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Improving Project Management in a small solar (photovoltaic) power plant EPC company with PRINCE2® method

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Abstract

By 2023, Lithuania has already constructed 545.5 MW of solar power plants. However, within the next seven years, there are plans to install approximately 2150 MW of additional solar power plants. As a result, both the government and solar photovoltaic engineering, procurement and construction (EPC) companies are actively seeking ways to accelerate the pace of solar power plant construction. One approach to achieve this goal could be enhancing the effectiveness of project management processes within these companies.

The objectives of this study were to investigate the background of the company, identify areas for improvement within its project management processes, and propose recommendations for enhancing project management methods using the PRINCE2 method. The study was conducted within a small solar (photovoltaic) power plant EPC company. Qualitative data was collected through interviews conducted with 28 employees of the company.

After analysing the data using the conductive analysis method, twelve areas for improvement were identified. It was discovered that not all of these areas can have recommendations generated based on the PRINCE2 method. For the areas that were related to the topics encompassed by the PRINCE2 method, specific recommendations were formulated addressing each type of problem identified during the analysis of the data. Eventually, based on all the findings, it was recommended for the company to consider the implementation of the entire PRINCE2 method, along with the improvement or replacement of the existing project management tool.

Keywords

project management; recommendations; PRINCE2

CONTENTS

1 INTRODUCTION

Increasing greenhouse gas emissions (GHG) in the atmosphere is causing rapid climate change. Energy production worldwide generates 72% of the global GHG (World Resources Institute 2017). Thus, solutions to reduce the amount of GHG emissions in the energy sector are promoted. Solar photovoltaic cells being well-developed technology and comparably cheap is one of the best solutions to produce renewable energy and reduce the GHG emissions. 198 countries in the world including Lithuania which signed or acceded to the Paris Agreement (2015) are planning to have significant changes in the energy sector in the coming years. Lithuania is planning that by 2030 at least 45% (not less than 7 TWh) of electricity consumption should be produced by renewable energy resources, of which 22% should come from solar energy. Achieving this goal would bring Lithuania closer to the goal of 2050 to reduce its GHG emissions by 85–90% (Ministry of energy of the republic of Lithuania 2018), which would not just fulfil the Paris Agreement commitments, but also meet the objectives of the Lithuanian Energy Independence strategy (2018).

However, even though the situation in energy production in Lithuania is changing, still the country heavily relies on fossil fuels when producing the energy (International Energy Agency 2022). According to the President of the Lithuanian Renewable Energy Confederation Martynas Nagevičius in 2022 installed power of solar power plants reached 545.5 MW, in the same year solar power plants produced 2.9% of total consumed electricity in Lithuania. To cover 22% of all electricity consumption by 2030 (which would be not less than 2.7 TWh), in seven years, around 2,150 MW of solar power plants should be installed in Lithuania.

Therefore, the problem is that the current pace of solar power plants construction is not enough. Improving project management practices in the companies that develop solar power plants is one technique to speed up the process and increase the number of solar power plants installed. Lithuania has dozens of companies working in the solar energy sector contributing to solar power plant installations for households and businesses. The company where the study has

been conducted is one of them, providing business clients with engineering, procurement, construction, operation and maintenance services.

According to the Head of the Project Management Team in the company, the success of business heavily relies on the efficiency of project management. Within the company, project management acts as a unifying domain to all services and bears the final responsibility for ensuring the quality of project execution. Therefore, effective project management assist to ensure that projects are finished on schedule and under budget while also maintaining the quality of the work (Great Britain. Office of Government Commerce 2009). The results of that can lead to various positive outcomes, including enhanced business performance, increased client trust, and a higher rate of photovoltaic power plant installations (PMI 2020).

This study was conducted in a specific company with the aim of identifying areas for improvement within the project management of the company. The goal was to provide recommendations that address these areas effectively. Qualitative data was collected through interviews and analysed using the conductive analysis method. For the formulation of recommendations, a process-based method for effective project management called the PRojects IN Controlled Environments abbreviated as the PRINCE2 method was selected as the foundation.

Thus, the main goals of thesis are:

1) Study the background of the company.
2) Identify areas for improvement within the project management processes.
3) Using the PRINCE2 method suggest recommendations for improving the company’s project management methods.

2 THEORETICAL BACKGROUND

2.1 Project management

To understand better what project management is, terminologies should be understood. Management, according to the author of the “Principles of Management” (1953) George Robert Terry, is “a distinct process consisting of planning, organising, actuating and controlling; utilising in each both science and art, and followed in order to accomplish pre-determined objectives” (Aquinas 2007). Then, a project by the Project Management Institute (2008) is defined as “a temporary endeavour undertaken to create a unique product, service or result”, therefore, project has a quite wide definition, meaning that the organization of the birthday celebration or developing software, both could be called projects and managing their process would be called project management. Though in the “Managing successful projects with PRINCE2” released by the Great Britain, Office of Government Commerce (2009,1-2), a project is defined more from the business perspective as “a temporary organization that is created to deliver one or more business products according to an agreed Business Case” (Business Case meaning the justification to start the project) and the project management is explained as “planning, delegating, monitoring, and control of all aspects of the project, and motivation of those involved, to achieve the project objectives within the expected performance targets for time, cost, quality, scope, benefits and risks”. So, as the definitions of the project and project management by the Great Britain, Office of Government Commerce state, a project cannot start without a clear justification and should be managed to control the mentioned six variables of the project.

Before the 20th century projects were managed without widely agreed methods. Engineers, architects, and constructors were executing the projects according to their created methods and techniques (Azzopardi n.d.). In the 1900s many different project management tools started appearing: Gantt Chart created by Henry Gantt, Critical Path Method (CPM) by Dupond Corporation, Work Breakdown Structure (WBS) created by the United States Department of Defense (DOD). Then and still today project management methods are being created for the same purpose – to make the project management more effective which is

directly related to the project success and usually all performance of the company (Haughey 2021). The statement that using project management techniques enhance the probability of the project success is supported by number of studies including Patanakul et al. (2010) and Marc Lappe and Konrad Spang (2014). While the importance of the project success to the organizations is proven in the survey “Pulse of the Profession” (2020) carried out by the Project Management Institute (PMI), which revealed that because of poor project performance, 11.4 percent of organizations’ investments are lost. Additionally, organizations that do not consider project management as an important skill to lead change, tend to have on average 67% more failed projects. This only confirms the importance of project management success to the organization and the significance of methods to project management.

Nowadays there are several widely accepted project management methods, standards, techniques, and tools offering different ways to manage the project. According to the digital project manager Ben Aston (2022), each method presents different levels of specificity and has a focus on different areas. The famous standard for the terminology and guidelines for project management - the Project Management Institute’s PMBOK (Project Management Body of Knowledge) focuses mostly on the standards, processes, and best practices, has high specificity. Other focus on one area: the concept of Lean project management resolves around the themes, whereas Khanban tool, Scrum framework, Waterfall model focus on the processes, and the Agile approach is about the principles. PRINCE2 (PRojects IN Controlled Environments) method defines three of the four Ben Aston’s (2022) described areas: themes, principles, and processes.

In certain circumstances, it may be necessary to merge multiple methods to create a well-functioning approach. Based on the Hubstaff survey “2021 Remote Project Management”, 39% of the companies apply a variety of project management approaches such as Agile, Khanban, Scrum, etc. This is more usual in the IT project management field. However, if possible, it is generally better to use only one approach to project management in order to maintain clarity and consistency and efficiency. (Kerzner et al. 2017, 19.)

2.2 Applicability of PRINCE2 method

During the 1970s, the British government began implementing project management techniques to manage large-scale IT projects. In the mid-1980s, the Central Computer and Telecommunications Agency (CCTA), which was responsible for managing the government's IT projects, identified a need for a standardized project management methodology that could be applied across all government departments. As a solution, the CCTA introduced PROMPT (Project Resource Organization Management Planning Techniques), a project management methodology. However, PROMPT was considered too complicated and bureaucratic and was difficult to apply to non-IT projects. Consequently, the CCTA created a new project management methodology called PRINCE (PRojects IN Controlled Environments) in 1989. PRINCE provided a more flexible and simplified approach to project management, which was widely adopted by various UK government departments. PRINCE was updated in 1996 with PRINCE2, which incorporated user feedback and offered more guidance on adapting the methodology to suit various project types and sizes. PRINCE2 has been revised several times since its introduction, with the latest version, PRINCE2 2017, released in 2017. Seven versions have been released: in 1989, 1996, 2002, 2005, 2009, 2013, and 2017. Although versions changed to make the method easier to tailor and more accessible, PRINCE2 core principles and basic methodology stay the same through all the versions. (Prince2 2017.)

PRINCE2 is one of the most popular project management methodologies, it is practised in more than 150 countries, offers a globally recognised certification, and more than a million professionals use the methodology in a range of roles and sectors. PRINCE2 is a versatile project management methodology that can be applied to a wide range of projects across various industries. However, it is particularly suited for complex projects that involve multiple teams, stakeholders, and phases. The methodology provides a structured approach to project management that can help organizations manage risks, ensure quality, and deliver projects on time and within budget. In addition, several sources of literature discuss the suitability of PRINCE2 for different types of projects. (Great Britain. Office of Government Commerce 2009, Foreword) For example, the book "PRINCE2 Study Guide" by David Hinde (2018) provides a detailed overview of

the methodology and explains how it can be adapted to suit various project types and sizes. The article "PRINCE2 for Small Scale Projects White Paper" by Chris Ferguson (2011) focuses specifically on how PRINCE2 can be used for smaller scale projects. Finally, the academic article "Key Success Factors of PRINCE2 Project Management Method in Software Development Project" by Saiful Islam and Nina Evans (2020) explores and explains the main elements of PRINCE2 that bring success to the project of software development.

PRINCE2 is applied by many big organizations. A few of the biggest executed projects with PRINCE2 is explained by Tony Kippenberger (2012, 7). The port of Rotterdam implemented PRINCE2 to execute the Maasvlakte 2 project. The project goal was to expand the port which is one of the biggest in the world. The project was finished on time and within the budget.

The British Council has been using PRINCE2 since 2009, and its methodology has enabled them to deliver global technical change through improved communication and organizational adaptations allowing the council to engage in information sharing and networks. All members of the Global IS team are PRINCE2 certified, which has resulted in a common language and set of principles across the organization, improving stakeholder engagement and bringing significant operational benefits. (Chambers 2009.)

Finally, Scheidt & Bachmann GmbH used PRINCE2 to ensure the success of a project to develop new hardware and software for 64 rail ticket vending machines for Bayerische Oberlandbahn. The project had strict deadlines and specifications, but PRINCE2 enabled bi-monthly meetings, planning, testing, and risk consideration allowed the project to run smoothly, kept the stakeholders involved, and complete the project smoothly and successfully. Scheidt & Bachmann won the PRINCE2 Best Practice award for the best German PRINCE2 project in 2014. (Scheidt & Bachmann GmbH 2015.)

2.3 PRINCE2 method specifics

PRINCE2 method contains three main parts: principles themes and processes. Throughout these parts close attention is paid to costs, timescales, scope, risks,

benefits, controlling the change, quality and its assurance, the progress of the projects, the structure of the project management team, project products and extensive process-based planning. The information presented in this section, as well as the following information in this section, is sourced from the book 'Managing Successful Projects with PRINCE2' by the Great Britain, Office of Government Commerce (2009, 17–18).

The unchangeable part of the PRINCE2 are the seven principles which are presented in Figure 1 are universal and empowering, proven through many years of practice.

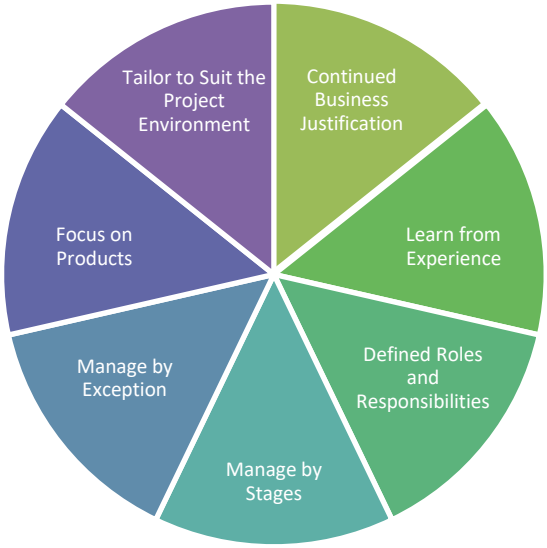

Figure 1. PRINCE2 seven principles (Great Britain. Office of Government Commerce 2009, 10)

Seven themes are the aspects of project management that must be handled continually. In the method, they all linked and managed together effectively. The themes are represented in Figure 2. The themes, principles and processes are all interconnecting the PRINCE2 methodology. The themes' function is to help to answer certain questions in the project management process. The Business case theme is answering the question of why the project should be started, maintaining the focus on the continued business justification. The Organization theme answers the question of who will be responsible for executing the project tasks. In this theme roles and responsibilities of the project management team are described. The Quality theme helps to answer the question of what the project products and their quality criteria are. The Plans theme answers the how,

how much and when. Complementing the quality theme, the Plans theme defines the means of the products that should be delivered focusing on communication and control during the project execution. The Risk theme answers the what-if question by identifying, assessing and controlling uncertainty in this way increasing the chance of the project to succeed. The Change theme aims to help answer what is the impact question. What is the impact of unanticipated problems, requests for change or quality failure and how it could be identified, assessed, and controlled? The Progress theme answers the following questions. Where are we now? Where are we going? Should we continue? To be able to answer these questions, mechanisms should be created to monitor any unacceptable deviations and compare actual process accomplishments with those planned.

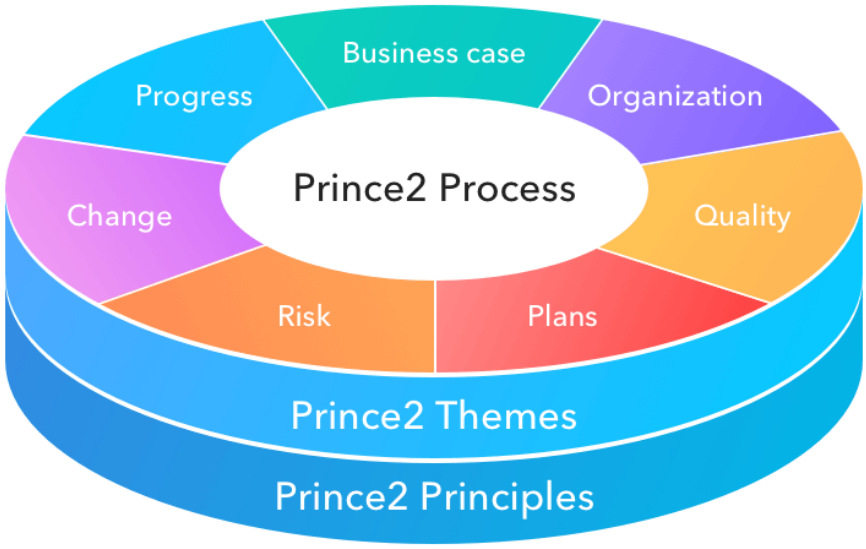

Figure 2. Themes and principles in PRINCE2 (Infinity n.d.)

Process-based planning helps to divide the project into manageable parts which could be individually managed and controlled easily. There are seven processes in PRINCE2 (Figure 3).

Starting up a project (SU): In this process, it is decided whether the project has a business justification to be initiated, then decisions are made about the commissioning of the project, key roles and responsibilities are assigned, previous

lessons are captured, and the basis for detailed planning is created. In the process the main question is: do we have a viable and worthwhile project? (Great Britain. Office of Government Commerce 2009, 121.)

Directing a project: In the process Project Board is enabled to be accountable for the success of the project by making the key decisions during the project. The main goals of the stage are to delegate the authorities to start and end the project and deliver objectives of the project, as well, as post-project benefits are foreseen. (Great Britain. Office of Government Commerce 2009, 135.)

Initiating the project (IP): The goals of the process are to envisage the possible risk and benefits of the project, the scope, and products of the project, what will be the costs, who will be involved in the project decision-making, how risks, issues, changes, progress and quality of the project will be monitored, what will be the communication management strategy, what will be the stages of the project. Answering these questions helps to lay a solid foundation for the project. (Great Britain. Office of Government Commerce 2009, 149.)

Controlling a Stage: When the project starts, in each stage of the project, work has to be monitored, corrective actions have to be done, scope and issues are kept under control, agreed products for each stage are delivered within quality standards, cost, effort and time tolerances agreed (Great Britain. Office of Government Commerce 2009, 167).

Managing Product Delivery: The process ensures the link between the Project Manager and other teams, suppliers and Team Manager(s) within or outside the organization. Each participating in the project must deliver the project products within agreed tolerances and provide information about the process for the Project Manager at an agreed frequency to guarantee that the expectations are met. (Great Britain. Office of Government Commerce 2009, 185.)

Managing a Stage Boundary (SB): The purpose of the process is to enable reasonable communication between the Project Manager and the Project Board which consist of the Executive, Senior User, and Senior Supplier who provide support for the Project Manager. Here Stage Plans, Project Plans are reviewed

and updated, if needed Exception Plans are created, and lessons are recorded. (Great Britain. Office of Government Commerce 2009, 193.)

Closing a Project (CP): The purpose of the project is to create a fixed point when objectives described in the Project Initiation Documentation are achieved and confirmed or when the project must be closed before these objectives are met. In this process attention is brought to the acceptance criteria of the products, the performance of the project, realised and unrealised benefits, solved or unsuccessfully solved risks and issues, lessons report, follow-on recommendations, and the project end report creation (Great Britain. Office of Government Commerce 2009, 205).

The PRINCE2 processes of the project can be visualised in Figure 3. The blue colour signifies the processes that are executed once in the project's lifetime. Green represents the processes that are executed one time in each project stage, and the processes represented in the red colour can be used more than once in a stage. (PRINCE2 wiki n.d.)

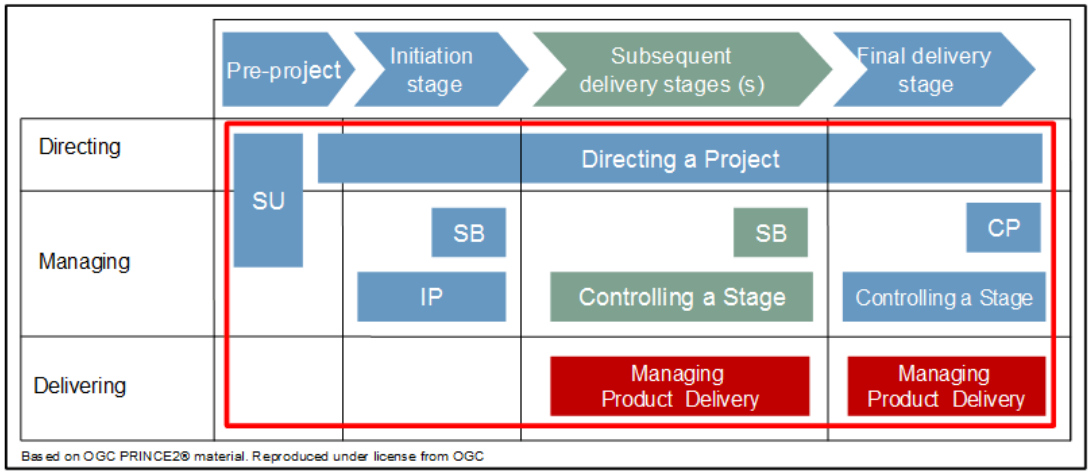

Figure 3. PRINCE2 processes: SU = Start Up a Project, SB = Managing a Stage Boundary, IP = Initiating a Project, CP = Closing a Project (PRINCE2 wiki n.d.)

Overall, the PRINCE2 method provides a structured approach to project management, with a clear focus on planning, monitoring, and control. It is designed to be flexible and adaptable to a wide range of projects, regardless of their size, complexity, geography, or culture. The method is tailored to suit all different environments, however, because all the elements in PRINCE2 are interlinking, tailoring does not mean omitting the elements from the method but adapting the

method to the following factors: project scale, type or corporate standards, organizational maturity, terms, language etc.

An organization can aim to adopt PRINCE2 method to all the projects in the organization or seek to adapt the PRINCE2 method to a project. In these two different cases the organization has to focus on different aspects. As it is mentioned in the “Managing Successful Projects with PRINCE2” (Great Britain. Office of Government Commerce 2009, 213–215), in the first case, when an organization is aiming to adopt the PRINCE2 method, it should focus on the processes and responsibilities, standards, tools and process assurance described in the method, method integration, training and development. Although, when the project management team aims to adjust the method to a specific project, the project management team should focus on adapting the themes, incorporating specific terms used in the method, revising the product and role descriptions, tailoring the processes to match the changes.

According to the studies by Joyce Fortune and Diana White carried out in "Current practice in project management - an empirical study” (2002) and "Looking again at current practice in project management" (2011), among different project management methods applied in the companies, PRINCE2 method is the second most used method in the UK and Australia after the in-house developed methodologies. Meaning that PRINCE2 is not just appealing in theory but in practice as well.

2.4 Solar photovoltaic power plant EPC project management

Using low-carbon renewable energy is one of the solutions to reduce Greenhouse gas emissions. As mentioned in the introduction, countries which signed the Paris Agreement are aiming to increase the amount of energy produced by renewable energy sources reducing the emissions of greenhouse gases.

According to the University of Texas at Austin, Energy Institute (2017), solar energy production emits 41–48 g CO2-eq per kWh of electricity through the lifetime of the system while for example, natural gas combines cycle emits 464 CO2-eq/kWh, natural gas combustion turbine 674 CO2-eq/kWh and coal 870

CO2-eq/kWh. Solar electricity emissions are at least ten times lower compared with the effective natural gas power plant emissions which makes it low-carbon energy. Low-carbon energy sources are gaining bigger popularity in the market. Among the choices, solar photovoltaic energy is the third most popular renewable energy source after hydropower and wind (International Energy Agency 2022).

All solar PV power plant projects, from the initial client order to the completion and handover of the power plant, involve similar processes. These projects encompass various activities such as EPC works, stakeholder management, and meticulous planning. The following chapters will delve into the fundamental aspects of project management specific to the solar PV industry.

Feasibility Assessment: It involves evaluating location, solar resource availability, and determining electrical grid connection possibilities, financing options, and regulatory requirements. It is usual for EPC companies that a detailed plan is developed which includes project scope, schedule, budget, and risk management strategies. In this stage, good project management techniques come in handy.

Design and Engineering: The engineers develop a detailed design plan that includes system specifications, component selection, equipment layout, and electrical design.

Procurement: The team identifies suppliers, negotiates contracts, and manages the delivery of necessary equipment and materials for the solar PV system. This includes developing procurement plans, managing the supply chain, and ensuring the timely delivery of materials, and their storage.

Construction: Includes site preparation, equipment installation, and electrical interconnection while coordinating with contractors, subcontractors, and stakeholders to ensure completion on schedule and within budget.

Testing and Commissioning: The team conducts tests on system performance and safety, as well as final inspections and regulatory approvals.

Obtaining the permits: The part contains checking the requirements and obtaining the documents relevant for the governmental institutions to produce and use the electricity from the power plant.

Operation and Maintenance: To ensure that the system continues to function correctly throughout the years.

Project management is critical to the success of a solar PV project. It requires coordination with engineers, contractors, suppliers, regulators, and investors. Effective management involves implementing effective communication, resource management, progress monitoring, and adaptability to changes in the scope or schedule of the project. Proper project management can ensure timely completion, high-quality results, and adherence to the budget and scope of the project. (Castillo 2022.)

2.5 Project Management in a small company

Small businesses are very different from large corporations. According to Turner et al. (2009), when the size of the enterprise is considered according to the people working in it, a small enterprise is once there are 25 or fewer employees, and a medium enterprise is considered to be when there are 250 or fewer employees in the company. According to the author, around 70% of the private sector economy is represented by small or medium enterprises (SMEs), which demonstrates the great significance that these enterprises have in the economy.

The company that is investigated in this study, according to the mentioned criteria, is considered to be a medium or medium-small company, therefore the main characteristics that are typical of a small or medium company apply to the company as well. There are a few differences when comparing small or medium enterprises (SMEs) with big companies. First of all, processes in SMEs do not require sophisticated planning or control systems, usually, more informal reporting and communication are dominating. Secondly, unlike big companies, smaller ones have less standardization and more idealistic decision-making.

Thirdly, larger companies have a more bureaucratic structure, and strict hierarchy, while in smaller companies there is a bigger tendency for one person or a small group of people to be in charge of the company. Fourthly, having fewer human resources and smaller revenue, SMEs do not have a big safety net, thus, uncontrolled risks have a probability to lead the company to failure. (Turner et al. 2009; Zhang 2021.)

However, considering that “projects in SMEs represent about one-fifth of the private sector economy” (Turner et al. 2009), it is evident that small and medium enterprises (SMEs) play a significant role. In order to promote their own well-being and contribute to the economy, SMEs should prioritize risk and issue management while continuously striving to enhance process efficiency.

2.6 Similar studies

There are several already published studies that are similar to this one, each of them is either taking a slightly different approach to implementing the PRINCE2 method or implementing the PRINCE2 in different industries. Here are the three studies that are the most similar:

In the research paper "Study of Applicability of using the project management methodology PRINCE2 in the management of a specific project" (2014) by Jolanta Słoniec, the objective is to examine the feasibility of incorporating PRINCE2 elements into project management practices. The author investigates the suitability of implementing the PRINCE2 methodology in small, complex projects, considering the compatibility of the company and the project. The study provides valuable insights into the potential benefits of adopting the PRINCE2 method and highlights the key requirements for successful implementation within the company.

"Application of PRINCE2 Project Management Methodology" (2017) by Radka Vaníčkov. The article examines earlier studies that look at whether the PRINCE2 approach is appropriate for the small tourism business. The article supports several claims. The first claim is that the project has a greater chance to succeed if the PRINCE2 methodology is followed. Second, it is confirmed

that every business or project can use the PRINCE2 methodology. The third idea that was supported in the study was that the method is not the most suitable for creating regular routine services like selling newspapers.

The study “Improving Project Management at DHV Shanghai” (2007) by Alex Korver, and Daan Seesing aims to offer recommendations for the Project Management of the DHV Engineering Consultancy Shanghai company. Possibilities for the project management practice improvements were investigated through interviews with the project managers in the company. Challenges and possibilities of the implementation of the improvements are provided.

3 MATERIALS AND METHODS

There are three phases of the study: Background analysis of the company and the project management processes, interviews with the project team members and project managers and composition of recommendations. The information obtained in each of them assist in the following step of the study and completion of the goals of the study. The process of the study is presented visually in Figure 4.

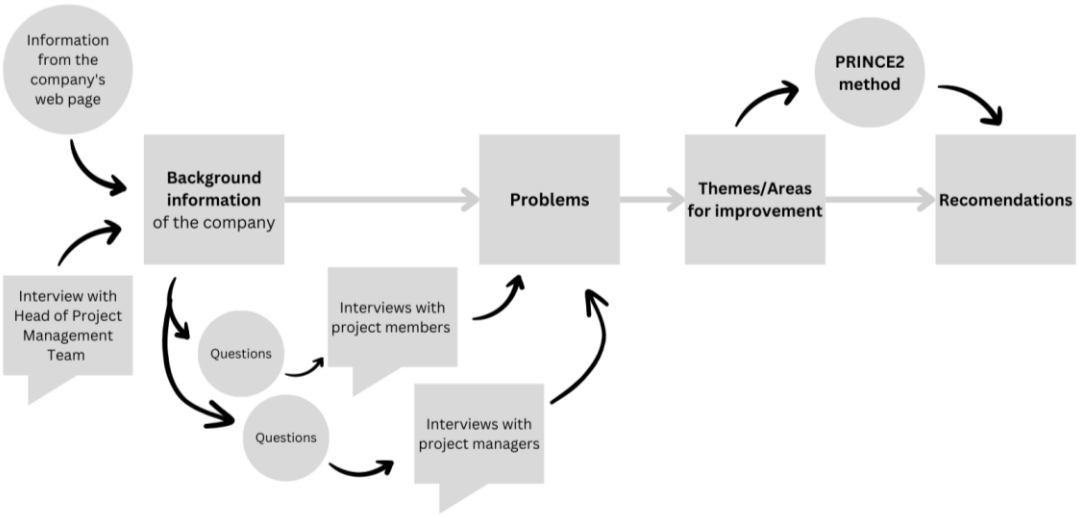

Figure 4. The processes of this study

3.1 Background analysis of the company and the project management processes

The first phase of the study is the background analysis of the company. It serves as a crucial step in preparing for the subsequent stage of study, which involves conducting interviews with employees and project managers. This analysis helps in formulating relevant questions and gaining a general understanding of the company. The primary objective of the background analysis is to gather specific information about the company.

To obtain this information, an in-depth analysis of the information provided in the company's website was conducted to obtain an overview of the company and its services. Furthermore, an interview was scheduled with the Head of the Project Management Team, chosen specifically for their extensive knowledge of the company's projects and their execution process. The interview was conducted in an open format, allowing for a free exchange of information.

During the interview the interviewee was asked about the main objectives of the projects, success criteria, organizational structure of the company and project execution team, key interactions among project team members during project execution and the techniques and tools used for successful project management process.

3.2 Interviews with the project team members and project managers

After completing the initial phase of the study, which involved conducting a background analysis of the company and its project management processes, the second phase of the thesis study commenced. The primary objective of the second study phase was to identify the existing drawbacks and limitations within the project management processes and, using the content analysis method, generate the themes of the problems identified. The themes or the area of the problems identified are to assist in the third phase of the study – the provision of recommendations.

In order to collect data about the issues arising within the project management processes, interviews were conducted with a total of 28 individuals from various roles and departments within the company. The selection of interviewees was based on the organizational structure of the company and the employees involved in the project execution process. The interviewees were: two Sales Managers, six employees from the Engineering Team (two DC Engineers, three AC Engineers and the Engineering Team Lead), three Procurement Managers, three employees form the Construction Team (two Construction Managers and the Mounting Works Team Lead), two employees form the Finance Team (Project Finance Project Controller and Accountant), two from the Counselling Team (Legal Counsel and Assistant Legal Counsel), Operation and Management Team Lead, Development Manager, Permitting Manager, Team Lead of the Project Management and five Project Managers.

Initially, a total of 30 individuals were invited to participate in the interviews. However, two individuals declined to take part in the interview process. For those who agreed to participate, the questions were prepared in advance and shared with the interviewees one day prior to the scheduled interview. Two sets of questions were created: one set for the Project Managers and another set for the remaining 23 members of the project execution team.

The interviews were conducted individually, either in the office meeting room or online, based on the preference of the interviewee. The interviews were intentionally designed to be open and unstructured, providing a comfortable environment for a free-flowing conversation. This approach encouraged interviewees to freely express their opinions, thoughts, and experiences without the constraints of a rigid interview format. The goal was to promote an open dialogue and facilitate the sharing of valuable insights and perspectives.

After conducting the interviews with in total 28 individuals, the content analysis method was chosen. The method allowed a systematic examination of the qualitative data obtained from the interviews. It led to a comprehensive understanding of the drawbacks in the project management processes and enabled the identification of the patterns and themes of the issues.

3.2.1 Interviews with the project team members

The primary objective of the interviews with the project team members from different departments was to identify the main challenges they encountered when working with project managers. Rather than directly asking about the problems they faced, the employees were encouraged to suggest potential improvements that project managers could implement. This approach aimed to create a comfortable environment and prevent any discomfort in identifying issues in their colleagues' work.

Thus, the following questions were presented to 23 individuals in the project execution team:
How do you evaluate the communication of project managers? What could the project managers could do better in terms of communication, organization, delegation of tasks? What actions of the project management team would help you work more efficiently, avoid risks, help you perform your tasks better?

3.2.2 Interviews the project managers

Therefore, this research is designed as a way to understand the needs of the company to improve and assure that the chosen techniques to be implemented in the company are supported by the employees of the company. More about how the research is carried out is presented in the materials and methods section.

Likewise, interviews with the project managers were carried out maintaining the objective of identifying drawbacks in the project management processes. However, given that project managers were directly involved in executing, implementing, and utilizing project management techniques, it was essential to formulate the interview questions in a manner that would not make them feel uncomfortable or question the quality of their work or chosen approaches in managing. Therefore, the interview questions were designed to encourage the project managers to reflect on the project management processes, techniques, and tools provided by the company and give suggestions on why and how they should be improved. The aim was to create a supportive environment where

project managers could freely share their insights. As well, by allowing the employees to participate in the decision-making processes by asking their opinion about the processes and their improvements within the company shows a positive effect on their motivation to enforce the changes in the company. The recommendation could be implemented in the company easier, with less resistance from the employees. (Fontein 2021.)

Therefore, the following questions were presented to the five Project Managers:
1) How would you evaluate the effectiveness of communication with other teams? What actions do you believe the project manager could implement to facilitate smoother collaboration, minimize inconsistencies, and optimize performance among both other teams and the project management team?
2) Can you identify any important features or functions that would be necessary but are lacking in the current project management tool for effectively managing your daily tasks, ensuring high work quality, and minimizing inconsistencies?
3) In your opinion, are there any approaches or methods that could aid in improving the overall smoothness and effectiveness of project management? How can company and the project management department enhance the ability to track and plan project progress, facilitate effective communication with the team and subcontractors, manage project finances, ensure project quality, handle changes and risks, and align the project with requirements of the client?

3.2.3 Data analysis

The data was decontextualized - the recordings and the personal notes were examined, and analysed using content analysis techniques of manifest analysis, focusing on actually said information, and latent analysis, which aimed to interpret what was intended to say. During the process of decontextualization, the codes (or labels) were created for the texts of the interviewees. Then, in the process of categorization in the content analysis, codes were manually applied to set the data into the types of problems identified by the interviewees. Consequently, types of problems were classified into categories, and categories were grouped into themes or areas. This method of information classification was applied to all of the data. (Bengtsson 2016.)

For instance, the comment of the interviewee was that the project managers should “collaborate in problem solving. When problems arise, project team members should try to collaborate with other teams to solve the problem faster, discuss and share information to find the most effective solutions”. The codes of “insufficient problem solving”, “collaboration in problem solving” was created. Then, after creating the codes to other comments of the interviewees, similar codes were classified into one type of problem – “Related parties sometimes are not too involved or invited in project problem solving”, the types of problems then were grouped into the category of “Solving problems, making decisions and changes”, thus this and other categories were grouped into an “Issue Management” theme.

By following this approach of problem gathering, synthesis, and categorization, it was possible to identify and organize a range of problems into meaningful types of problems, categories, and themes. This analysis served as a foundation for suggesting possible improvements in the project management processes.

3.3 Composition of recommendations

The composition of recommendations was the third and last phase of study. The main resource used to formulate the recommendations was the book that serves as a comprehensive guide and resource for understanding and applying the PRINCE2 methodology in project management. The 2009 version of the book was used, called “Managing Successful Projects with PRINCE2” authored by the Great Britain. Office of Government Commerce.

The synthesized and categorized data from the previous stage of the study allowed the composition of the recommendations. The process of the composition of the recommendations included the revision of the categorised results, examining the "Managing Successful Projects with PRINCE2" book and providing easy-to-follow recommendations for the project management team based on the literature.

Identified themes allowed to find information more easily in the book that was related to the themes. All the sections for potential recommendation options covering all the themes were highlighted. Subsequently, the necessary information was narrowed down using the categories identified in the previous study phase. Based on this information, recommendations were formulated and then verified with the types of problems identified in the study analysis. The verification process ensured that all types of the problems were covered by the recommendations. The recommendations were structured in a manner that would allow easy comprehension and step-by-step implementation, avoiding unnecessary explanations that are available in the used literature.

4 RESULTS AND DISCUSSION

4.1 Background information of the company and the project management processes

The study was done in a company that provides business clients in Lithuania with Engineering, Procurement and Construction (EPC), Permitting and Operation and Maintenance services for the solar PV power plants.

4.1.1 Objectives of the project

There are 8 main objectives of the project associated with a solar power plant installation are presented in the work breakdown structure (WBS) in Figure 5. However, when the project objectives are decomposed into manageable tasks, tasks become mixed and lose the Waterfall model structure. So, large-scale projects like these are challenging to maintain a clear overview and track progress effectively during the project. (Interview with the Head of the Project Management Team 2022)

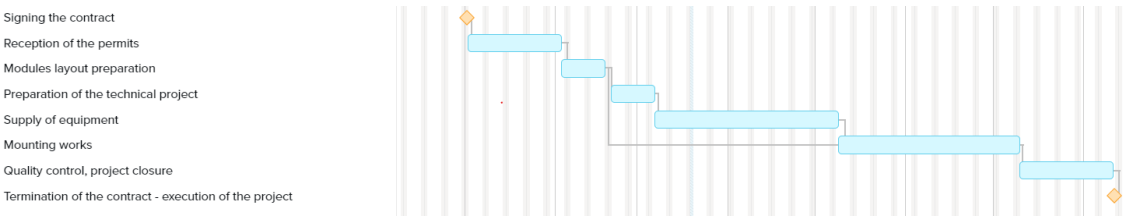

Figure 5. The work breakdown structure of the project

4.1.2 Project success criteria

According to the Head of the Project Management Team, project success criteria concern various aspects. Project is considered to be successfully executed when the solar power plant is installed according to the requirements, finished on time, within budget and scope, its quality is approved by the governmental institutions, and the client takes over the power plant with no complaints.

4.1.3 Organizational structure

As well, an important aspect of successful project management is the organizational structure. In addition to the project management department, there are 10 other departments contributing to the project execution and interacting directly with the project managers in the company.

Project Managers play a central role in the project management process. They are accountable for all aspects and decisions throughout the project lifecycle, responsible for controlling risks, project finances, time and scope ensuring project compliance with the laws and legal acts of the EU and Lithuania. Additionally, Project Managers are responsible for effectively managing teams, subcontractors, and maintaining great communication with clients, and other relevant stakeholders both internally and externally. Each department and its members have different roles in the project, but only the departments which interact directly with the project manager are represented in Figure 6. The Project Manager is as well responsible that the tasks of these departments would be executed successfully.

Each department and its member view the project from a different perspective which means that each individual in the project execution team may identify different challenges in project management. (Interview with the Head of the Project Management Team 2022.)

Figure 6. Communication structure within the group of companies.

4.1.4 Main project management methods, techniques and tools used in the company

There are a few techniques and tools that assist Project Managers in their daily work. Project Managers use a project management tool for the daily track of the project process and communication with the other project team members, as well, a file storage system is used, and weekly meetings attended by project managers and other employees related to the daily execution of the projects to solve the main issues arising during the projects.

The company is certified by the occupation health and safety (ISO 45001), environmental (ISO 14001) and integrated quality (ISO 9001) certificates and

management systems certifications. ISO 9001 directly focuses on enhancing the effectiveness of the project management process. Achieving the certification involves improving processes, conducting risk assessments, effectively managing discrepancies, evaluating subcontractors, and actively collecting the feedback from the client for continuous improvement. (Interview with the Head of the Project Management Team 2022.)

4.1.5 Discussion

To overview the results obtained in the interview with the Head of the Project Management Team, a few things can be noted. Such as many small or medium enterprises, this company as well does not have a highly developed project management process, and the project management in place can be considered a lighter version of the project management processes than the ones used in bigger organizations (Turner et al. 2009). As well it is important to highlight that the project managers like any other member of the project execution team have a different task, so, as well different points of view on the project execution process. This means that the identification of the problems related to the project management can vary according to the role of the employee in the project execution. For instance, the Sales Manager might see totally different problems than the Engineer or Construction Manager sees. So, it is more likely that employees who are in the same department and have similar tasks might look at the project from the same angle and notice similar problems. The finding encourages outlining not the number of employees that would notice similar problems but rather the number of departments for the similar problems noted.

The biggest limitation of this phase of the study is that I, as an interviewer, did have the right amount of the experience to precisely plan in advance the exact information that is needed in the following phase of the study. It would be more beneficial for the study if the person with more knowledge about the company and the project management would carry out the study.

4.2 Results from the interviews with project managers and project members

After the analysis and classification of the results, main themes and areas of improvement can be identified. 12 main areas of improvement were determined. Each of them has a connection with one or several types of problems identified by at least one department. The areas of improvement as well as the number of types of problems and the number of departments that identified the problems associated with the theme are visible in Table 1. Types of the problems as well as categories associated with the problems together with the departments that noted specific problems can be found in Appendix 1 and Appendix 2.

It is essential to point out that PRINCE2 method does not encompass all the topics related to the themes determined during study analysis. Consequently, the Project Panning, Contracts, Responsibilities, Communication Management, Issue Management, Quality Management and Lessons Management themes can be used for the composition of the recommendations. However, recommendations based on the PRINCE2 method cannot be composed for the Engagement, Project Management. Tool, Skills, Knowledge or Noncompliant behaviour themes.

Also, from the table 1 it can be indicated that the Project Planning, Communication Management and Project Management Tool themes stand out with the biggest numbers of the types of problems identified that were identified. As well, the biggest number of departments noted the problems from the project planning and communication management themes.

As well, Project Managers specified only 5 types of the problems from all the themes that could be addressed by the recommendations based on the PRINCE2. However, Project Managers noted 9 types of problems related to the project management tool.

Based on these observations, it is likely that the biggest influence on the effectiveness of the project management processes could be achieved by implementing the recommendations together with the improvement or change of the currently used project management tool.

However, it should be emphasized that the study has its limitations. One of the main is a lack of objectivity. The chosen content analysis method for the analysis and classification of the results, the classification and the conclusions are very much reliant on the perception of the interviewer which could affect the validity and reliability of the findings. Also, the results achieved could be influenced by the type of interview or the questions given. Since all interviewees were asked open-ended questions, they only highlighted the problems they could recall. However, that does not necessarily mean that interviewees who did not mention certain issues would not agree on the presence of those mentioned by colleagues.

Theme/Area of improvement	**Types of problems identified**	**Number of departments that identified the problems**
Project planning	7	9
Contracts	2	4
Responsibilities	2	6
Communication Management	11	10
Issue Management	4	4
Quality Management	1	2
Lessons Management	2	3
Engagement	4	6
Project Management Tool	10	3
Skills	1	1
Knowledge	2	4
Noncompliant behavior	4	4

Table 1. Results of the interviews

4.3 Recommendations for the project management team

The aim of the composition of the recommendations is to provide the company with clear and easy-to-follow steps towards increasing the effectiveness of the company's project management processes. The recommendations focus on themes identified during the analysis of the results process and cover all the types of the problems described in the interviews (the themes and the types of the problems can be found in the annex). The recommendations represent the condensed information originally presented in the book "Managing successful projects with PRINCE2" by Great Britain, Office of Government Commerce (2009).

Recommendations addressing the seven themes (Project planning, Contracts, Responsibilities, Communication Management, Issue Management, Quality Management and Lessons Management) are further described.

4.3.1 Project Planning theme

Project Planning was widely addressed in the company and is as well broadly covered by the PRINCE2 method. According to Great Britain, Office of Government Commerce (2009, 61), "Effective project management relies on effective planning as without a plan there is no control". Therefore, there is a whole process of planning in PRINCE2 to achieve the creation of an effective plan.

Before proceeding with the recommendations concerning the project planning, firstly, it is important to note that PRINCE2 method across the themes and processes focus on the definition and delivery of products. This is as well described in one of the seven principles: Focus on Products. Using the concept of products refers to the output, not action-oriented project objectives. Therefore, as well as the whole method and topics described PRINCE2, planning is product-based.

Before or together with the Project Plan, Product Descriptions should be completed. To create the Product Descriptions, it is necessary to complete the following steps:

- Determine the products of the whole project or the stages of the project.
- Establish the interdependencies between the products.
- Indicate the products that are outside the scope of project management but are required for the project's success.
- Include the details about the purpose and characteristics of the product.
- Describe the production process of the product and the necessary competencies to develop the product, or a reference to the areas that should provide the development resources for the product.
- Identify the quality criteria that the product must meet and what quality checks that are consistent with the project quality standards will be implemented.
- Define the roles and responsibilities for reviewing and approving the Products Description record.

To add up, the book notes that the Product Description does not need to be completed all at once and can instead be approached as an iterative process. (Great Britain. Office of Government Commerce 2009, 251–253, 250–251.)

The plan in PRINCE2 outlines the specific targets or objectives to be achieved, along with details of when, how, and by whom they will be accomplished. The plan can be broken down into three tiers: Project Plan (presents the major products of the project) Stage Plan (with the main project products broken down into manageable products for everyday control) and Team Plan (created by the Team Manager of the team working on particular project tasks, this plan can be created to assist in the completion of the Work Packages). In order to develop a Plan (Great Britain. Office of Government Commerce 2009, 59–72, 250–251), certain steps must be followed:

- Include the information about what the plan comprises, what are the levels of planning, what is essential in the plan and cannot be changed, what planning tools are used.
- Define how the plan will be assessed, controlled, and managed to be improved, how the lessons will be integrated.
- For the plan itself make sure that it includes the budgets, tolerances of time, scope, and cost.
- To improve the clarity and communication, the plan could be represented graphically (as a breakdown structure, flow diagram, activity network, table of resource requirements or specific resources).
- When creating a plan, PRINCE2 recommends on dividing work into smaller chunks that enable the creation of detailed plans allowing the project managers to manage and control the project more effectively.
- Ensure that the plan is approved by the users and validated to be manageable.

Also, the optimal strategy is to collaborate with the users of the plan, as it improves engagement and reduces approval-related disagreements (Great Britain. Office of Government Commerce 2009, 59–72, 250–251).

4.3.2 Theme of Contracts

The recommendations concerning the Contracts theme can be straight linked to the Business Case described by the PRICE2. In PRINCE2 Starting up a Project process which is the primal stage in the project, the Business Case is critical to set the justification for the project providing the basis for the decision-making throughout the project lifecycle. In this regard, when the project involves building a new facility for a client, in this case solar power plant, contract together with the project budget plan can be considered as the Business Case. The contract together with appendixes and the budget plan covers all the most relevant parts that the Business Case should contain. According to the information obtained in the Business Case theme (Great Britain. Office of Government Commerce 2009, 11, 19-27, 237-238), the following actions should be taken to solve the issue related to the contracts:

- Consider the contracts as a part of a Business Case.
- Review the Business Case regularly.
- Use the Business Case as a reference for making the decisions during the project.
- Share the Business Case with the stakeholders that can help to assure that everyone is aligned with the project objectives and benefits.

4.3.3 Theme of Responsibilities

The responsibilities topic is discussed in the PRINCE2 as one of the seven core principles – Defined Roles and Responsibilities. According to the book “Managing successful projects with PRINCE2” book by Great Britain, Office of Government Commerce (2009, 12), “projects involve people. No amount of good planning or control will help <…> if people involved do not know what’s expected of them or what to expect of others.” According to the book, for a project to achieve success, it is crucial to establish a clear project management team structure with defined roles and responsibilities for all project members, along with effective communication channels between them. This structured approach unites all parties towards the shared goals of the project and helps answer the important question of "What is expected of me?" for everyone involved.
To solve the issues related to the responsibilities, according to the PRINCE2 Organization Theme (Great Britain. Office of Government Commerce 2009, 29-43), there are two main actions to take:

- Define roles and responsibilities for each member of the team based on the PRINCE2 approach.
- Conduct periodic reviews of project roles throughout the project to ensure that they remain effective.

The more detailed explanation concerning the recommendations is provided in the Organization Theme that supports the principle of the Defined Roles and Responsibilities in providing knowledge on what action to take and what to consider when establishing the “project’s structure of accountability and responsibilities”.

4.3.4 Communication Management theme

The issues that are associated with the Communication Management theme can be solved by implementing number of steps described in the Organization Theme by the Britain Office of Government Commerce (2009, 29-43, 239):

- Create the document of the Communication Management Strategy that would include the description of the objectives, scope, purpose and responsibility for the strategy.
- Include in the Communication Management Strategy the definition of the communication tools, records or reports that are to be used for the communication procedures.
- The strategy should include the information about the timing of the formal communication activities,
- Description of roles and responsibilities for different aspects of communication,
- Identification of the internal and external stakeholders, information to be provided to them and to be issued to the project, information receiver and supplier, desired relationship with the stakeholder, interfaces, regularity of communication, way of communication, and key messages.
- The strategy should include the feedback from the stakeholders on the communication requirements.
- The communication method, content, and frequency of the communication should be approved by all stakeholders.

Essentially, to solve the problems identified during the interviews concerning communication, a proper Communication Management Strategy focusing on a description of how and how often communication will take place with both internal and external project stakeholders. This approach promotes stakeholder involvement by establishing a controlled and two-way exchange of information. The document is to be created or updated in the Initiation Stage of the project and followed during the project process. The Communication Management Strategy can include a number of logs, records or reports which could facilitate

in the project management process and serve as a part of a communication tool.

For the task assignment problems that are identified within the Communication Management theme, the solution of Work Packages could be implemented. Work Packages are a collection of information about one or more products that are described and assigned to the Team Manager or team member.

4.3.5 Issue Management theme

The recommendations for the Issue Management theme address almost all main aspects described in the Change theme (89 –96) in “Managing successful projects with PRINCE2” book. The PRINCE2 method’s main approach to the issues focuses not on the avoidance of them but rather the opposite providing guidance on effectively identifying, assessing, and controlling the issues. Therefore, avoiding the identified problems in the interviews associated with the issue management requires the implementation of the following steps and techniques:

- Create a Product Description, which serves as a baseline for identifying the issues.
- Establish a Daily Log that tracks project progress and records any issues that arise.
- Create Product Status Accounts where the information about the state of the products within the project, stage or area of the project.
- Decide on a clear method for identifying and prioritizing their severity and priority.

When the issue arises, the following steps should be implemented to handle them properly:

- Firstly, assess and decide on the priority and severity of the problem to determine the appropriate action to be taken.

- Document the issues based on the level of formality that they need to be handled with. Issues that do not require a high level of formality should be documented in the Issue Register, while issues that require a higher level of formality should be documented in the Issue Report.
- For easier identification and resolution, project issues can be categorized into three groups: Request for Change, which would lead to a change in the Product Description; Off-specification, which refers to the absence of something that was previously agreed upon; and Problem/Concern, which involves a positive or negative question that needs to be raised or solved.
- Depending on the severity of the issue, different levels of authorities may be involved in the problem-solving process. For instance, if the issue is not serious, it may be managed by the Project Manager. However, if the issue is very severe, it may require involvement from Corporate Management or the customer.
- If an issue is identified as a Request for Change, appropriate level of authorities have to decide whether the issue should become a change. To assist in decision making MoSCoW method can be used. The MoSCoW method categorizes changes as 'Must have', 'Should have', 'Could have', or 'Won't have (for now)', helping to prioritize changes and ensure that the most important ones are implemented first. Therefore, every issue must be identified, evaluated, and either approved, rejected, or put-off for consideration to become a change.
- To make issue management easier for the project manager, project manager may delegate Change Authority, the designated person such as the one who proposed the particular change and who will fill out a Change Request form. The Change Authority and other level of authorities will then decide regarding the request and the implementation of the change.

The described process is visualised in the figure bellow:

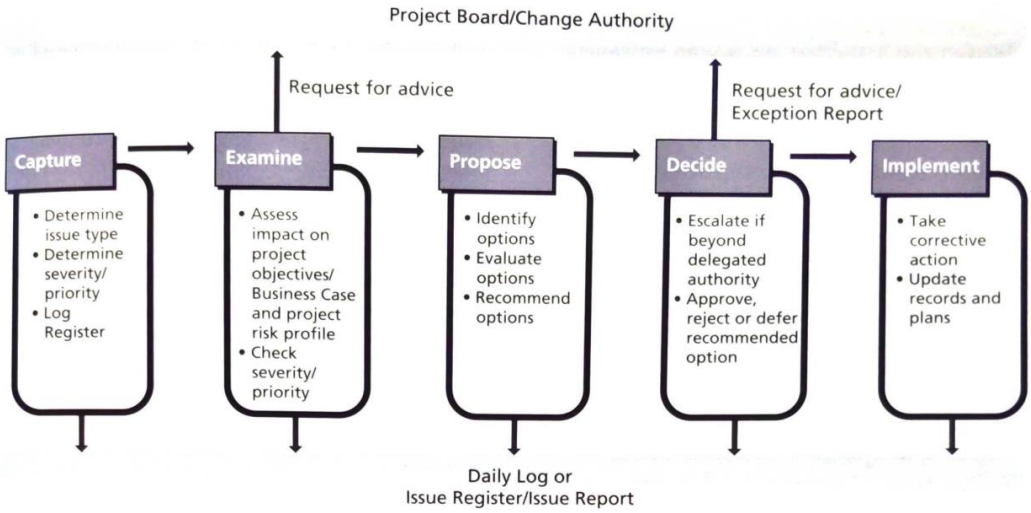

Figure 5. Issue and Change control procedure (Great Britain. Office of Government Commerce 2009, 95)

4.3.6 Quality Management theme

Quality Management is another theme that was identified from the data of the interviews. PRINCE2 clearly explains that quality management should proceed in the PRINCE2 Quality theme. It mostly includes the creation of the Quality Management Strategy which as well as most of the described approaches in PRINCE2 should be planned, because “to control anything, including quality, there must be a plan” (Great Britain. Office of Government Commerce 2009, 48). Therefore, the recommendation to solve the issue regarding the quality of the company includes the following actions that should be accomplished:

- Create a Product Description to identify which products require quality registers for effective quality management.
- Create the Quality Management Strategy document which includes the information about who is responsible for the strategy, what is the scope, objectives and purpose of the strategy.
- Describe the process of planning for quality management, process of quality control and assurance that will ensure the product meets both quality requirements and client expectations. Description of control could include quality control methods, templates, standards, and metrics, and a description of the quality assurance could involve audits or reviews of relevant authorities.

- Specify the tools and techniques that will be needed to assist in managing the quality of the products.
- Add the description of the reports, their purpose, format, timing when they should be produced, where the reports will be kept and what are the recipients of the reports.
- Define the timing for quality management activities to take place.
- Determine the roles and responsibilities for quality management of products.

To assist with the execution of the Quality Management Strategy, Quality Register for products that require quality management is to be created. The Quality Register (Great Britain. Office of Government Commerce 2009, 45-57, 257-259.), which is used to track all quality management activities related to a product, should include

- name and identifier (numeric or alpha-numeric) to ensure clear identification of the product in question
- definition of the method and actions that are applied for the quality management of the product
- clear identification of a person or team that is responsible for quality management
- dates when the quality management activity is planned or completed
- result of the quality review
- references to the quality review documentation that can include the actions obliged to repair the faults.

As well, to maintain the accuracy and integrity, proper control of the quality management activities must be ensured.

4.3.7 Lessons Management theme

At last, Lessons Management theme was established according to the types of problems that were identified in the interviews. Recommendations are to be of-

fered to avoid the repetition of the problems arising regarding this topic. Implementing the principle “Manage by Exception” together with the Progress theme describing how the lessons should be managed according to PRINCE2 method, will help to manage the lessons more effectively.

In more detail, there are three management products that can assist in management of the lessons: End Project Report, End Stage Report and Lessons Report.

Lessons Report contains the shared lessons learned during the project with future projects, and to promote actions that will enable the organization to integrate these lessons into its standard practices while avoiding negative lessons in future projects. The data of the Lessons Report should be presented to the people involved in the project and used by the authority responsible for the quality management systems and their development.

Lessons Report must be a part of the Project or Stage End Report but can as well be generated at any time of the project. The Lessons report (Great Britain. Office of Government Commerce 2009, 243-245) includes

- indication of the stage, project or timing of the project that the report was created
- comprehensive review of the project's successes and failures, and offer recommendations on methods used during the project, on quality, communication, risk and change management strategies, controls and efficiency of controls of the project and unexpected events that caused deviations from the original plan
- useful information for the future projects about the amount of effort that was needed to create the products and the effectiveness of the strategies that were used to delivering the products, information about the issues and risks that were identified
- critical lessons that consist of the details on the accident, a comparison of what was planned and the actual outcome (positive or negative), cause, recommended actions, and information on whether there were

any signs that the event was likely to happen and if it was already described as a risk.

The End Project Report and End Stage Report (Great Britain. Office of Government Commerce 2009, 99-109, 243-245, 249) excluding the Lessons Report include

- clear analysis of the project or stage performance comparison with a plan or Business Case
- description of the impacts of unusual situations
- assessment of the objectives achieved to those planned, review of the performance on the project controls – quality, risks, benefits, cost, time, scope, evaluation of the controls and strategies of the project
- team performance revision (especially noticing good performance)
- comment on the status of the products, in particular, the planned and actually performed quality activities, approvals, list of products missing of not meeting the original requirements, advice.

In addition, the End Stage Report should include risks and issues that affect the project, also, the anticipation of the following stage, what can be changed compared with what was planned, and what amendment should be made to the project tolerances – cost, quality, time, benefits, risks, scope.

Together with the End Project Report should be verified that all issues were resolved or became the subject of a follow-up action recommendation and the project's products were handed over to the client or operation and maintenance. Also, if the work is not fully finished or products need to be developed, approval is received that the recommendations for the following actions are communicated to appropriate stakeholders.
(Great Britain. Office of Government Commerce 2009, 99-109, 243-245, 249.)

4.3.8 Discussion

After the composition of the recommendations, it is highly significant to acknowledge that almost all he main approaches and aspects of the project

management described by the PRICE2 method were mentioned in these recommendations. The only information that was not mentioned of developed in the recommendations is related to the Progress and Risk themes, as well as the processes and some of the principles. However, as it is described in the "Managing successful projects with PRINCE2" book by Britain Office of Government Commerce (2009, 215), PRINCE2 should be implemented as a whole to avoid the flawed understanding and the implementation of PRINCE2 method. Thus, it is advisable for the company to tailor the method as a whole to align the project environment in order to achieve the highest results, comprehensive understanding and proficiency in utilizing the method rather than implementing separate parts of the method.

Implementation of the "full PRINCE2" would ease the process of tailoring and application of the method to the existing project management processes. In the case of the whole method and not just the recommendations adaptation, proposed recommendations would support the customization of the PRINCE2 method by directing focus towards the key areas where the greater emphasis should be placed.

Anyhow, the composition of the recommendations has some limitations with the most notable subjectivity factor. Analysis of the book as well as the effort to condense and structure the recommendations were based on the perception of one individual.

To enhance this aspect of the study, it would be recommended to involve at least two individuals in the composition or review process of the recommendations. Ideally, one of these individuals should be a PRINCE2 practitioner, as their expertise and practical experience with the method would greatly contribute to the reliability, quality and effectiveness of the recommendations.

5 CONCLUSION

The goals of the study were successfully achieved. The background of the company was studied which assisted the following stages of the study. The in-

terviews with the Project Managers and project members from different departments were conducted. Analysis of the data from the interviews revealed that some of the problems noted in the interviews cannot be addressed with the recommendations based on PRINCE2. The recommendations based on PRINCE2 for the problems associated with the project management tool could not be composed, however, Project Managers noted the biggest number of problems related to the project management tool compared with any other area for improvement within the project management. Composition of the recommendations revealed that almost all the main subjects of PRINCE2 method were mentioned to address the identified problems. Based on principle of PRINCE2 and this finding, the project management within the company would benefit the most implementing whole PRINCE2 method.

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APPENDIXES

Appendix 1

Results obtained from the interviews and used for the composition of the recommendations

Theme	Category	Type of the problem	Departments that identified the problems
Project planning	Beginning the project	The project manager may sometimes fail to plan ahead for critical target dates, budgets, and tasks for each department	Procurement, Engineering
	Closing the project	The process of handing over project information to Operations and Maintenance after project execution is unclear.	Operation and Maintenance
		A proper project closing plan with the client has not been agreed upon	Sales, Engineering, Operation and Maintenance
	Synchronization of the work	The working methods of project managers are not uniform.	Sales, Engineering
		There is a lack of a project plan, or the project manager is not following the plan that is in place.	Sales, Engineering, Development
	Request and provision of information in advance	Most of the time information is demanded late	Finance
		Tasks are not provided in advance.	Finance, Site Management, Project Management
Contracts	Contracts with the client and subcontractors	PM doesn't use and pay enough attention to the contract during the project	Sales, Counselling, Engineering
		PM together with the task sometimes doesn't provide the main pledges of the contract	Engineering, Site Management
Responsibilities	Project tasks are divided not in detailed way causing confusion on the roles and responsibilities in the project		Engineering, Project Management, Development, Procurement
	PM sometimes doesn't feel the ownership of the project		Sales, Finance
Communication Management	The way and platform for the communication	The way of communicating as well as the platform for the different type of communication is not agreed among all the departments	Engineering,

		The information about the project stage is not sufficiently shared	Engineering, Procurement
	Communication with the client	Changes communication sometimes is delayed, the communication is pretty infrequent	Sales, Engineering
	Task assignment	Available tool is not sufficient for the task assignment and tracking	Engineering, Project Management, Site Management, Permitting, Development, Counsel
		PM together with the task should provide the main pledges of the contract and additional needed information in order to execute the tasks	Engineering, Site Management, Counselling
		Lack of the prioritization and deadlines for the tasks from PM	Engineering, Construction, Site Management, Finance, Team Lead
		PM sometimes is not warranted about the choices and the tasks given	Procurement
	Issues	Issues are not communicated instantly	Counselling
	Decisions and changes	Sometimes not all the related parties are informed about the occurred issues, taken decisions and made changes	Engineering, Procurement, Construction, Site Management
		Changes are sometimes not registered	Engineering, Construction
		When changes or decisions are documented, arguments for decisions are not always added	Engineering
Issue Management	Solving problems, making decisions and changes	Related parties sometimes are not too involved or invited in project problem solving	Project Management
		Occasionally there might be a delay in addressing and solving issues.	Sales, Construction, Project Management
		There is a lack of agreement on the problem solving and decision-making process among the departments.	Procurement, Construction
		At times, decisions on changes may be rushed	Procurement, Construction
Quality Management	Mounting works quality is not managed efficiently enough		Operation and Maintenance, Project Management
Lessons Management	Departments do not receive enough feedback for improvement purposes		Sales
	The team could benefit if the project manager would share more about their experiences and discoveries from the project		Procurement, Operation and Maintenance

Appendix 2

Other results obtained from the interviews

Area	Topic	Problem	Department
Engagement	PM engagement into the project	There is a noticeable disengagement on the part of the project manager in participating and seeking enhancements in their own tasks as well as the tasks assigned to other stakeholders	Sales, Engineering, PM Team Lead, Procurement
		The project manager shows a lack of interest in cost-saving initiatives and revenue generation	Sales, Engineering, PM Team Lead
	At times, there is a noticeable absence of engagement from the project manager when it comes to planning the project in advance		Procurement, Finance
	Sometimes there is an absence of documentation from the project manager regarding the events that take place throughout the project		Counseling
Tool	The project management tool is not user-friendly		Sales, Engineering
	It is difficult to effectively monitor and track tasks within the tool.		Project Management
	The significant events and plans should be clearly visible		Project Management
	Tool should provide easy and efficient ways of assigning tasks		Project Management
	The tool should provide an easy way to identify the responsible individuals for the tasks		Project Management
	The tool should facilitate clear visibility and easy monitoring of the project's various stages		Project Management
	The tool should make it effortless to locate, update and access the necessary information		Project Management
	The tool should provide a reliable and convenient platform for storing and retrieving the critical information related to the project		Project Management

	The tool should offer a straightforward and efficient way to track changes, decisions, and the corresponding arguments		Project Management
	The tool could also include a feature for tracking the time spent on tasks.		Project Management
Skills	Leadership	The project manager should aim to be both efficient in managing tasks and projects while also demonstrating a genuine concern for the well-being of the employee	Construction
Knowledge	The project manager should work on improving their knowledge and skills in project management.		Sales, Engineering
	The project manager should work on improving their knowledge and skills in construction field		Team Lead, Sales, Engineer, Project Management
Noncompliant behavior	Project managers often fail to provide timely updates regarding the progress and status of projects		Engineering, Procurement
	The project manager does not effectively communicate relevant information to project stakeholders		Engineering, Sales, Construction, Procurement
	There is a tendency for the project manager to neglect the prescribed file structure when uploading files		Counseling