologies in the energy sector of Finland?

The identification of the challenges and significance of digitalization in project management while integrating it provides a deeper understanding of factors that promote the effectiveness of digitalization in project management. Furthermore, this study will explore more about the understanding of digitalization in project

management, methods and practices to tackle the issues of digitalization in project management, its outcomes, and effectiveness, and offer practical insights for its application.

1.4 Framework

This part of the study explains the methods and processes that are used for the theoretical framework. To examine the impact of digitalization in energy industries we used the Technology acceptance model (TAM), Resource-based view, and Digital transformation framework as a component for the study framework.

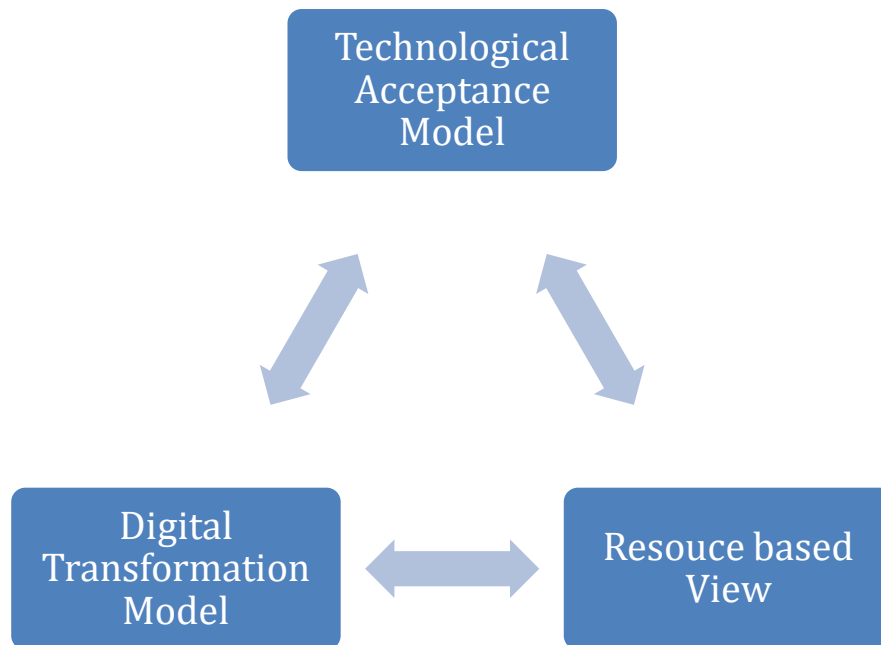


Figure 1: Research Framework

1.4.1 Technology Acceptance Model(TAM)

The Technology Acceptance Model (TAM) is often used as a theoretical framework in technology adoption and acceptance. This model helps researchers to explain and predict the user perception about the users' acceptance of new technologies based on their perceived usefulness and ease of use. This model

focuses on individuals who perceive it to be useful in achieving their goals perceive it to be easy to use and are more likely to accept new technology. It is a user-focused approach, provides empirical support, ability to predict use acceptance, and adaptability which make it particularly effective for study than other methods.

1.4.2 Resource-Based View(RBV)

It is a strategic management framework that emphasizes mostly strategic management which is important for a firm's internal resources and capabilities in achieving sustainable competitive advantage. This model mainly focuses on enhancing their strengths by utilizing its internal sources and a deeper understanding of the significance of such resources that provide a clear path to strategic success and effective resource utilization. So, this makes RBV a valuable framework compared to other strategic models.

1.4.3 Digital Transformation Framework(DTF)

A digital transformation framework is also known for transitioning businesses into digital form by using a structured approach model. This model shows a clear vision and strategy for the organization which helps in fostering a supportive culture, enhancing customer experience, adopting modern technologies, optimizing processes, developing digital skills, and promoting innovation, which helps them to remain competitive and responsive in a rapidly evolving global digital market. Thus, the DTF method stands at its best than other models.

1.5 Research Problems

Considering the digitalization topic, over the past decay there is significant improvement has been made. Much research and literature have been done in the past regarding digitalization in project management in Finland. Despite, the previous study, most of the study was done and focused only on challenges faced by the project manager during its adaptation. They still lack study about

the impact of digitalization especially on the traditional project management methodologies.

Further, the study investigates and explores the impact of digitalization on the methodologies of those who are running traditional method and their challenges during their implementation in project management. In our empirical research, we plan to tackle such issues by applying three methods Technology Acceptance Model, Resource Based View, and Digital Transformation Framework.

The current body of literature primarily examines the impacts of digitalization in energy industries but lacks a thorough exploration of the factors that make vulnerable the effectiveness specifically in project management contexts. This absence of comprehensive analysis hampers project managers' capacity to fully influence the advantages of digitalization. Although some literature addresses the precursors of digitalization in energy sectors, this thesis undertakes a review and comparison of existing works to develop a comprehensive understanding of the necessity for the assumption of digitalization of project management in the energy sector.

1.6 Thesis Structure

This research study is categorized into five primary chapters, each chapter explores and plays a distinct role within the broader study. Each of the chapters is briefly mentioned below for a better understanding of this study.

Chapter 1, Introduction: Introduce the topic, and provide the necessary background and context for the research. This presents the research problem, the objectives of the study, and the importance of investigating the impact of digitalization on project management.

Chapter 2, Literature Review: Presents the literature review method. This provides a detailed explanation of how the study was conducted, the sources of

literature, selection criteria, critical analysis of the literature, and empirical review.

Chapter 3, Methodology: Presents a detailed description of the method for a survey, research design, data collection, sample collection, and analysis techniques

Chapter 4, Finding, Result, and Discussion: Present and analyze the data collection, exploring the impact of digitalization in project management. Analyses research findings, evaluates the impact of digitalization in project management, and provides practical recommendations.

Chapter 5, Summary and Conclusion: Summarize the key findings, highlight research significance, and present practical implications of digitalization in the project.

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

This literature review is studied and designed by the very careful study of empirical cases on the digitalization of Finland's energy sector. It includes key elements and components thoroughly addressed in the case study from an academic standpoint. This empirical review study covers essential terminology, foundational concepts, methodologies, and processes that are relevant to the digitalization of project management. These elements will be thoroughly described and presented. Further, the study will help to understand and explore the impact of digitalization on project works, customer perception, and socio-economic aspects in detailed ways.

In this section, the main focus will be a review of previously studied cases on digitalization in project management especially in the energy sector in Finland and across the world. Different aspect and their empirical finding from other literature will be discussed highlighting the meaning and purpose of digitalization.

Digitalization provides access to the project manager to allocate resources efficiently, track and evaluate the work, and identify bottlenecks which as a result helps in the decision-making process. Consequently, it enhanced the performance of project management work by automating tasks, facilitating collaboration, and providing real-time data insights. This improved efficiency translates to faster project completion times and cost savings.

2.1 Theoretical Framework

In this study, we explore and review the previous literature and try to investigate and connect the review with our theoretical framework. The components of the theoretical framework are the Technology Acceptance Model, Resource View, and Digital Transformation Framework.

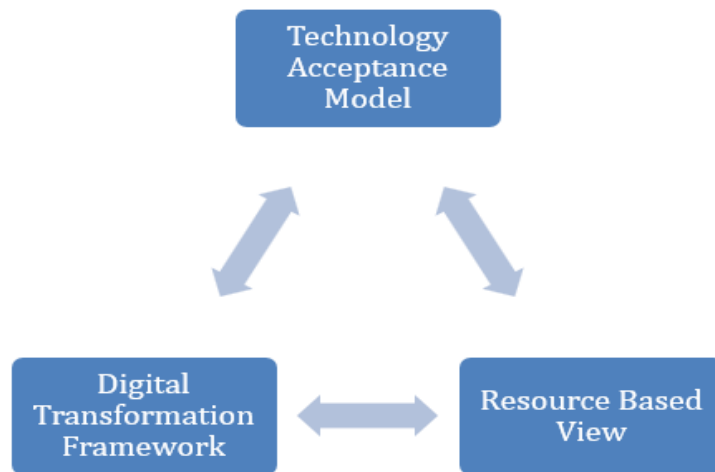


Figure 2: Theoretical Framework

2.2 Technology Acceptance Model

The Technology Acceptance Model (TAM) is a theoretical framework that helps in understanding and predicting how customers perceive, accept, and use such technology. TAM specifically addresses the factors influencing users' decisions to adopt or reject a technology. It has two major components: perceived usefulness (PU) and perceived ease of use (PEOU).

The Technology Acceptance Model (TAM) holds significant value in project management, especially when it comes to implementing new technologies and systems. Its relevance spans several aspects of project management, including stakeholder engagement, risk management, change management, and project success evaluation. The perception of rather positive sides of the changes caused by DT, superior functioning of the organization, and the improved delivery of projects in the new conditions of the digital economy (Kozarkiewicz, 2020).

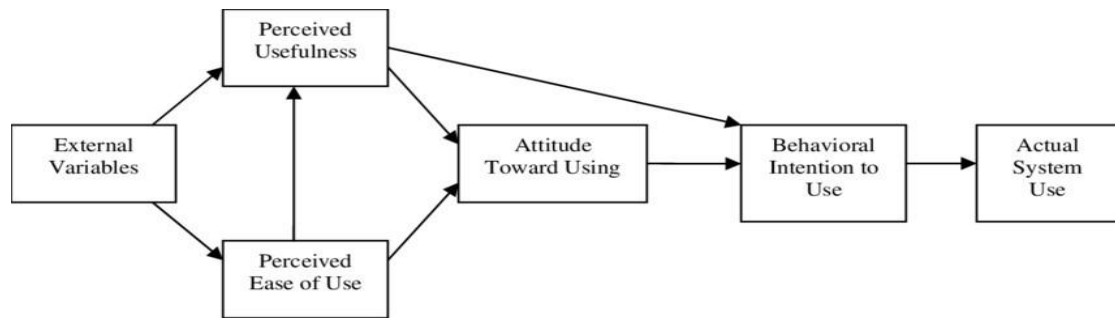


Figure 3: Technology Acceptance Model (TAM)

(Davis, 1989)

2.2.1 Perceived Usefulness (PU):

Perceived Usefulness (PU) is a theoretical framework which a degree to which a person believes that using a particular system or technology will enhance their job performance or overall productivity. It is a key determinant in predicting whether users will accept and adopt a new technology.

Perceived Usefulness (PU) is a fundamental aspect of the Technology Acceptance Model (TAM) and plays a vital role in the successful adoption of new technologies. Project managers need to focus on enhancing PU so that they can inspire user acceptance, increase satisfaction, and ensure the success of digital transformation initiatives. This helps to motivate users as well as suppliers towards the adoption of digitalization in the energy sector. Thus, acknowledging the PU helps align technological solutions with user needs and organizational goals, leading to more effective and efficient outcomes (E. Park, & M. Park, 2020).

Furthermore, PU is often considered with higher user acceptance significantly impacts successful project outcomes. The users become more enthusiastic when they believe that technology will significantly improve their work performance. It will be more effective when user reduces their resistance and foster a positive

attitude towards the new technology. This enhances and motivates the energy sector of Finland towards digitalization and work efficiency.

With the help of PU Finland's energy industry can boost their productivity, communication, time management, and staff performance with the help of Data Center Infrastructure Management (DCIM) systems through digitalization in the energy sector. The components of digitalization like PU can significantly support project management tasks, allowing more focus on what truly matters. Project management is not just about planning, executing, monitoring, controlling, and closing tasks; it is also about leadership (Saarela). This shows how PU is crucial for all the staff and members of any project in the energy industry to reach the set goals and objectives and achieve expected results.

2.2.2 Perceived Ease of Use (PEOU)

Perceived Ease of Use (PEOU) is a crucial component of the Technology Acceptance Model (TAM). It refers to the degree to which a person believes that using a particular system or technology will be free of effort. Moreover, PEOU also helps to provide customers, with methods of learning, adapting, and operating flawlessly and effectively. A higher PEOU represents that the customer or users find this technology easy to understand and use, as a result, it positively impacts their willingness or encouragement to adopt it.

Generally, it is known that when users feel that the technology is easy to use, they are more likely to adopt it into their daily work to harness their performance and for a better outcome. So, it is said that high PEOU represents the greater user acceptance and adoption of new technology. This technology has greatly impacted the energy sector of Finland, as it faced challenges in the beginning to make customers understand their product and technology. But with the constant effort from the energy sector, they become able to motivate and influence their customers.

Thus, with high PEOU of technology in the energy sector, can significantly improve overall performance efficiency by reducing the time and effort required to perform tasks, leading to productivity gains (E. Park & M. Park, 2020). The level of satisfaction of users depends on how the new technology improves their outcomes and which is very effective, and also easy to learn and use, resulting in a positive overall experience. This leads to the effectiveness of digitalization in the energy sector of Finland through effective strategies and decision-making processes. PEOU is a critical phenomenon that helps minimize resistance to change in new technologies by facilitating its features and beneficial impact through easy-to-understand and easy-to-use (Varzaru, 2022).

Project managers need to enhance PEOU to address the issues generated during the adoption and project function in energy sectors in Finland. Because it helps to create user-friendly technologies that are easy to learn and adopt. As a result, it facilitates smoother digital transformation and more efficient workflows in energy sectors.

2.3 Resource-Based View

The organization has its assets either it is tangible or intangible. The project manager needs to use and handle it effectively to get their set objectives. This represents the manager's ability to effectively utilize its resources which can optimize and source of competitive advantage and superior performance.

RBV provides superior performance advantages over competitors because is rare, and unique. Killen et al. (2012) asserted that applying the Resource-Based View (RBV) to these studies introduced "methodological rigor and enhanced explanatory power." They also noted that the effective use of these strategic management theories across various contexts suggests that these theories have significant potential to underpin future research in project management.

It is a strategic management theory that is extensively utilized by managers in project management (Almarri & Gardiner, 2014). There is a growing trend and interest in adopting RBV in the field of project management by project managers to get the desired result, especially in the energy sector. Whereas project management involves a series of processes that include tools, techniques, and knowledge-based practices aimed at achieving organizational objectives and delivering products or services (Fernie et al.,2003). With the help of RBV project managers of energy sectors can respond according to the ongoing trend environments and it also enhanced the ability to adapt, integrate, and reconfigure internal and external competencies to address the rapidly changing environments of Finland.

It mainly focuses on how users can obtain their uniqueness and enhance those unique aspects, so companies can maximize their strategies' advantages over competitors. In doing so, the users must maintain the balance between internal resource development and external market dynamics to maintain long-term competitiveness in the energy sector of Finland.

2.4 Digital Transformation Framework

It is a structured approach applied by the project managers for organizations to transition from traditional processes to modern ones. This approach is crucial in the energy sector because it helps to develop the way of performance in the energy sector. It brings digital work patterns so that the energy sector can yield the maximum amount of output. However, the level of successful transformation significantly depends on its effective implication and smooth transformation. It involves maintaining a flawless working environment that supports innovation and growth for the team and a customer-centric environment. So that, a manager can get to know, how it has impacted on customer's perception and internal operation.

Digital transformation plays a crucial role in bringing positive change in the organization and project work in the energy sectors. It provides a clear roadmap and strategic direction which helps in setting organizational goals, identifying areas for improvement, and charting a course of action to achieve digital objectives (Meier, 2017). It is done with the application of guided strategy, efficient resource allocation; enhanced decision-making, scalability and flexibility, risk mitigation, customer-centric approach.

The success of an organization and its project largely depends on various factors, including internal organization, stakeholder engagement, and digital competencies (Slavkovic, 2019). Furthermore, it helps to maintain closer relationships for the reach of new markets with significantly lower investment and establish excellent communication channels with customers and partners through the application of new digital transformation (Pereira,2021).

Studies of digital transformation should adopt a longitudinal perspective to understand the factors that have driven current innovations in the industry. In this context, employing methods such as researching document archives or retrieving digital traces is crucial and should not be underestimated (Hepso& Parmiggiani, 2022)

Digital transformation has significantly impacted project management by enhancing their work efficiency, collaboration, and decision-making. It reduces manual tasks into automation through smooth operation and eliminating errors. Such advanced tools give real-time data analysis and provide better project tracking and insights, facilitating informed decisions (Szczepa & Stepień, 2022). Moreover, the study and research document of digital transformation archives digital trace by improving communication platforms, and fostering team collaboration, which enables organization and project work more agile, responsive, and highly successful.

2.4.1 Project Management Methods

A project management method is a systematic approach, which is used to plan, execute, monitor, and control projects effectively. It requires or possesses various techniques, processes, and tools to ensure that projects are completed on time, within budget, and to the required quality standards. Some examples of project management methods are Waterfall, Agile, Scrum, Kanban, Lean, PRINCE2, CPM, and PERT. Each method offers a unique set of principles and practices that are supportive and applicable according to the types of projects, team dynamics, and organizational goals. Similarly, these methods provide structure and guidance to project managers and teams throughout the project lifecycle which are helpful for the project's success.

2.4.2 Waterfall Method

The Waterfall model is known as the traditional project management approach which works under a linear and sequential process. It is done thoroughly inspection of various processes or steps i.e., Requirements Gathering, System Design, Implementation, Testing, Deployment, and Maintenance. Each step is done one after another completion. This model is mostly used for projects that have well-defined requirements and minimal expected changes, ensuring proper documentation and clear progression. However, it can be inflexible in adapting to evolving project needs (Thesing et al., 2021).

2.4.3 Agile Method

Agile is a project management approach that is flexible and mostly focuses on collaboration, adaptability, and customer satisfaction. In this method, work is divided into segments, collecting respond's feedback and adaptation to changing requirements. Various team departments work together and deliver incremental value to the organization and its body at the end of each repetition, focusing on customer needs and promoting continuous improvement throughout the project lifecycle (Thesing et al., 2021).

2.4.4 CPM Method

The Critical Path Method (CPM) is a set technique that is used for project planning and scheduling activities. This technique helps in identifying the best way possible path which determines the minimum time required for the completion of the project. After, analyzing such a path, project managers prioritize the tasks that should be completed on time and help in optimizing project schedules, allocating resources efficiently, and managing projects well (Aliyu, 2012).

2.4.5 PERT Method

It is a project management method that estimates the time required to complete a project. It identifies the project activities and calculates their duration based on optimism. It also provides a network diagram to represent the sequence and dependencies of project activities. PERT provides a more accurate estimation of the project's overall duration. It also provides necessary information regarding the project to the project managers for better planning, and execution, and manages project timelines to accomplish the target objectives.

2.5 Digitalization and Project Management Method

In the digital age, project management is affected by several factors or components such as managing time, costs, and quality, evaluation of project teams, effective communication, ability to handle project risks, and managing procurement and resources. Each of these elements plays a crucial role in navigating and successful completion of projects within the estimated or projected time effectively (Simion, 2018).

Project management and its methodology have unique sets of tasks that require continuous and constant improvement. The main source of enhancement and

improvement of project management is digitalization. Hence, digitalization plays a crucial role in making the project successful. It brings improvement mostly in the sector of communication, data analysis, automation, and risk management, along with documentation and scalability. This ultimately increases efficiency, productivity, and overall project success. The implementation of digitalization in energy sectors and each project with the innovative activities of domestic enterprises will enhance the effectiveness of these changes. Consequently, it will boost the efficiency of overall development processes, facilitating the implementation of innovations that drive the acceleration of the innovative development trend (Kiseleve, 2020).

Digitalization in Finland's energy sectors helps reshape the project plans, execution, and monitoring. This enhanced collaboration and agility for decision-making and automation. Digital tools have become inseparable assets for modern project managers motivating toward success in an increasingly complex and dynamic environment in energy sectors.

The energy sectors of Finland are highly influenced by digitalization and modernization. Even though, digitalization in energy sectors has brought many positive changes from efficiency to overall performance. In the beginning, they faced many challenges, and many changes in their work methodology and thought. They overcome such challenges and surpass the perception of resistance to change. So, the methods that outline the advantage by reducing expenses resulting from efficient and enhanced processes through better alignment of generation, consumption, and grid capacity are influenced by a favorable stability system (Weigel & Fishedick, 2019).

2.5.1 Opportunities of digitalization in project management

Digitalization has offered numerous opportunities for project management, transforming from traditional practices to digital ways and enabling more efficient, effective, and flexible approaches. Here are some key opportunities:

- Various means and media have reduced the burden of traveling and help in instant communication and collaboration to the team members to work together efficiently regardless the location.
- It provides multifunctional tasks, like sharing the documents instantly among the team and allowing multiple users to take part in meetings.
- It helps the project manager create detailed project plans and timelines, and track the progress and deadlines of the project.
- It provides data instantly on resource utilization that helps project managers make quick and corrective decisions.
- It helps in analyzing past data to predict future trends, avoid potential risks, and estimate project outcomes.
- It helps project managers by automation tasks and smooth workflows that add more extra time for project managers and team members to focus on more strategic activities.
- It helps in identifying, assessing, and mitigating risks through simulations scenario analysis, and monitoring which enable teams to track, manage, and resolve issues more effectively, reducing project risks.

2.5.2 Challenges of digitalization on project management

Digitalization offers numerous benefits to project management, but it also presents several challenges. Here are some of the challenges faced during digitalization:

- Cyberattacks, data breaches, and unauthorized access often create threats to the sensitive information and data of the organization.

- Implementation of digitalization over existing systems and software can be challenging, often requiring custom solutions and significant IT support.
- Employees may resist change because of fear of losing jobs, and lack of knowledge.
- Implementation of digitalization often requires a significant amount of investment in software, hardware, and training.
- Keeping up to date with new features of digitalization can be challenging, requiring continuous learning and adaptation.

2.5.3 Potential solution for challenges

Challenges of digitalization in project management need to be effectively addressed, organizations can implement a range of solutions. Here are some potential solutions for each key challenge:

- Implementation of advanced security systems to protect sensitive project data such as encryption, multi-factor authentication, etc. needs to be done.
- Effective change management should be done to maintain clear communication and advance toward competitiveness.
- While implementing digitalization organizations should establish robust backup and contingency plans to handle potential system failures or downtime.
- Continuous training programs should be done to adopt or handle the change and update on new features.

2.6 Digitalization in Energy Industries

In this section of the literature review, we discuss the impact of digitalization in the energy sector and also explore its opportunities and challenges as per the framework of the study. The energy industry in Finland involves the integration

of digitalization for the improvement in efficiency, enhance sustainability, and optimize operations across the energy sector. So, this transformation affects various segments of energy sectors such as production, distribution, and consumption of energy.

One of the significant of digitalization in energy sectors is that it primarily helps to reduce or cut out the maintenance, monitoring, and supply costs. Furthermore, its most crucial aim is to minimize energy losses in grids and those countries which are advancing rapidly in the energy industry through digitalization have successfully reduced the losses or cost (Kapitonov, Voloshin, Filosofova & Syrtsov, 2020). Therefore, it is clear that the adaptation of digitalization in energy sectors has yielded a significant cost reduction and is capable enough to generate maximum revenue or profit.

This study also suggested that the energy industries of Finland are more likely to continue their journey of digital transformation or we can say they have adopted digitalization and realized its benefits. They have achieved their set goals through digitalization integration. Similarly, digitalization also has enhanced the performance of the project, its workforce, and operational efficiency.

2.6.1 Significance of digital transformation in the energy sector

Woodhouse and Brown (2022) emphasize that digitalization has the potential to significantly impact on energy system by reducing production and supply costs. The true paradigm shift facilitated by digitalization will arise from two key factors: Firstly, the establishment of digitalization in energy systems of the framework is capable of providing the smooth flow of energy and data across multiple sectors including heat, transport, and electricity. Secondly, it coordinates with companies' capacity to establish direct relationships with customers, fostering the creation of innovative products and services and unlocking new revenue streams.

2.6.2 Digitalization and Work Efficiency

Digitalization plays a crucial role in enhancing the work efficiency of energy sectors by automating routine tasks and improving communication and collaboration. It also provides access to real-time data, a smooth flow of operations, and improved productivity. So, it has enhanced work efficiency through various ways such as optimizing processes, stabilizing production, and improving maintenance management (Jasonarson, 2020). This has made a significant improvement in the energy sector of Finland by reducing the time consumption while production and improving the efficiency, meeting the customer expectations.

Implementation of digitalization in the energy sector also requires skilled personnel along with effective communication, leadership, and adaptability capabilities. So, they can effectively find the root cause of the complexities of digitalization, identifying opportunities and effective strategies that can initiate to capitalize on the potential benefits of digitalization (Martin, 2024). Therefore, it can bring significant improvement in daily routine, enhance communication, provide a better experience to the customers, and perform their work efficiently and effectively.

Digital transformation doesn't impact on efficiency of tasks only; it also affects strategies, business models, organizational structures, and the skill sets needed by human resources (Varzaru, 2022). Furthermore, it also helps to find the best possible alternatives of strategies, work models, and organizational frameworks and enhances the skills of the employees so they can get the expected results.

2.6.3 Digitalization and Operational Efficiency

In comparison with the traditional method of work model, Finland has gained a huge advantage in the energy sector through digitalization because it provides advanced tools and technologies that are necessary to enhance operational

efficiency in any industrial sector as compared to traditional methods. With the implementation and adaptation of digitalization in the energy sector of Finland have achieved significant improvements in productivity, cost reduction, and overall performance. Therefore, energy sectors have diverted their work model and converted their work into a digital way. With the help of digitalization in Finland's energy sectors can deliver better strategies to achieve the organization's goals and continuously find opportunities to overcome challenges by optimization and innovation.

Generally, most of the energy industries of Finland are commonly using digital tools such as ERP systems, CRM software, and robotic process automation (RPA). Such tools can significantly reduce manual work, minimize errors, and speed up processes.

Other digital tools like big data analytics, machine learning, and AI are also used by the energy sector in Finland to gather and analyze data, which helps in optimizing operations, predicting market trends, and improving decision-making processes. The result obtained from such tools further helps in coordination, communication, and enabling better resource management which leads to the sustainable competitive advantages and operational resilience of the energy industry.

2.6.4 Digitalization and Customer Expectation

Based on customer expectations in Finland, digitalization has significantly impacted it. With the rise of technology advancement customer now expect smooth and flawless work; instant access to information and quick responses to their queries. Digitalization directly influences the customer experience and expectations which leads to customer loyalty, retention, and revenue. K. Vaskioja et al. (2022) note that customers find satisfaction in the convenience of automated meter readings, data accessibility, and reduced fees. A positive customer expectation indicates the customer's satisfaction and vice-versa.

Digitalization in the energy sectors of Finland has raised the bar of customer expectation because there are two types of customers, one is price sensitive and another one is less sensitive. It is found that Finland's energy industry is also targeting price-sensitive as well as less sensitive customers with their digital services like easy access to their tools and lower fees than other ones. With this higher customer satisfaction level, Finland's energy sectors are more motivated than before.

2.6.5 Challenges of digitalization in the energy sector

Xing et al. (2022) emphasize that in their study energy management system have encountered a distinctive array of challenges from the dynamic evolution of the power system and the swift advancement of innovative technologies. The energy sectors are facing numerous challenges during the implementation of digitalization. The main challenges of digitalization are cyber-attacking, resistance to change within an organization's structure and methodology, malfunctions, etc. Moreover, according to the World Energy Council in 2019, both the frequency and seriousness of cyber incidents within the power sector are on the rise. Some of the other challenges of digitalization in energy sectors are:

- Implementation of digitalization requires a significant amount of investment to adopt advanced digital technologies, such as smart meters, advanced analytics, and automated systems.
- Employees feel fear of job loss during the adaptation of digitalization and they may resist adopting new technologies.
- The failures of one component can impact the entire energy supply chain because it can lead to reliability issues.
- Companies have to bear or invest extra money in teaching and training their employees to make them capable enough to handle the new digital technologies.

2.6.6 Potential Solution

To address the above challenges, the following solutions can be considered:

- Cyber security protocol and investment in advanced threat detection and response systems should be installed to protect data and information from cyber-attacks in energy industries.
- Energy sector should use data integration and management platforms to consolidate and analyze data from various sources, ensuring interoperability.
- Conduct skill upgrading training programs, continuous learning, addressing resistance to change from employees, and fostering a culture of innovation.
- Developing comprehensive and effective strategies and regular updates on regulatory changes to ensure adherence.
- systems to enhance stability and reliability.

Author(s) Year	Methods	Independent	Outcomes
Aliyu (2012)	Critical Path	Project Management	Operational Effectiveness
Almarri, Gardiner (2014)	RBV	Project Management	Competitive Advantage
E. Park, M. Park (2020)	TAM	Construction IT	Performance Efficiency
Fernine (2003)	Soft System	Knowledge Sharing	Product Effectiveness
Hepso, Parmiggiani(20Sy22)	Input-Output	Company Size	Team Collaboration
Jasonarson (2020)	Optimization	Energy efficiency	Future Competitiveness
Kapotonov,Voloshine, Filosofova&Syrtsov (2020)	Horizontal Vertical	Energy Efficiency	Increase Efficiency

Killen et al. (2012)	RBV	Project Management	Superior Performance
Kiseleve (2020)	Agile & Waterfall	Project Management	Effectiveness & Efficiency
Kozarkiewicz (2020)	Agile	change management	Team Collaboration
Martin (2024)	Soft Skill-Hard Skill	Quality Management	Competencies Efficiency
Meier (2017)	Critical Incident Technique	Managing Digitalization	Employees Productivity
Pereira (2021)		Company Size	Excellent Communication
Simion (2018)	Agile & Waterfall	Project Management	Competitive Advantage
Slavkovic (2019)		Digital Competencies	Employees Efficiency
Szczepanska, Stepien (2022)		Barriers of Digitalization	Performance Efficiency
Thesing (2021)	Holistic Decision	Agile	Competitive Advantage
Varzaru (2022)	TAM	Behavioral Intention	Performance Efficiency
Vaskioja (2022)	Multi-level Perspective	Social-Technical Energy	Customer Satisfaction
Weigel, Fishedick (2019)	Multi-criteria analysis	Digital Application	Performance Optimization
Woodhouse, Brown (2022)		Impact of Digitalization	Cost Efficiency
Xing (2022)	Machine Learning	Energy Management	Customer Satisfaction

2.7 Empirical Evidence

There is increasing demand and a trend of digitalization in every sector. According to the complex and changing patterns in customer choice and global market competitiveness, there is a high demand for digitalization. It facilitates the smooth flow of work, reduces the cost, saves precious time for the business organization, and also helps in the effective decision-making process. It enhanced productivity; improved service quality and also helped in navigating challenges and opportunities, especially in the energy sector.

Praviainen, Tihinen, Kaariainen, & Teppola (2017) examined the research and found that digitalization helped business organizations address the issues regarding digital transformation, enabling them to capture or utilize the positive effects of digitalization. As a result, they can apply or implement digitalization to grab the opportunities.

Vartolomei & Avasilcai (2019) emphasizes that digitalization is indispensable for enhancing the productivity, efficiency, and competitiveness of all businesses. Moreover, it presents a chance for many to explore new business ventures or markets, transition from products to services, and disrupt adjacent markets through dematerialization and disintermediation.

There is the necessity of digitalization to boost the productivity, efficiency, and competitiveness of companies across the board. Furthermore, it represents an opportunity for many businesses to venture into new markets or sectors, shift from product-based to service-oriented offerings, and even disrupt adjacent markets.

Enterprises should regularly monitor technological trends to swiftly adapt their strategic plans, aligning their development pace with evolving environmental conditions (Nikonorova, Aleksakhina, & Ivanova, 2021). They should stay informed about technological advancements to enhance their strategic plans.

This agility helps them to develop a pace that aligns with the ever-changing environmental conditions. By monitoring trends and future potential, the energy industry should effectively navigate the evolving landscape, seizing opportunities and mitigating risks promptly to maintain its competitive edge.

This study helps to find out that the entire issue of the energy sector revolves around how digitalization impacts the business models of solutions; also provides and influences firms' decisions regarding the boundaries and limitations of digitalization. As companies create digital solutions that span firm boundaries to manage and monitor fleets, the evolution of digitalization necessitates greater focus beyond individual firm boundaries. This involves aligning the business models and technologies of various firms within the ecosystem (M. Kohtamaki et al, 2019).

Digitalization can manage how organizations decide where to draw boundaries, according to the report. It shows an easy way to how businesses to work together to adapt to the rapidly changing landscape of digital transformation.

Applying the method of digitalization projects within the innovation activities of domestic enterprises will enhance the effectiveness of implemented changes. This, in turn, will boost the efficiency of development processes, accelerating the innovative development trend in enterprises (Kiseleva, Sysoeva & Vasina, 2020). The implementation of digitalization projects in domestic firms' innovative activities guarantees the efficacy of the modifications that are undertaken. This increases the effectiveness of the development process and fuels the trend of inventive development in businesses.

Ngereja (2021) study indicates that project team members possess a significant understanding and a positive perception of learning for innovation. This can be attributed to the frequent use of both terms in the context of digitalization. Undoubtedly digitalization has a significant impact on project management, both technical and behavioral skills to strategically implement digital transformation.

According to Kiseleve (2020), a study found that the implementation of digitalization projects within the domestic enterprise can help enhance the effectiveness of these changes. This, in turn, will boost the efficiency of development processes, facilitating the implementation of innovations that drive the acceleration of the innovative development trend.

Goncalves (2023) has investigated and found that digitalization has both positive and negative aspects. On the positive side of digitalization, it enhances the effective execution of strategy and competitiveness. However, during the implementation of the digitalization process, its challenges need to be addressed through developing and maintaining technical and managerial competencies. To tackle these challenges, organizations must build and maintain technical and managerial skills, and balancing these competencies benefits the organization from digitalization.

Gbadegeshin (2019) study found that digitalization has played a crucial role in the commercialization of energy sectors through flexible, effective, and efficient operational work. However, they also highlighted concerns such as security issues (e.g., the risk of cyber-attacks), insufficient or incorrect information, exposure to business predators, and limitations on secrecy.

Blaskovics (2018) study highlighted the benefits of digitalization. These advantages, such as cost and time savings and increased efficiency, are leading companies, particularly multinational ones, to increasingly rely on digitalization. This transformation enhanced capability and improved the overall performance which ultimately helped in cost saving over expenses and methods.

Digitalization helps in evolving skill sets that are essential for the transformation process and also for ongoing operations afterward (C. Matt et al., 2018). Adaptation to digitalization requires sets of skills and knowledge about the usages, practices, and benefits to accelerate the workflow and gain potential benefits from competitive markets.

Bugarcic & Slavkovi (2023) examined the study and found that digital transformation readiness plays a crucial mediating role in the relationship between the other two components of Intellectual Capital (IC) and Project Management (PM) effectiveness. Its introduction results in both a statistically significant direct and indirect impact of these IC components on PM effectiveness, suggesting a partial mediation effect.

Digitalization has significantly impacted by improving communication, efficiency, decision-making, innovation, and customer relationships in project management. Furthermore, organizations are capable enough to utilize their capital more effectively, for better project outcomes and overall organizational performance through digitalization.

Hepso (2022) stated in his study that organizations should adopt a longitudinal perspective to understand the factors of digitalization that have driven current innovations in the industry. Research on digitalization may be a long-term approach to comprehending the elements that have fueled recent advancements in the energy sector.

Saarela (2018) examined the study and found that digitalization in project management can significantly support project management tasks, allowing more focus on effectiveness in operational performance. Digitalization provides time for other strategic plans for top-level management. So, they can do task planning, execution, monitoring, and controlling.

The implementation of digitalization in projects enhanced the innovation activities of domestic enterprises. This, in turn, will boost the efficiency of development processes, facilitating the implementation of innovations that drive the acceleration of the innovative development trend (Kiseleva, Sysoeva, & Vasina, 2020). One can highlight the predominance of positive opinions and the generally favorable perception of the changes brought about by digital transformation. This includes the superior functioning of organizations and the

enhanced delivery of projects within the new conditions of the digital economy (Kozarkiewicz, 2020).

Pereira, Duraó, Moreira & Veloso (2021) investigated the study and found in their study that digital transformation helps maintain closer relationships, reach new markets with significantly lower investment, and establish excellent communication channels with customers and partners. With far less expenditure, DT opens up new markets, fosters stronger relationships, and provides first-rate channels of communication with partners and customers.

2.8 Summary

Based on the study and literature findings, it indicates that digitalization has a significant impact on both project management and the energy sector. Digitalization affects project management by boosting efficiency through digital processes, refining customer experience analysis, promoting agile management, and strengthening network relationships within ecosystems. Similarly, energy sectors are advancing toward fostering innovation and enhancing efficiency. This leads to the transformation of the energy industry into a digital technology hub center.

Digitalization has significantly improved the efficiency and sustainability in the energy sector of Finland. It provides facilities like smart grid technologies, innovative solutions, and rapid digital evolution, and also reshaping operations and promoting renewable energy-focused strategies. It also helps in the reduction of production losses, decreases environmental impact, and facilitates data-driven decision-making. Similarly, digitalization greatly enhances industrial energy efficiency by connecting production and marketing, speeding up the replacement of traditional power resources with data-driven solutions.

3 METHODOLOGIES

The research was conducted to explore the use of digitalization in the energy sector of Finland. It also explores how digitalization influences project work its effective management and the perception toward it. Even, though the speed of digitalization is fast, we will explore its relevance in both the energy sector as well as project management. The research study describes the method used and examines the scope and level of digitalization in the energy sector. It further revealed the significance of digitalization and its usefulness in the daily operation of work; various determinants are involved in developing the level of digital transformation among them.

The study explains the relationship between research and the reality of digitalization and methodology and practices. The assumption of various factors like the Technology Acceptance Model, Resource-Based View, and Digital Transformation Model to determine the Opportunities and challenges of digitalization in Finland will be considered. It examines the value of factors. This research will analyze the impact and perception of digitalization in the energy sector considering the effects on efficiency and methodology. With all this analysis this thesis will deliver a detailed understanding of the various dimensions of digital transformation in the energy business

3.1 Population and Sample

The population is the particular area from where the total number of people will be selected, where the survey will be conducted, and their responses. In other words, it is the process or the method of choosing or selecting the desired respondents from a different demographic and geographic population and getting their views on the research purpose as a whole. The expected population of the research is 360. Whereas, a sample is the technique of choosing certain targeted people of different areas (population). It is small in size in comparison to the population and it comes under population. The population for this

research constitutes individuals from the age of 20 to 60 because they are the most active respondents who are involved in the energy sector. The expected sample size was 120 individuals but only 80 were engaged in the research survey and responded to our survey questionnaire.

3.2. Sampling and data collection techniques

The data collection for the research was carried out using a convenient sampling technique to determine the sample. After identifying the sample size, a questionnaire set was prepared with the help of Google Forms and distributed the link among the employees of the energy sector in Finland. In the research process, each respondent was randomly contacted who worked in the energy sector and the sample was collected from both face-to-face interviews and through the Internet. A structured questionnaire was distributed among all the respondents/samples. The research study was conducted and categorized into four sections. In each section, Five sets of questions were asked from each model to the respondents. This method minimizes the rate of bias from respondents. In total 20 close-ended questionnaires were asked to the respondents. Also, a few open-ended questions will be distributed to the respondents through different media like mail, messages, etc. The respondents are free to choose their answers as per their experience and knowledge.

This study uses the five-point Likert scale as an evaluation tool that gives participants five choices for responding, ranging from strongly agree to strongly disagree. It also includes a neutral option, so survey administrators can get detailed input. Compared to higher-point scales, it requires less time and effort to complete. More closely fits the displays of handheld gadgets than higher-point scales. The five-point rating system, with 1 denoting strongly disagree and 5 denoting strongly agree, was used to assess answers to each sentence in the questionnaire. This scale's applicability to a wide range of statistical methods used in social analysis and advertising is one of its specific benefits. After the

data were gathered, statistical processing was done to extract the appropriate data.

3.3 Research Design

The research revealed that there is some sort of gap in digitalization in project management, practices, and methodology. To explore the study, quantitative and descriptive research design is used. Quantitative research is a research strategy that focuses on quantifying the data collection and analysis of data. It deals with data in numbers, logic, and an objective stance. Whereas, descriptive design explains the relationship between digitalization and project management. This research design method further revealed the aptitude for digitalization among the respondents. The study links the significant determinants or models (Technology Acceptance Model, Resource-Based View, and Digital Transformation Model) and finds how these models play a crucial role in influencing and motivating the perception of the digitalization in energy sector of Finland.

3.4 Analysis of Collected Data

The research study has used a structured questionnaire with the majority of questionnaires being closed-ended and very few open-ended questionnaires. Various questionnaires were asked as per the determinants of the respondents. It is the best way to collect the required raw and primary data because the respondents do not belong to only a particular place or industry sector. Five sets of questions were asked from each model to the respondents. This method minimizes the rate of bias from respondents. Only 66.67% out of 120 samples have provided their feedback and other samples didn't.

The collected data are analyzed as per the research model. Microsoft Excel is used for the analysis of data to get the desired result as per the objectives. By using natural language queries to ask questions without complex algorithms,

Excel's analyze data feature enables us to better understand the data. Furthermore, various tools like pie charts and bar graphs are used as the representative of collected data analyses. After analysis of the data, it was found that most of the respondents were middle-aged employees with varying years of experience.

3.5 Data Analysis Tools

The collected research data were analyzed through different methods to explore the relationship between the Technology Acceptance Model, Resource Based View, and Digital Transformation Model in the digitalization of project management in the various sectors of Finland. The used data analysis methods for the research study are

- Mean
- Standard deviation
- Correlation Analysis

3.6 Ethical Consideration

To protect the confidentiality and privacy of participants or respondents, we ensure that their information will be secured and not shared with unauthorized persons. We are conscious of and respect the emotions, and feelings of participants. Also, we are cautious regarding the data collection, and interpretation and ensure not to disclose the respondent's names and their institutions.

4. RESULT, FINDINGS& DISCUSSION

This chapter explained the interpretation and presentation of findings and detailed analysis of the impact of digitalization on project management in the energy sector in Finland. In this study 20 questionnaires were asked to the respondents and their responses were collected the results of the study were analyzed on the specific objectives of the study. This section explains and focuses on the detailed analysis of data, presentation of empirical findings, and interpretation of results. Presentations of the data are cleaned, coded, and analyzed using Statistical Package for Social Sciences (SPSS).

4.1 Respond Rate

The study had a targeted population of 360 and a sample of 120, respondents out of which 80 participated. The rate of returns of a questionnaire for analysis was 66.67%. Because we only get access to 120 samples which is very low for the reliability and validity of the research. The main targeted population and sample are the employees who are working in the project and energy sector in Finland and try to find their attitudes towards digitalization analysis through questions related to their capabilities, and skills based on their knowledge and real-life experience.

4.2 Age of Respondents

There are four groups of age in the age of respondents. They are between 20-30, 30-40, 40-50, and 50-60.

Table 1: Age of Respondent

Valid Age	Frequency	Percent	Valid Percent	Cumulative Percent
20-30	33	41.3	41.3	41.3
30-40	34	42.5	42.5	83.8
40-50	12	15.0	15.0	98.8
50-60	1	1.3	1.3	100.0
Total	80	100.0	100.0	

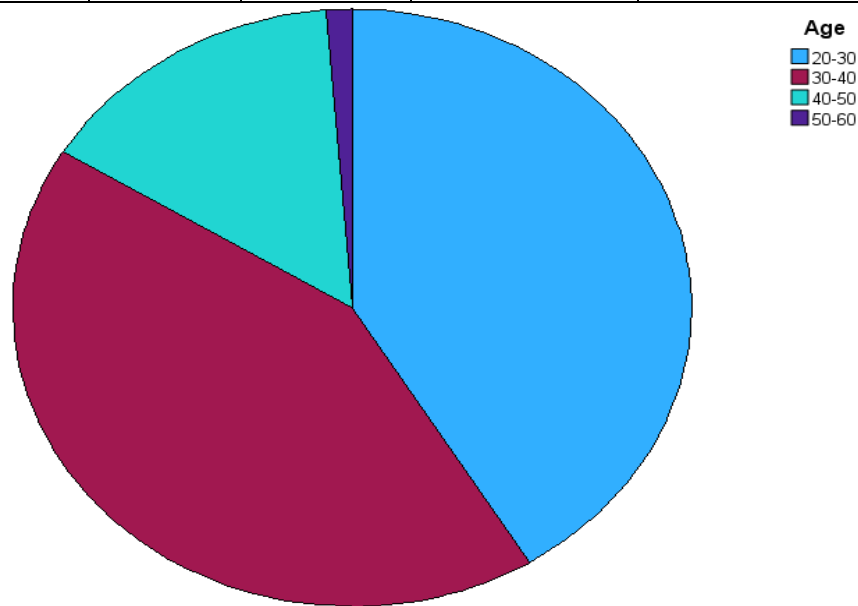


Figure 4: Age of Respondents

Figure 1 shows that the sample size of the respondents consists of 41.3% (n=33) of the age group 20-30, 42.5% (n=34) of the age group 30-40, 15% (n=12) of the age group 40-50, and 1.3% (n=1) of the age group 50-60. Most of the respondents are middle age group followed by 20-30 & 30-40 age groups. Given that the sample's age distribution points to a predominance of young to middle-aged individuals, the study's conclusions may be impacted by the viewpoints and experiences of these age groups. The results may not apply to a wider age group due to the smaller percentage of respondents who are over 40. This might cause the findings to be biased toward the attitudes and behaviors that are common among those in the 20–40 age range.

4.3 Gender of the respondents

The profile of the respondents is presented below.

Table 2: Gender of Respondent

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Male	46	57.5	57.5	57.5
Female	34	42.5	42.5	100.0
Total	80	100.0	100.0	

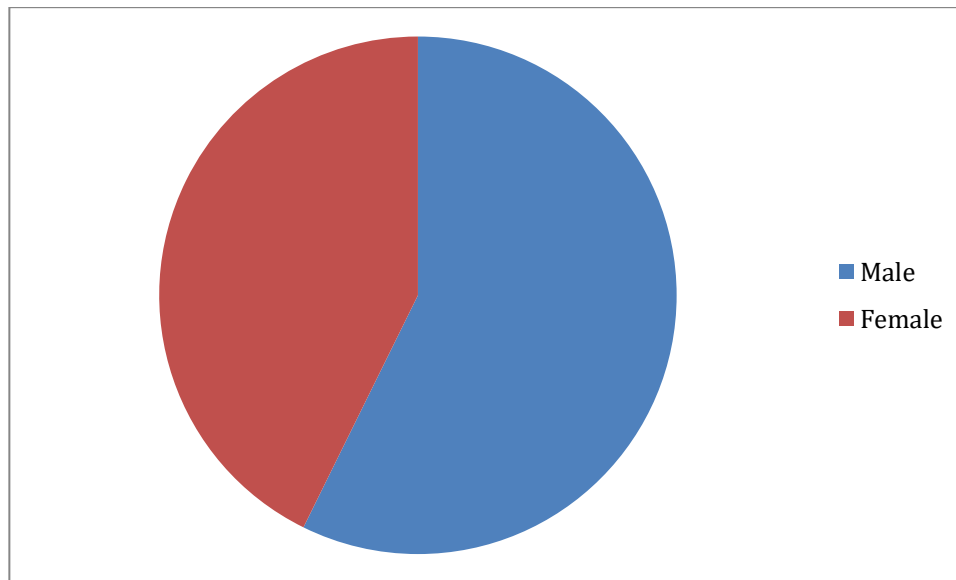


Figure 5: Gender of Respondents

There are both male and female respondents from various industry sectors in Finland. As shown in figure 2, the gender of the respondents consists of 57.5%, (n=46) of male respondents and 42.5% (n=34) of female respondents. This suggests that there is a greater proportion of females in the sample population. The study's conclusions may be impacted by the notable disparity in gender representation, especially if gender-specific viewpoints or experiences are pertinent to the subject matter. The results may not be as generalizable to other genders due to the underrepresentation of women,

4.4 Respondent Rate of Year of Experience

According to Figure 3, it is clear that the years of experience of each respondent are varied or different. Some are them have been working in their respective sector long before and some are at the beginning of their careers. The ranges of the working/year of experience of the respondents are a minimum of 2 years to a maximum of 4 years.

Table 3:Year of Experience

Year	Frequency	Percent	Valid Percent	Cumulative Percent
2	3	3.8	3.8	3.8
3	6	7.5	7.5	11.3
4	7	8.8	8.8	20.0
5	5	6.3	6.3	26.3
6	8	10.0	10.0	36.3
7	8	10.0	10.0	46.3
8	10	12.5	12.5	58.8
9	9	11.3	11.3	70.0
10	9	11.3	11.3	81.3
11	6	7.5	7.5	88.8
12	6	7.5	7.5	96.3
13	2	2.5	2.5	98.8
14	1	1.3	1.3	100.0
Total	80	100.0	100.0	

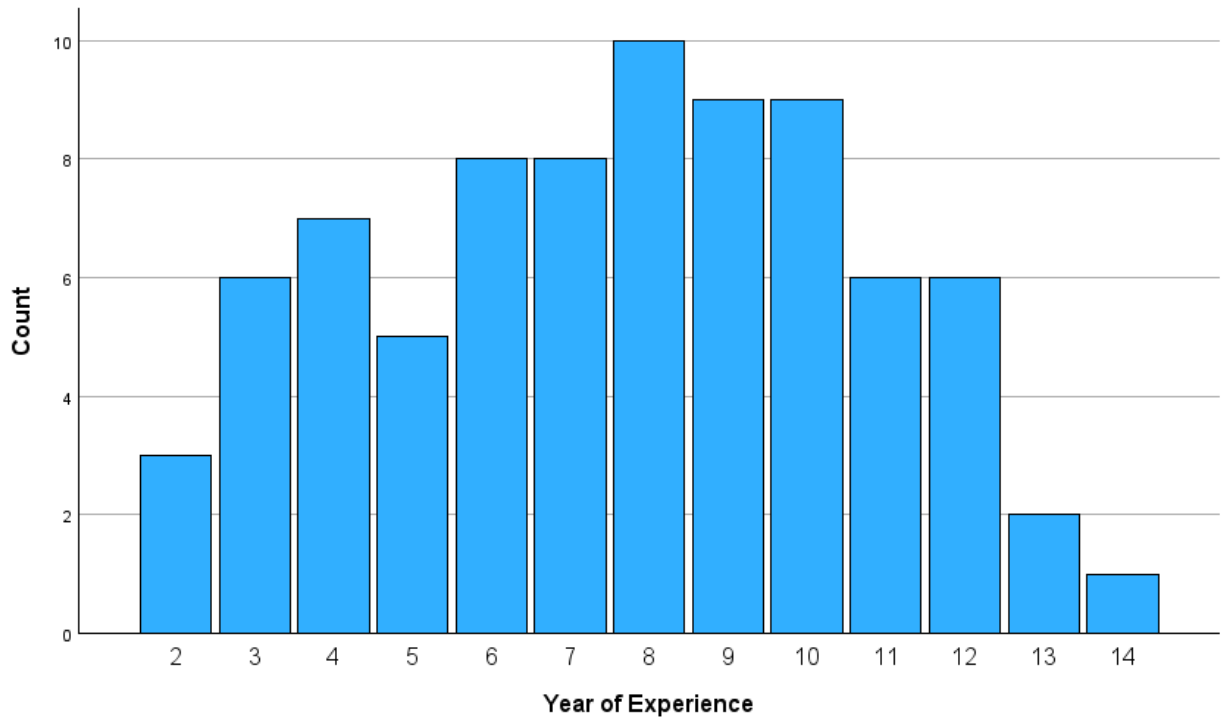


Figure 6: Year of Experience

From Figure 3, the majority of the respondents have a year of experience in between 6 years to 10 years of experience. However, very few of them have more experience in comparison. This gap in the respondent's experience also has created a debate over the perception and biases. The respondents, who are new and have a moderate experience of 10 years show their bias and positive attitudes towards the adoption of digitalization. Because they are familiar with digitalization and modernization. Whereas those who are older have shown some resistance to digitalization because of their working style which is based on manual rather than automation.

4.5 Analysis of the Technological Acceptance Model

The technological Acceptance Model is one of the variables that affect one's perception and behavior on digitalization. This model is further divided into two parts i.e., Perceived Usefulness and Perceived Ease of Use. Each of these parts is measured and their finding is also explained separately.

4.5.1 Perceived Usefulness

It is one of the most effective methods that inspired and enhanced the overall performance of the project. Table 5 explains the summary of the perceived usefulness effects of digitalization on project management.

Table 4: Central Tendency of Perceived Usefulness

	N	Minimum	Maximum	Mean	Std. Deviation
PU1	79	3	5	4.47	.574
PU2	79	2	5	4.34	.638
PU3	80	2	5	4.26	.651
PU4	80	2	5	4.16	.787
PU5	80	3	5	4.40	.608
Valid N (listwise)	78			4.326	.655

According to Table 4, the highest mean score by PU1 is 4.47, and the lowest mean score by PU4 with 4.16 among all the five statements. The survey also shows that digitalization comes from perceived usefulness having a total mean value of 4.326. Meanwhile, the result also shows that the highest standard deviation value of perceived usefulness by PU4 i.e., 0.787, and the lowest standard deviation value of perceived usefulness by PU1 with 0.574 among the five statements and the overall standard deviation value is 0.655 for perceived usefulness.

From the result of the mean on the table can be summarized that all the respondents agree with the influence of perceived usefulness on digitalization. It shows that the response and feedback of the user is positive and it has impacted positively in their daily work. This distribution can be applicable a wide range of the other industries because the low standard deviation suggested that most of the participant shares a similar view over digitalization.

4.5.2. Perceived Ease of Use

Perceived Ease of Use defines and measures how the user or customer maximizes their satisfaction with the easy and comfortable process while using digitalization. Table 6, explains the summary of the perceived ease of use role in digitalization on project management.

Table 5: Central Tendency of Perceived Ease of Use

	N	Minimum	Maximum	Mean	Std. Deviation
PEU1	80	2	5	4.18	.708
PEU2	80	2	5	4.05	.614
PEU3	80	2	5	3.83	.742
PEU4	80	2	5	4.00	.712
PEU5	80	1	5	4.05	.673
Valid N (listwise)	80			4.022	.691

Based on the survey and data in Table 5, the overall mean for the central tendency of perceived ease of use is 4.022 with which the highest mean is 4.18 for PEU1 whereas the lowest mean of perceived ease of use is 3.83 for PEU3. Similarly, the study also found that the highest standard deviation of perceived ease of use is 0.742 by PEU3, whereas the lowest standard deviation of perceived ease of use with 0.614 by PEU2. The overall standard deviation of the central tendency of perceived ease of use is 0.6912.

Therefore, it can be summarized or concluded that all the respondents agree with the variable that digitalization is also influenced or impacted by perceived ease of use. The standard deviation result suggests that some inconsistency in responses, meaning the general perception is positive, but not all users have the same level of ease with the tools. This could imply that most of the respondents

find digitalization easy to use, but a portion of the population experiences challenges.

4.6 Resource Based View

Resource Based View is a framework that optimizes its available resources which can be a source of competitive advantage and superior performance. Table 7 summarizes the tendency of the Resource Based View on digitalization in project management.

Table 6: Central Tendency of Research-Based View

	N	Minimum	Maximum	Mean	Std. Deviation
RBV1	80	1	5	4.15	.731
RBV2	79	2	5	3.92	.747
RBV3	80	2	5	4.01	.606
RBV4	80	2	5	3.97	.656
RBV5	80	2	5	3.93	.671
Valid N (listwise)	79			3.996	.684

Table 6, represents the mean and standard deviation of the resource-based view on digitalization. The given data outline the highest mean value which is 4.15 by RBV1 and similarly, the lowest mean value by RBV is 3.92. Whereas the average mean of the data is 3.996. This shows that the majority of the respondents agree with the statement that digitalization on project management is impacted or influenced by a resource-based view. The data suggests that respondents normally believe that they have used proper and maximum use of their resources to gain a competitive advantage through digitalization, with an average score close to 4. This reflects a positive but not overwhelming perception of resource utilization.

4.7 Digital Transformation Model

The Digital Transformation Model is transferring the organizational culture, methods, and overall structure from traditional to digital form. It is one of the prominent factors that significantly influence or impact project management during digitalization. Table 8 explains the summary of the digital transformation model on digitalization.

Table 7: Central Tendency of Digital Transformation Model

	N	Minimum	Maximum	Mean	Std. Deviation
DTM1	78	2	5	4.04	.654
DTM2	80	2	5	3.96	.625
DTM3	79	3	5	4.16	.541
DTM4	78	2	5	4.08	.717
DTM5	80	2	5	3.90	.851
Valid N (listwise)	75			4.028	.685

Based on the survey and data in Table 7, the overall mean for the central tendency of the digital transformation model is 4.028 with which the highest mean is 4.16 for DFT3 whereas the lowest mean of the digital transformation model is 3.9 for DFT5. Therefore, it can be summarized or concluded that all the respondents agree with the variable that digitalization is also influenced or impacted by the digital transformation model. The data shows that respondents generally perceive themselves as ready for digital transformation. This readiness is indicated in the relatively high scores across the board, suggesting that respondents feel confident in their ability to engage with and adapt to the changes that digitalization brings. Similarly, the study also found that the highest standard deviation of the digital transformation model is 0.851 by DFT5, whereas the lowest standard deviation of the digital transformation model with 0.625 by DFT2. The overall standard deviation of the central tendency of perceived ease of use is 0.685.

4.8 Analysis of Overall Mean and Standard Deviation Value of Factors impact of digitalization on project management

Throughout the whole process of the survey and the data that were collected through the survey, we came to find the overall mean and standard deviation of the study. This section explains the overall mean and standard deviation value of factors that impact digitalization on project management.

Table 8: Central Tendency of Aggregate Mean

	N	Minimum	Maximum	Mean	Std. Deviation
PU	78	3.20	5.00	4.3333	.43920
PEU	80	2.80	5.00	4.0200	.48114
RBV	79	2.80	5.00	3.9924	.44542
DTM	75	3.20	5.00	4.0240	.44230
Valid N (listwise)	72			4.0924	.45233

According to Table 8, it is shown that Perceived Usefulness has the highest mean value at 4.333, similarly Digital Transformation Model has the second highest mean value at 4.0240 followed by Perceived Ease of Use at 4.0200. Whereas, the lowest mean value score by Resource Based View with a mean value of 3.9924. This data informed that digital tools are widely perceived as highly useful in project management. A high mean value in data reflects that most participants find digitalization more beneficial, effective, and efficient and enhanced overall project outcomes While RBV is slightly lower in comparison to PU and PEU, it still shows that digitalization is viewed as adding strategic value to project management. The result of data indicated by DTM indicates that organizations show confidence in the adoption of these technologies for dynamic and complex project management tasks. Similarly, the value of standard deviations across all constructs is comparatively low (ranging from 0.44 to 0.48) which implies that

participants usually share similar views, demonstrating broad recognition of the positive role of digital tools in project management.

4.9 Assessment of Reliability

To find the reliability and validity different methods and statistical tools are used. Using such tools following correlation analysis was derived for the Technology Acceptance Model, Resource Based View, and Digital Transformation Model.

4.10 The Effects of Influencing Factors on Digitalization

In analyzing the effects of determinants of digitalization on project management, different statistical tools are used in this study, they are correlated.

4.11 Correlation Analysis of the Influencing Factors on Digitalization

The following Table 10 explains the correlation coefficient of factors (Perceived Usefulness, Perceived Ease of Use, Resource Based View, and Digital Transformation Model) that affect digitalization on project management. To test the reliability of the data, correlation coefficient (r) is considered between -1.0 and +1.0. While calculating the correlation coefficient, if the r value is negative, it indicates that it has a perfectly negative linear relationship and similarly if the r value is positive, it indicates that it has a perfectly positive linear relationship. On the other hand, if the r value is neither negative nor positive i.e., 0, it indicates that there is no correlation between the factors.

Table 9: Central Tendency of Correlation Coefficient

		<u>Correlations</u>			
		PU	PEU	RBV	DTM
PU	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	78			
PEU	Pearson Correlation	.513**	1		
	Sig. (2-tailed)	<.001			
	N	78	80		
RBV	Pearson Correlation	.505**	.631**	1	
	Sig. (2-tailed)	<.001	<.001		
	N	77	79	79	
DTM	Pearson Correlation	.618**	.498**	.655**	1
	Sig. (2-tailed)	<.001	<.001	<.001	
	N	73	75	74	75
**. Correlation is significant at the 0.01 level (2-tailed).					

The given correlation table represents the Pearson correlation coefficients between four variables i.e., PU, PEU, RBV, and DTM. The Pearson correlation coefficient helps to find and measure the strength between two variable and their linear relationship. As per the Pearson correlation coefficient, the values range from -1 to 1. If the value is 1, it indicates a perfect positive correlation,

similarly, if the value is -1, it indicates a perfect negative correlation and 0 indicates no correlation.

According to Table 10, it is found that all the models are positively correlated or associated with each other. As per the result, there is a strong and positive correlation between technology acceptance models, resource-based views, digital transformation models, and digitalization.

Calculations of the correlation coefficient between variables are:

PU and PEU

There is a moderate positive correlation between PU and PEU shown by $r = 0.513$, statistically significant ($p = 0.001 < 0.05$) at 1% level and the sample size for this relationship is 78. The correlation between PU and PEU reflects those digital tools perceived as easy to use are often also perceived as useful.

PU and RBV

There is a moderate and positive correlation between Resource Based View and Perceived Usefulness shown by $r = 0.505$, statistically significant ($p = 0.001 < 0.05$) at a significant 1% level and the sample size for this relationship is 77.

PU and DTM

There is a strong positive correlation between PU and DTM shown by $r = 0.618$, statistically significant ($p = 0.001 < 0.05$) at 1% level and the sample size for this relationship is 73. It suggests that an increase in the perceived usefulness of digital tools enhanced the effectiveness of decision-making in project management.

PEU and RBV

The correlation coefficient between PEU and RBV is 0.631, which indicates a strong and positive correlation coefficient. The statistically significant is < 0.001 at

1% level. Similarly, the sample size for this relationship is 79. This indicates that both ease of use and usefulness of digital tools are related to resource optimization. Project manager work is more efficient with better tools that can be used for decision-making by improving access to critical information and project resources.

PEU and DTM

The correlation coefficient between PEU and DTM is 0.498, which indicates a positive correlation, with a statistically significant <0.001 at a 1% level and the sample size is 75. It suggests that the more user-friendly and accessible digital tools are, the better they support project managers in decision-making. Ease of use of digital tools helps in making better adoption and integration into project management processes, making decisions faster and more accurate.

RBV and DTM

There is a strong and positive correlation coefficient between RBV and DTM shown by $r=0.655$, statistically significant <0.001 at 1% level, with 74 sample size.

Based on the above information and data, it is clear that all the Models or approaches are positively associated with each other. This suggests that the effective utilization of digital resources (such as software, platforms, and data) contributes significantly to decision-making. It is concluded that this strong positive correlation is causing a great impact on digitalization on project management in Finland.

4.12 Major Finding

This study was conducted to find out the underlying relationship between the Technology Acceptance Model (Perceived Usefulness and Perceived Ease of Use), Resource View, and Digital Transformation Model with the digitalization of

project management in the energy sector in Finland. This research is based on the population of employees who are involved in the energy sector in Finland.

The sample size of the respondents is 80 including male and female respondents who are working in various job positions in their respective industrial sectors. Based on the results of the study majority of the employees are belongs to age between 20-40 years. It shows that they are young, talented energetic, and capable enough to handle the pressure of new technology models or can handle digitalization with ease.

According to the statistics of gender, it is revealed that both genders are nearly equal in numbers i.e. 42.5% and 57.5% male and female respectively of the total respondents. It shows that both genders are more actively participating in this field.

Whereas on the base of years of experience, it is found that they have different numbers of job experience. The lowest year of experience is 2 years, whereas, the highest number of job experience is 14 years. It shows that the respondents have a wide range of job experience. The other findings are summarized below:

- Respondents agreed on the Perceived of Usefulness related items with a mean value of 4.362 and standard deviation of 0.655.
- Respondents agreed on the Perceived Ease of Use related items with the average mean value of 4.022 and standard deviation of 0.6912.
- Respondents agreed on the Resource Based View items with a mean value of 3.99 and standard deviation of 0.684.
- Respondents agreed on the Digital Transformation Model-related items with a mean value of 4.028 and a standard deviation of 685.
- The correlation coefficient between PU and DTM suggests that individuals or industries perceive digital systems as more useful

than they definitely and significantly enhance their decision-making abilities.

- Similarly, RBV and DTM have the strongest and most positive correlation which shows or represents that a strong resource-based outlook is highly correlated to the better decision-making process.
- However, PU and PEU have a moderate and positive correlation between them which reflects that when a system is perceived more easier to handle and use, then it is also perceived as more useful.
- Similarly, PU and RBV also have a moderate and positive correlation, which means that the perception of the usefulness of digitalization shows a strong association with a resource-based view.
- PEU and DTM correlation reflects that perceived ease of use on digitalization has a positive impact on effective decision-making.
- The findings also suggest that enhancing or improving the perception of usefulness, ease of use and proper utilization of internal resources can have a significant impact on effective decision-making processes.

In Finland, it is found that over 85% of companies are using digital project management tools among which 70% of them are using cloud-based solutions. Around 40% use AI and automation; 30% leverage IoT and data analytics in Finland organizations. In the case of remote work and collaboration, 60% support remote work; 75% use collaboration platforms which have significantly impacted their performance and efficiency. It is estimated that around 20-30% improvement in project delivery times; a 25% increase in resource utilization is found in Finland. According to sources, it is estimated that for cybersecurity purposes, every company has invested around €1.5 million annually. These data

demonstrate Finland's robust approach to digitalizing project management which continuously pushes every company toward innovation and efficiency.

4.13 Discussion

This study helps to explore the relationship between the Technology Acceptance Model, Resource Based View, and Digital Transformation Model and Digitalization in project management. Firstly, Perceived Usefulness and Perceived Ease of Use had a strong and positive association with digitalization in project management. Perceived Usefulness enhances the capacity of people to use digital tools and techniques for their everyday tasks and decide to get overall better outcomes from their project work (E. Park, & M. Park, 2020).

This section of the study helps to know how people utilize their knowledge in real-life practice. As per the findings and results of the study, it is clearly shown that most of the respondents have utilized or used digitalization in real-life practice to increase their performance and get multiple diversifications of outcomes of project work through digitalization.

While analyzing the results of respondents' responses, in a demographic number of female respondents are a bit more in numbers than male respondents. And most of the respondents belong to the age groups of 20-40 years composite of 83.8% of the total respondents which is followed by 15% of 40-50 years respondents.

Similarly, the years of experience of the respondent survey, some of them have 2 years of experience whereas some have up to 14 years of experience. Even, though they have different numbers of job experience they have performed their job very excellently. They have enough knowledge about the use and usefulness of digitalization in project work and management. As per the opinion of the respondents over the challenges of digitalization, they have shared their different experiences of challenges while integrating it. In the beginning, they

faced many problems and obstacles but once they were familiar with digitalization, they found its usefulness in their work.

Furthermore, when they are asked about the impact of digitalization, they have shared their positive feedback or experience after adopting digitalization. They found it is easy to use and it has enhanced their work performance and increased efficiency and effectiveness in their performance. So, they can achieve their ultimate goal and have improved their knowledge about digitalization.

Digitalization has enhanced their career growth. From the survey and literature review, it is found that despite having or facing challenges while integrating digitalization they have managed to optimize the opportunity and taken advantage of it for their project work for better outcomes. With the help of digitalization, they have managed or enhanced their capability of utilizing their available resources to maximize their performance.

From the study of different models and methods of digitalization on project management, we can say that digitalization has brought positive change in the concept of user, and customers as well.

According to the Pearson Correlation Coefficient, there is a strong positive significant correlation between digitalization and its approach or framework model. Digitalization and project management are highly correlated to each other. The finding shows that using the various frameworks, digitalization is a prominent factor for the success and overall development of project work.

Each of the models in the study shows a positive correlation with each other. They have shown a strong positive significant level which indicates their reliability and validity. The study also explained that all the approaches like perceived usefulness, perceived ease of use, resource-based view, and digital transformation model have a strong relationship with each other showing a

greater impact on digitalization as they show, that they are less than significant level of 1%,5%, and 10% confident interval.

According to the previous chapter, it is found that the resource-based view and digital transformation model are strongly and positively correlated as shown by $r=0.655$, statistically significant ($p<0.05$) at 1% level.

The study further found that most of the respondents belong to the energy sector, so they have experience in handling and managing the processes and methods while integrating digitalization into their daily activities. Also, they have different years of work experience in their respective industrial sector.

The study further reveals that the respondents also found some difficulties during their beginning stages but later they realized the significance of digitalization especially in project management and work for their successful journey. Despite, the issues of digitalization, it has provided greater opportunities for employees and customers too.

All these findings and the result of statistics it is clear digitalization has a crucial role in simplifying task through different means and media. Based on the theoretical framework, it is shown by the data and the fact of correlation that they significantly influence or impact the meaning of digitalization in the general concept. It has some drawbacks but the overall effect of digitalization on project work and management has a tremendous role in paving the path of success.

Perceived Usefulness has played a major role in influencing factors on project work and management through digitalization in Finland especially in the energy sector and others as well. The study further revealed that Perceived Usefulness helps to build a mindset and also provides ways to boost your performance on project work through various methods and skills. It helps to identify and choose the most effective tools and techniques alternatives for the accomplishment of

tasks very smoothly. It enhanced the capabilities of thinking before any challenges accepted related to the digital work.

The study also explains that perceived usefulness also increases the ability to make critical situation decisions making and uplifts self-confidence so, they can diversify their work in various sectors like material handling, data extraction, data protection, safeguarding the privacy of the work and organization, etc.

Through perceived ease of use, people can maintain their daily records of their work, income, and expenses and control the flow of work under their expectations. It also helps in preparing daily work routines, maintaining the pace of work consistency; producing better results, save precious time by the use of digitalization.

Similarly, from a resource-based view, the study finding reveals that digitalization has helped organizations to identify and diversify their available resources to obtain maximum results it. So, they can maximize their opportunities and performance at the competitive level. It has shown a strong positive correlation with the other factors for the positive impact of digitalization on project management.

The study explained that the resource-based view has a great role in helping to increase the performance of respondents. It is found that most of them spend their time maximizing and grabbing opportunities by diversifying the resources they have with them. Through, digital tools and technologies they are capable enough to develop skills regarding their job for better results.

According to the study, the digital transformation model is also one of the factors that influence digitalization on project management. From the previous study, it is shown that it has a strongly positive correlation with other approaches in digitalization. The study further revealed that it has brought the change in outlook of the traditional method of working style and transformed it

into a modern way. This has made a sequence of systematic ways of handling work and problems regarding digital glitches or errors.

The study shows that the test results of reliability found similarity with previous research, Technology Acceptance Model, Resource Based View, and Digital Transformation Model have a major role in digitalization on project work. Digital technology has greatly explored the growing influence on the various technical and scientific developments (S. Woodhouse & M. Brown, 2022), (Benzerga, Hauf, Pretz, & Bounfour, 2017) and advances in the various industrial sectors across the globe (V. S. Litvinenko, 2019), (Nwosu Victor, 2023) collaboration and data skill development among the team enhance decision-making capabilities during digital challenges (J. Martin, Q. H. Dang & I. Gremyr, 2023), (Afanasyev, Lyubimova, Ukolov & Shayakhmetov, 2019).

Digitalization helps enhance the flow of information, and collaboration among inter-industry and motivates the development of scientific advancement (F. Brunetti & D.T. Matt, 2020), (A.Kwilinski, O. Lyulyov & T. Pimonenko, 2023) that can reach its maximum capacity and full potential (M. Andoni et. al., 2019), (Vartolomei and Avasilcai, 2019) also reduces energy losses and cost (Kapitonov et al., 2020), (Xing, 2022), (Nazari & Musilek, 2023) which shows possible future changes (N.Mamedova, 2022) so, it brings a positive attitude that helps to solve the pre and post challenges and barriers during the innovative activities (O.N. Kiseleva), (V.O. Sysoeva & V.A Vasina,2020), (Forradellas, & Gallastegui, 2021). So, it motivates the user of smart energy services (K. Veskiöja et al., 2022), (Z. Csedo, K. Kovacs & M. Zavarko, 2017), (Schneider and Kokshagina, 2021) also found the same results.

The findings and the results of the study match the similarity with the previous study, so the data of the study have reliability and validity. Thus, the Technology Acceptance Model, Resource Based View, and Digital Transformation Model are

strongly correlated and interconnected with each other in the digitalization of project management.

5 SUMMARY AND CONCLUSION

This section provides a brief overview of the study findings based on the objectives of the study. It also provides the conclusion derived from the analysis of the findings based on the effects of factors influencing or impacting digitalization on project management. This chapter also consists of suggestions and recommendations of the results from the research data presented in the previous chapter.

5.1 Summary of Finding

The purpose of the study was to determine the influence or impact of digitalization on project management in Finland. The main motive or the objectives of the study or the research was to explore the situation of digitalization in the energy sector in Finland. And, also to explore the association between the theoretical model/approach like Technology Acceptance Model, Resource Based View, and Digital Transformation Model. In this study, it is found that all the approaches have an equally influencing role in digitalization on project management especially in the energy sector of Finland.

In this section, the findings are reviewed for validity, and recommendations are made for the improvement of further research results and improve project work and its management. The study examines and elaborates on how each independent model can affect digitalization on project management in the energy sector. This study has two primary objectives, to explore the impact of digitalization in the traditional project management methodologies in the industrial sector in Finland and to explore the challenges and opportunities faced by the organization during implementation of digitalization on project work in Finland.

The results show that all the approaches have a positive relationship with digitalization through questionnaires and their responses. The study further

revealed that skills and technical knowledge are some of the key factors for individuals to find alternative solutions to challenges while integrating digitalization. No one is wise and talented by birth; it should be acquired through a learning process that is either academic or by its surrounding environment.

From the research study and questionnaire, it is found that future security or threats can be faced by deploying a robust system of digital tools and making employees capable enough to handle critical situations when needed. The study found that there is a positive and strong association between all the individual approaches with digitalization. It indicates that not only a single factor is enough to learn and master about digitalization.

The findings and statistical results also show how each approach affects the level of digitalization. Each approach plays an important role in influencing/impacting the project-related work and daily basis work through digitalization. Each approach has its separate identity and is complementary to digitalization in project management.

As per the Perceived Usefulness side, the study shows that people found various benefits and enhanced their performance by leveraging the result. In the beginning, users face difficulties but later they understand how to use and utilize digital tools and technology. It has made their daily routine work much easier, faster, and more convenient. It is also found that not all the employees accepted it but most of them have resisted change while integrating digitalization.

Similarly, perceived ease of use has a role in motivating and building confidence in themselves in making corrective and critical decision-making. It is clear that during the integration process, employers need to understand and provide learning and practical facilities to the employees so they can be capable of handling the challenges or problems related to digitalization. This interim helps to save time, money, and privacy of the organization, which ultimately provides the upper hand over competitors in the global market.

However, the resource-based view is another approach that significantly impacted on project management. It helps the manager to find the best alternative to tackle the challenges by making them utilize their own/available resources in the highest possible way. It helps in identifying and diversifying the organizational resources in a digital way to maximize the true potential of the resources to obtain maximum returns/results.

The Digital Transformation Model is another important approach to influencing digitalization. Making a plan and setting objectives and goals is not enough for project work and management. There should be discipline and systematic approaches/methods are required. New sets of tools and technologies are required to accomplish the project work. So, DTM helps in bringing all sets of odds that are needed for survival in a digital era. The previous study found that DTM has helped managers to solve the problems of old- and traditional-time-consuming methods into effective and result-oriented methods.

The study suggested that while integrating digitalization there may occur various barriers and challenges. Such barriers and challenges need to be sorted out to achieve their goals and set targets, otherwise, they will end up losing their will. Further, it is revealed that challenges may be internal or external; organizations must be precise while implementing digital technologies. They should study carefully and find the best solution. The challenges they faced during its integration are:

- Unskilled and lack of knowledge of their employees during the beginning phase of digitalization integration.
- Uncertainty about the customer acceptance and expectation of digitalization.
- Uncertainty about its impact on work and operation outcomes and efficiency.

- Integration of new technology requires heavy investment and the arrangement of such investment creates challenges and problems in work function.
- Reinforcement and rescheduling of new work methodology after digitalization.
- Data breaches, technical errors, overload, and sometimes malfunction.

Regarding all these findings of the impact of digitalization on project management, organizations must act actively to make all employees participate in digital transformation. This will help to adopt the habit of being digitally friendly, which ultimately helps in completing the project work. Mostly Finnish government should focus on centralizing digitalization in every industry sector.

To increase the performance and overall result of the energy sector not only the energy industry but also the government and users must adopt and accept the habit of digitalization. Most importantly, the manager should handle the employee's resistance to change and bring positive change management, either facilitating learning or practicing the technical tools to the employees making sure that there won't be any threat of losing jobs. So, they can keep track of their daily routine work and be able to find the solution if any problems occur.

This study provides evidence as a tool to monitor their performance and bring the change in the chain of methods relationship with services and outcomes of project management work. The study will help them to better understand the impact of digitalization on project management in Finland and through that they can provide different ideas and strategies that further help to understand their potential threat or challenges. So, it creates a chain system of information about why digitalization is necessary for every project management work. This helps to build skills and self-confidence and enhance the capabilities how to overcome barriers and challenges for further gain.

The need for digitalization and the result of the study easily can explain why change needs to be brings in methods of working. Digitalization in the industry sector of Finland can change their tactic bring new strategies and develop new attractive as well as alternative digital products and services to match or exceed their expectation. In addition, this interim helps to gain the faith of the customer/user in such an industry in the future. Because it helps to enhance various factors of organization project management. The perception employees of project management on digitalization after integration are:

- Digitalization brings the operation cost lower, resulting in high revenue for the organization.
- It has brought positive attitudes of employees and customers towards digitalization through its performance and efficiency.
- It makes work easily accessible from home and makes time duration shorter.
- Tracking of progress and Roadmaps, Real-time visibility, building information modeling, etc.

Digitalization has significantly impacted work in many positive ways. For instance, it has transformed project management by streamlining communication and collaboration. With digital tools like Slack, Trello, or Asana, teams can easily track project progress, assign tasks, and share files in real-time, regardless of their location. This has reduced the need for lengthy email threads and in-person meetings, making project management more efficient and agile.

Moreover, digitalization has improved data management and accessibility. Cloud storage solutions like Google Drive or Dropbox allow for secure, centralized access to important documents and files, ensuring that team members can access the information they need at any time, from any device. This has minimized delays and enhanced the ability to respond quickly to project changes or client requests.

The results of the study also help policymakers to rethink and rebuild their strategy and take advantage of the study. Most of the researchers emphasize various approaches like the technology acceptance model, resource-based view and digital transformation model has strong and positive associations with digitalization.

This study provides a required solution for the government and the energy industry for formulation and implementation of their new policies and strategies of digitalization. So, people can understand the importance of digitalization to improve their living standards and also help to eradicate the problems regarding data privacy, data storage, effectiveness, and performance efficiency.

5.2 Conclusion

This study is conducted among those industries that are dealing with digital transformation or digitalization in project management work in Finland. They have integrated digitalization in almost every industrial sector in Finland. The study was based on the various approaches of digitalization by the industry sector on project management in Finland. Three approaches are considered for the study of the digitalization of project management in Finland by the energy sectors. They are the Technology Acceptance Model, Resource Based View, and Digital Transformation Model. This study explored the impact of digitalization on project work in real practices, implementation, challenges, and potential opportunities.

The most common motive for digitalization by the industry sectors in Finland is to master generating quality products and smooth services that enhance productivity. Also, for the security purpose of data breach and cyber security, empowering the capabilities of employees, customers, and the industry itself. The study result shows that there is a positive relationship between technology acceptance models, resource-based views, and digital transformation models on digitalization.

Similarly, from the empirical evidence and the result of the study, it is found that digitalization improves the overall performance of the industry but still some challenges should not be negligence. Project management is influenced by various factors, including time management, cost management, quality management, project team management, communication management, project risk management, and procurement and resource management. These can be managed easily with the help of digital tools and technologies; implementation of digitalization enhanced the acceleration of work.

The study has found that digitalization is not free of challenges and barriers. Cyberattacks, data breaches, and unauthorized access often create threats to the sensitive information and data of the organization. High installation cost, operation cost, required highly skilled manpower, etc. challenges are faced by the energy industry. Such challenges need to be sorted out in time to enhance stability and reliability.

Digitalization has a greater impact on paving and shaping the modern-day art of work and revolutionary step toward making the world compact and small. It has set the industries and government methods of working to a whole different level. Despite having many challenges and barriers, it is undeniable that it has created many opportunities to cope with those challenges and help in finding new alternatives to success.

Similarly, the government also played a great role in inspiring and motivating different industries towards digitalization through different policies, rules, regulations, subsidies, etc. Based on review and study it is found that Finland's government has played a vital role in revolutionizing digitalization by coordinating with various industrial sectors.

Based on the study, a resource-based view has significantly influenced and motivated industries over their self-ability to control their action on managing, utilizing, and diversifying their resources to get optimal levels of performance

and outcomes too. This study contributes to the literature by examining the effects of digitalization on both performance and outcomes/results in a simple understanding context. Our study found that the success of project work is significantly related to greater participation in digitalization to cope with future challenges.

The benefit of digitalization is that they can manage their performance efficiently and effectively. It is therefore important for every industry sector to ensure that every program that aims or targets to uplift and enhance the capabilities to invest, manage, and diversify their project must not be limited to books, paper, rules and regulation modules, printing materials, and other forms of media. Instead, a well-defined structured form of digital project should be considered to enhance and bring more efficiency and effectiveness to people's understanding. Whatever the policies are made, they should be implemented in a systematic way to bring prosperity to the industry sector regarding project management tasks.

Based on findings and a review of previous studies, it is clear that Finland is considered the most advanced country in the case of digitalization and technology. The results of the study underscore the pivotal function that skill development, utilization of resources, and advanced technology play in shaping organizational efficiency and helping in overcoming challenges. These factors have a significant positive link with digitalization, which highlights how important they are in determining the impact on project management methodology that organizations have.

The correlation between TAM, RBV, and DTM underscores the imperative for organizations to continually enhance project efficiency by showcasing their knowledge, acceptance, and dependability. Similarly, cultivating usefulness and ease of use, maximizing resource utilization, and adopting new and advanced technology enhance overall efficiency by overlapping challenges. Moreover, the

noteworthy correlation seen between Perceived usefulness and the digital technology model emphasizes the significance of swiftly addressing and resolving challenges and improving project outcomes and efficiency.

The validity of the data is strengthened and our understanding of the elements influencing digitalization on project management is improved by the congruence of the findings with previous research. The relationships that have been identified validate the significance of Technological Acceptance, Resource Utilization, and Digital Transformation as critical factors that influence digitalization on project management in many businesses and circumstances. The strength of these correlations is shown by this congruence with previous research, which also highlights how applicable they are for enhancing project outcomes and efficiency.

5.3 Implication

This study only concentrated on the digitalization of project management in Finland with a sample size of 85 employees from the energy sector. To equal the sample, mean to the population mean a large sample size is needed to be representative. Therefore, for further research, it is recommended that there should be required large sample size be required to construct a more accurate and representative manner to fulfill the gap.

This study identifies the pattern of challenges and opportunities while implementing digitalization in project work in the industry sector. Other factors of identification can be used to measure the impact of digitalization on project management. There are other models or approaches like the Diffusion of Innovation Theory (DIT), Agile Project Management Framework (APMF), and Change Management Model, etc. that can influence digitalization on project management. So, these variables could be explored, and their association with digitalization on project management for further study and research. Regarding this digitalization, other factors have effects and can potentially influence the

project management such as independent variables like Level of Digital Tool Adoption (LDTA), cloud-based solution, level of data analytics integration, etc., and so on. Considering hypothesis also explores the wide range of digitalization on acceptance and rejection.

The result of this study only indicates the findings in Finland about the energy sector. Such study can be done in other industries like the communication sector, service sector, business sector, transportation, health sector, etc. The study of large sectors helps to better understand the true figure of how digitalization is influencing and impacting the work model of those industries. This study only focuses on the factors and impact of digitalization influence for future purposes based on how to accomplish project management work through digitalization.

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APPENDICES

APPENDIX 1

These are the survey questionnaires used for research purposes.

Impact of Digitalization on Project Management Methodology and Practices in various Industries of Finland.

Questionnaire for Research
Dear Respondents,
First of all, we deeply appreciate for your co-operation. We are pleased to inform that , we are going to undertake a survey on Impact of digitalization on energy industries in Finland. We would further like to assure you, all the information contained to questionnaire will be kept confidential and used only for academic purpose.

Best Regards,
Usha Gautam and Deepa Chhetri.
Master's in Project Management
Vaasa University of Applied Sciences

[Kirjautu Googleen](#), jotta voit tallentaa edistymisesi. [Lue lisää](#)

* Pakollinen kysymys

Age *

20-30

30-40

40-50

50-60

Gender *

- Male
- Female
- Other

Industry Sector *

- Energy Sector
- Business Sector
- Communication
- Others

Year of Experience *

- 0-5
- 5-10
- 10-15
- 15-20

TECHNOLOGICAL ACCEPTANCE MODEL

A (Perceived Usefulness).

1. Digitalisation has improved the performance of project management task such as planning, scheduling and resource allocation.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

2. Digitalisation has enhanced the effectiveness of project management process such as initiation, planning, execution, evaluation and monitoring.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

3. Using digital technologies improves the reliability of energy infrastructure, including monitoring, maintenance and fault detection.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

4. Digitalisation has increased the accuracy of energy monitoring and reporting.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

5. I have positive attitude towards using digital technologies in energy management.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

B) Perceived Ease of Use

6. I felt it is easy to use digital tools and technologies in my project works.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

7. I am very clear and understandable while interacting with digital tools in energy project works.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

8. It is easy to learn and use digitalisation for energy operation related task.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

9. I found digital technologies are user-friendly for energy management works.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

10. I would recommend using digitalisation for energy management to my colleagues.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

RESOURCES-BASED VIEW(RBV)

11. Digitalisation provides organisation's with a competitive advantage in project management.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

12. My organisation has the necessary resources (financial, technical, human) to support digitisation in project management .

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

13. I have necessary skills to operate digital tools in our project work.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

14. I/We effectively utilise all available resources in energy operations.

- Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
-

15. We maximise the potential operation of digitalisation and its resources in energy operation.

- Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
-

DIGITAL TRANSFORMATION FRAMEWORK(DTF)

16. Our leadership actively supports and promotes digitalisation in project management.

- Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
-

17. Digitalisation has streamlined our project management process.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

18. Employees are encouraged to adopt and integrate digital tools and practices in their daily works.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

19. Digital tools have significantly improved operational performance.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

20. I have observed a reduction in operational ineffectiveness (delays, errors) due to the use of digital tools.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

a. What are the biggest challenges you face when using digital tools in project management? *

Oma vastauksesi

b. Can you provide an example of how digitalisation has positively impacted your work? *

Oma vastauksesi

Lähetä

Tyhjennä lomake

Älä koskaan lähetä salasanaa Google Formsin kautta.

Google ei ole luonut tai hyväksynyt tätä sisältöä. [Ilmoita väärinkäytöstä](#) - [Käyttöehdot](#) - [Tietosuojakäytäntö](#)

Google Forms

Questionnaire Link

https://docs.google.com/forms/d/e/1FAIpQLSeSmfM6Z2IA2NJGaTtGIMF1WzCaJqoHs_5PJGeQbcplfhFPjg/viewform