

Project portfolio management in telecommunication company: A stage-gate approach for effective portfolio governance

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ABSTRACT

In today's fast-paced business environment, implementing strategies through programs, projects, and business-as-usual activities can be challenging for companies. The telecommunication industry, in particular, faces these challenges as it experiences the effects of digital transformation and fast-changing markets. It requires a flexible and adaptive approach to project portfolio management (PPM) to optimize investments and deliver value. This article presents a successful case study of a PPM process using the Stage-Gate model in a prominent telecommunications company that operates in a dynamic and fast-growing environment. The Stage-Gate PPM model comprises four stages: Proposal Selection, Selection of Nominated Demands, Prioritization, and Categorization of Projects. The model is unique as it can be adapted to different projects and incorporates elements of Agile approaches, such as Portfolio Sprint meetings and artefacts. The study demonstrates the importance of a well-defined PPM process in coordinating short-term and long-term activities and effectively allocating time, money, and resources. The Stage-Gate PPM model can potentially enhance project success rates and bring greater value to companies by ensuring the realization of suitable projects. This article contributes significantly to the existing literature on portfolio management, providing valuable insights and lessons applicable to other companies in the industry to enhance their portfolio management processes. Furthermore, this study can interest scholars and researchers seeking to explore effective portfolio management in other complex and dynamic environments.

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1. Introduction

The telecommunications industry is constantly evolving, with new trends emerging as a technology and consumer preferences change. As stated in the *Telecom Services Market Size, Share & Trends Analysis Report By Service Type*, the telecommunications services market is expected to grow significantly in the coming years, driven by the increasing demand for mobile data services and the growth of machine-to-machine services [1]. In today's dynamic and highly competitive business environment, where customer demands are constantly evolving and competition is fierce, every industry faces significant challenges [2, 3]. Telecommunication companies, in particular, must possess the capability to adapt to these changes and uphold flexible internal processes in order to achieve success.

In the telecommunications industry, companies are process and project-oriented, relying on project management to solve business problems and adapt to the dynamic environment [4]. Environmental uncertainties and changing customer demands are just another factor pushing companies to be more flexible [5]. However, effective portfolio management techniques are essential to remain competitive and achieve their business goals. The role of portfolio management is to align the company's product offerings with the changing needs of its customers and the market while also ensuring that the portfolio delivers the desired financial performance and supports the company's overall business strategy [6-8]. Through portfolio management, companies can optimize resource utilization, mitigate risks, ensure alignment with business objectives, and facilitate resource allocation, resulting in more efficient and effective goal attainment [9].

The telecommunications industry has experienced significant changes in recent years due to privatization and liberalization, resulting in a dynamic and fast-growing environment. To remain competitive in this industry, companies require access to cutting-edge technology, innovations, and domestic and international market access. Effective portfolio management is essential for telecommunications companies to achieve their goals more efficiently and effectively, driving long-term success. Therefore, this research focuses on the telecommunications industry to investigate the challenges of portfolio management and identify successful practices that can enable companies to stay competitive and achieve their strategic goals.

This article presents a case study of a project portfolio management process (PPM) using the Stage-Gate model in a leading telecommunications company based in Serbia operating in a regional market. The study aims to contribute to the broader literature on portfolio management in the telecommunications industry by focusing on value capture and providing insights and lessons from the company's portfolio management process. Specifically, the article uses a unique Stage-Gate model to observe a company's organizational approach to achieving strategic goals and adapt project management according to the project's size, complexity, and characteristics.

This article makes a significant contribution to the existing literature on portfolio management. Its importance lies in its contribution to understanding the value of portfolio management in the telecommunications industry, particularly through the unique Stage-Gate PPM model. Companies in the industry can apply the insights and lessons learned from this case study to achieve their strategic goals and enhance their portfolio management processes.

The remainder of this article is structured as follows. The second section presents the literature review on PPM, rethinking value creation through PPM, the benefits of using the Stage-Gate model for PPM, and the fundamental PPM challenges in the telecommunication industry. The third section details the case study of introducing Stage-Gate PPM in a telecommunication company. The fourth section presents the case study's lessons learned. Finally, the paper concludes with a summary of the key points and provides directions for further research.

2. Literature review

2.1 Project Portfolio Management (PPM)

A portfolio represents a collection of projects, programs, subsidiary portfolios, and operations managed to achieve strategic objectives. Portfolio components (projects, programs, subsidiary portfolios, and operations) compete for a share of limited resources. Organizations must examine their unique circumstances and determine how to optimize and balance the portfolio components.

The beginnings of PPM date back to the 1950s in determining inventory portfolios [10]. PPM can be seen as one large entity of all the projects in an organization managed and sponsored by company managers. The right projects must be selected, prioritized and evaluated to form one entity that helps the organization reach its strategic goals. Project and program management are focused on process efficiency, but portfolio management refers to effectiveness – aligning tasks and priorities according to the strategic goals and vision of the company [10]. PPM attempts to answer the questions such as “What should we take on? What should be terminated? What is possible? What is needed?” [11].

Organizational strategy is composed of goals and policies that provide the overall direction and focus of the organization, as well as plans and actions to achieve those goals. PPM is the centralized management of one or more portfolios to achieve strategic objectives. Applying portfolio management principles aligns the portfolio and its components with the organizational strategy, contributing to the company's competitiveness and business success [12]. PPM can also be viewed as a dynamic activity through which an organization invests resources to achieve its strategic objectives by identifying, categorizing, monitoring, evaluating, integrating, selecting, prioritizing, optimizing, balancing, authorizing, transitioning, controlling, and terminating portfolio components. PPM is recognised as an active decision-making procedure that modifies a set of projects, whereby a business's list of active new projects is constantly updated and revised [10]. Optimising the PPM emphasises transparency through clear goals, roles and processes. Also, without standardization of project management, PPM is elusive [6].

2.2 Rethinking value creation through PPM: An organizational approach to achieving strategic objectives

One of the noteworthy changes in the project management field is the orientation of project management towards value delivery, defined as set of strategic activities contributing to achieving strategic goals and enhancing the company's operations. The concept of value capture has garnered considerable attention from scholars in the past decade [14]. However, a detailed examination of the value approach to project management has only recently emerged [15]. Value capture studies are pertinent because organizations have often encountered challenges capturing value from their projects [14]. These difficulties stem from an uncertain environment that necessitates anticipating project execution, managing uncertainties, and comprehending various stakeholders' diverse perspectives [16].

The shift from "product creation" to "value creation" has arisen from long-standing discussions about measuring project success [17]. The conventional observation of project success was centred on the well-known project management "Golden Triangle" imperatives – cost (remaining on a budget), time (meeting deadlines), and scope (meeting requirements). Rethinking project success assessment has spurred the recent emphasis on value and emphasized the importance of situating project management in a strategic context, namely emphasizing the importance of PPM [17]. PPM should ensure that the portfolio components (projects) that contribute the most to the value chain, impact the enhancement of the company's operations, and achieve strategic goals are selected for implementation. PPM provides a comprehensive framework for strategy execution and necessitates constant alignment with strategic objectives through processes and practices for project and program management to achieve strategic business objectives [7].

Effective PPM is critical for companies to achieve their strategic goals and deliver value to stakeholders beyond just commercial success [17]. This requires careful consideration of both tangible and intangible benefits for stakeholders delivering the requisite values that stakeholders expect [18], and an alignment of strategy and execution while balancing feasibility with necessity. components that contribute most to a company's strategy. Although these components may be independent, they often compete for the same limited resource pools, making it crucial for companies to assess their resource potential and optimize the balance of their portfolio components. Once the projects are selected, it is imperative to allocate limited resources to them in a coordinated manner to achieve the best possible results [7, 19]. Coordinated management makes it possible to allocate human, financial and physical (logistical/material) to achieve the best possible results. In other words, effective PPM ensures that a company's strategic goals are met by selecting, allocating resources to, and implementing the most important projects.

By analysing portfolio components and their interdependencies, PPM can identify potential challenges and risks, constantly updating and revising an active list of projects [20, 21]. This helps make strategic decisions that align with the company's goals. To achieve this, PPM must be integrated with organizational planning and business analysis to analyse current business risks, which may drive strategic changes to support planned portfolio components.

Portfolio components are grouped based on risk, financing, and other parameters to facilitate effective work management while achieving organizational strategies and priorities. Assigning

appropriate priorities to portfolio components is critical to managing the portfolio effectively. PPM enables a company to execute the right projects at the right time by selecting and managing projects as a portfolio of investments. Linking PPM to strategy balances resource utilization and investments to maximize the value delivered in executing programs, projects, and operational activities. PPM has become a key element of how companies deliver value to multiple stakeholders and achieve business success.

However, achieving strategic goals and delivering value through PPM are not without their challenges. These include obtaining and maintaining senior management support, determining short-term and long-term goals, managing limited resources and capabilities, and sustaining the ability to execute [17]. Hence, companies must focus on doing the right projects at the right time in the right way to avoid the wastage of precious resources [22].

2.3 Benefits of using the Stage-Gate model for PPM

The Stage-Gate model, which was introduced in the mid-1980s, has helped many companies making the new product development process more effective and built to prevent or minimise risks [23]. The model has been continually refined and enhanced by industry leaders to make it more flexible, scalable, and adaptable, incorporating best practices such as better governance, integration with portfolio management, accountability, and continuous improvement.

The Stage-Gate model's benefits extend to portfolio management, where it provides a systematic approach to managing projects and ensuring alignment with a company's strategic objectives while achieving the desired outcomes. Adopting a systems perspective to the Stage-Gate process underscores the importance of feedforward controls, such as planning and forecasting, in making critical decisions such as go/kill/hold/recycle [24, 25].

This article highlights the benefits of using the Stage-Gate model for portfolio management, emphasizing its ability to improve decision-making, enhance resource allocation, mitigate risks, and improve communication. By using predefined criteria and gates, decision-makers can objectively assess the project's potential and determine whether to continue, revise, or terminate it. The strength of Stage-Gate methodology is its simplicity and decision-making based on information available at that moment [26].

The Stage-Gate model enables effective resource allocation, ensuring each project has the resources it needs to succeed. This is achieved by using predefined stages and gates that help companies allocate resources based on the project's needs and potential. For integrating the PPM to the Stage-Gate process, gates have to be modified. In addition, resource allocation methods are added to the gates without reprioritising the entire set of projects every month.

The model also includes a structured approach to risk management, enabling companies to identify and address potential risks at each gate, thereby reducing the likelihood of project failure.

Effective communication and reporting are also integral parts of the Stage-Gate model, ensuring stakeholders are informed and engaged throughout the project's lifecycle. This helps to build trust and support for the project, increasing the chances of success.

2.4 PPM in the telecommunication industry

The telecommunication industry is highly competitive and subject to rapid technological changes. Consequently, telecommunication companies invest substantial amounts of capital into numerous projects, such as network infrastructure, product development, and marketing initiatives.

Effective PPM within this industry encompasses managing the company's portfolio of products and services, including developing and launching new products, optimizing existing products, and discontinuing underperforming ones. The primary objective of PPM is to identify and prioritize projects that are most likely to yield the highest return on investment, ensuring that the company's resources are utilized efficiently and effectively to maximize value. PPM optimize a portfolio's value, develop its strategic alignment, and balances its assignments [15]. In addition, it helps to diversify the company's portfolio of projects, reducing the risk of a single project failure affecting the entire business. It also enables the company to monitor the progress of each project and make adjustments if necessary, reducing the likelihood of unexpected setbacks.

In the telecommunications industry, effective PPM must ensure that the company's product offerings align with the dynamic needs of the customers and the market while delivering the desired financial performance and supporting the company's overall business strategy [27]. This ensures that all projects are working in unison towards a common objective, thus enhancing the likelihood of success. Portfolio management is instrumental in efficiently allocating company resources, such as capital, staff, and time, across different projects. This not only ensures that each project has the resources it needs to succeed but also prevents resource bottlenecks and wastage.

Peter Krüssel [28] has identified various challenges faced by telecommunication companies in managing their portfolio of products and services. One major challenge is the rapidly changing technology landscape, which requires companies to adjust their portfolio offerings to stay relevant continuously [29]. Moreover, telco companies require significant capital investments to build and maintain their networks, making investing in new products or services that may not have a guaranteed return on investment difficult. In addition, increasing competition from new entrants such as over-the-top (OTT) providers and technology companies also poses challenges for maintaining a competitive portfolio and differentiating themselves from their competitors. Another challenge is balancing short-term financial goals with longer-term strategic objectives. This can create tension between investing in new products and services that may have a longer-term payoff versus maintaining profitability in the short term. Furthermore, the highly regulated nature of the telecommunication industry with complex regulations that vary by country and region presents challenges in introducing new products or services. As a result, companies need to navigate regulatory requirements and obtain necessary approvals, which can be time-consuming and expensive.

The ultimate goal of linking PPM with organisational strategy and strategic business execution is to establish a balanced, realistic plan that will help achieve both short-term financial goals and long-term strategic goals [30]. Furthermore, successful companies in this industry must be agile and innovative [31, 32], which is unthinkable without a well-established PPM.

3. Case study: Introducing Stage-Gate PPM in telecommunication company

The case study presented in this section focuses on successful implementation of a PPM process using the Stage-Gate model in a prominent telecommunications company based in Serbia. The company offers a range of services, including mobile and fixed-line telephony, broadband internet, and cable television, and has a strong market position with over 11 million subscribers in three regional markets.

3.1 Introducing PPM in the portfolio cycle

Like programs and projects, portfolios require diligent life cycle management, including initiation, planning, execution, and optimization, to ensure stability and adaptability in a constantly changing environment. The portfolio's performance is monitored and controlled during all phases, with relevant information analysed and decisions made about which components should be transferred to the next stage. The phases in the portfolio life cycle are not necessarily sequential and can have multiple iterations in one phase, and all phases within the portfolio are subject to change. Management decisions are made within the portfolio's life cycle, enabling the portfolio to be changed and updated to adapt to internal and external factors. For instance, if there are legal and regulatory changes, the PPM process must align the management plans with the new requirements, as illustrated in Fig. 1.

The goal of establishing the PPM process within this telecommunication company under analysis was to identify all business requirements at the company level and enable centralized management of priorities for programs, projects, and other business-as-usual (BaU) requirements derived from the current business strategy and market demands. A PPM process was deemed crucial to prepare the organization for future exploration of new markets and development possibilities, acquiring new skills and competencies, and adapting to rapidly changing business environments [8].

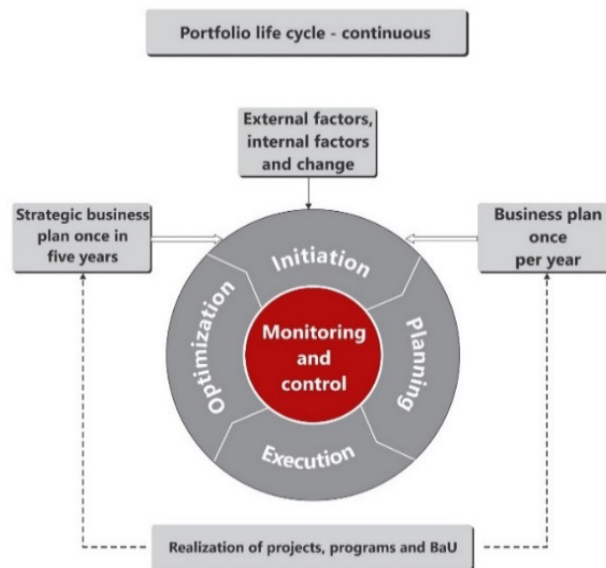


Fig. 1 Portfolio Life Cycle as a continuous process

The process aimed to shift the organization's mindset from tactical to strategic by selecting and managing projects aligned with its strategy. The company's business strategy, formulated by the top management, clearly indicated how the company's operations would be shaped in the following period. PPM was central to achieving the organization's intended strategies and future growth [11].

In 2022, the PPM process was introduced through a pilot project, which was based on the five-year strategic business plan that had been created in 2021. The pilot project covered several operational fields the Portfolio Governance Board had to deal with, including gaining an end-to-end overview of all inserted portfolio components and their associated activities. The pilot project also involved prioritizing the realization of portfolio components/activities and understanding the possible consequences of not completing other activities due to priority changes. Additionally, the pilot project aimed to balance short-term and long-term portfolio components/activities, present strategically important projects and programs and connect the portfolio components with monitoring the implementation of the strategic business plan. The monitoring involves using defined strategic initiatives, key performance indicators (KPIs), and preventive/corrective measures. Doing so makes it possible to properly balance and prioritize projects/programs/BaU within the established portfolio, which in turn contributes to achieving the defined strategic goals. It is essential to base the KPIs and strategic initiatives on the company's strategic goals and ensure that they contribute to its overall success and sustainability [31].

3.2 Stage-Gate project Portfolio Management model

In this case study, the Stage-Gate model is used to establish the PPM process by taking a big-picture overview of all activities at the company level, dividing their realization into stages, and enabling an easier decision-making process in every gate (determine whether or not the project can continue to the next phase). The Stage-Gate PPM model presented in this article is uniquely valuable because it can be adapted to different types of projects [33]. It shares some similarities with the Agile-Stage-Gate model, as it incorporates elements of Agile approaches such as Sprint meetings and artefacts [34].

The Stage-Gate PPM model description

I) STAGE 1 (S1): Proposal Selection

Telecommunication company receives a large number of proposals from its different organizational units for potential projects and programs. These proposals cover various areas such as network expansion, new product development, and process improvement initiatives. To start the PPM process, the Executive Directors of each organizational unit

consider nominated proposals in their respective units of responsibility and nominate the most promising ones for further selection at the company level. The output of the S1 is a List of company-level nominated demands for projects/programs (Gate 1 – G1).

II) STAGE 2 (S2): Selection of Nominated Demands

The company conducts a business analysis and financial asset verification for the nominated demands to determine which demands should be realized as projects or programs. The output of the S2 is a List of portfolio components at the company level, which are entered as portfolio components in the Portfolio Database (Gate 2 – G2).

III) STAGE 3 (S3) Prioritization

Prioritization is carried out iteratively during Portfolio Sprint Meetings. The Portfolio Manager and Portfolio Team prepare relevant information and proposals to aid decision-making. The Portfolio Governance Board reviews the proposals and makes decisions on prioritization, ensuring that Go-NoGo decisions are clearly defined when priorities change. Executive Directors are also involved in decision-making for reprioritization or termination of activities when necessary. The goal of prioritization is to ensure that the implementation of short-term and long-term activities is coordinated to bring the greatest value for the company, taking into account the proper allocation of time, money and human resources to individual activities. A detailed Risk/Value analysis is conducted to confirm project priorities through discussion at Portfolio Sprint meetings. This process aims to ensure that the company is realizing the most suitable projects by carefully calibrating, levelling, and harmonizing R/V parameters at the company level through a joint and transparent assessment. The output of the S3 is a List of prioritized portfolio components at the company level (Gate 3 – G3).

IV) STAGE 4 (S4): Categorization of the Projects

The Program Management Team utilizes the List of prioritized portfolio components (G3) to categorize the projects and recommend an appropriate project methodology for each. The team considers various factors, including project scope, complexity, and duration. Still, the most important is the benefit that the project brings to the company in the short and long term to classify the projects into small, medium, or large categories. This categorization allowed for a balanced distribution of short-term and long-term activities as part of the PPM process.

Fig. 2 present the modified Stage-Gate model integrating the PPM.

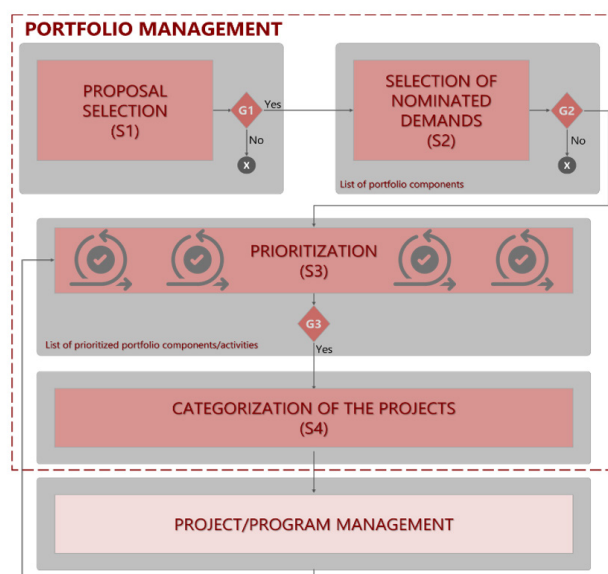


Fig. 2 Stage-Gate PPM Model

For each project category, the Program Management Team analyse each project individually and proposed an appropriate project methodology. They considered the need for iterative and incremental development throughout the project life cycle, changing customer requirements, uncertain processes, and value delivery. As no one-size-fits-all project methodology suits all companies and project types, the team recommended either a waterfall approach, an agile approach, or a hybrid methodology that incorporated both waterfall and agile approaches. Agile approaches are better suited for situations where changing customer requirements and uncertain processes are expected, and value delivery is a focus. On the other hand, traditional project management approaches, such as the Waterfall methodology, are plan-driven, focused on detailed planning and process control, and customer requirements are defined at the outset [35].

3.3 Stage-Gate PPM model roles and responsibilities

The Stage-Gate PPM process involves several key participants, including Executive Directors, the Portfolio Governance Board, Middle Management – other department directors who are not members of the Portfolio Governance Board but whose participation is relevant in portfolio management, and a Permanent Team from the Strategy Department that supports the work of the Portfolio Governance Board.

1. *The Executive Directors* are responsible for managing the participation of the company's organizational units in the PPM process. They make decisions on which requests will be nominated to achieve strategic goals based on business needs and potential, and also monitor and control the realization of portfolio components. They may also decide on reprioritization or termination of portfolio components if necessary.
2. *The Portfolio Governance Board* is composed of 10 department directors from organizational units relevant to portfolio management, who have the right to vote for prioritization/reprioritization of activities (projects/programs/BaU). These departments include product development, technical and IT, sales, customer care, financial controlling, and budgeting. The Portfolio Governance Board is coordinated by the director of the Strategy department, who also oversees periodic Portfolio Sprint Meetings.
3. *Middle Management* comprises other department directors who are not members of the Portfolio Governance Board but participate in all or some activities based on their competencies and needs. They do not have the right to vote for prioritization/reprioritization but are responsible for communicating with their organizational units about any changes in prioritization status.
4. *The Permanent Team* from the Strategy Department supports the work of the Portfolio Governance Board and the preparation of the Portfolio Sprints. It includes the Portfolio Manager, Portfolio Team, Strategic Team, and Program Management Team.
 - The Portfolio Manager and Portfolio Team analyse all relevant information and prepare a proposal for making decisions on reprioritization of portfolio components at the next Portfolio Governance Board sprint. They also prepare a unified report on the status of the portfolio in Power BI, containing relevant indicators on the status and trend of realization on the project/program, and a proposal for making decisions on balancing and reprioritization.
 - The Strategic Team connects strategic initiatives with projects/programs/BaU entered in the Portfolio table and monitors the implementation of the current strategic business plan by quarter, strategic and operational KPIs, and the connection with the implementation of portfolio components.
 - The Program Management Team, in cooperation with Business requestors, is responsible for categorizing projects and selecting an adequate project management methodology.

Through open and transparent governance, including processes for categorizing, prioritizing, selecting, and approving portfolio components, PPM key stakeholders are more likely to accept the decisions and agree with the process, even when they may not fully endorse the decisions made.

3.4 Stage-Gate PPM model artefacts and meetings

The *Portfolio Database*, as a crucial PPM artefact, was established at the inception of the pilot project in Q1 2022 to record all company planned, ongoing or completed activities, including Program, Project, and BaU, along with relevant data. All responsible participants, including Portfolio Governance Board members and their associates, Project/Program managers/Product owners, Process managers, and the Strategic team, constantly update the Portfolio Database. Key data for each activity is arranged in columns, including the name of the aggregated activity, its type (PR/PG/BaU), description, owner, project manager/product owner, percentage of realization, status, strategic pillar/strategic initiatives, traffic light status (project health check), category, and risk/value. These data are essential for top management reporting and must be updated promptly to ensure accurate and complete reports.

Each portfolio component must be assigned to either the short-term category, which includes small application changes and small and medium projects, or the long-term category, which includes large projects and programs and BaU activities. The primary criterion for project categorization is the benefit it brings to the company in the short and long term.

All activities submitted by business requestors for prioritization using various tools must be added to the Portfolio Database. Business requestors can indicate the need to prioritize an activity by adding the "P" mark in the Portfolio Database and a brief explanation.

This database serves as a source for systematizing, monitoring, and reporting, as well as a basis for balancing and prioritizing activities during periodic meetings of the Portfolio Governance Board, known as Portfolio Sprints. This is a living artefact being continuously maintained. The *Portfolio Sprint* is a regularly scheduled, time-limited meeting lasting one hour on Wednesdays. During this meeting, the Project Governance Body directs its attention towards pre-determined tasks focusing on achieving specific objectives.

The Portfolio Manager, along with the Portfolio Team and operational associates of department directors who serve as Portfolio Governance Board members, evaluate the impact of increasing the priority of specific portfolio components. They analyse all relevant information and prepare a proposal for making decisions on the reprioritization of portfolio components at the next Portfolio Governance Board sprint once a week. Based on their proposed new ranking, the final priority decision is made during the Portfolio Governance Board's Portfolio Sprint Meeting.

The Portfolio Sprint agenda often includes an end-to-end (E2E) overview of individual activities, which helps shift the focus from individual activities to the overall activity (Strategic business plan), making the realization process more comprehensive. To provide an E2E overview of portfolio components, it is necessary to aggregate all basic activities by linking them to the overall activity, enabling the monitoring of interdependence during the realization of associated activities.

In addition, *Regular Status meetings* with the strategic initiatives' owners provide an opportunity to identify projects and programs that have strategic importance and should be prioritized.

Long-term activities identified through this process are specially flagged in the Portfolio Database to ensure they receive the necessary attention and resources. Meanwhile, strategic initiatives owners are also able to apply for and launch projects and programs that have not been recognized by the previous analysis but which they consider to be strategically important. This flexibility allows the continuous refinement of the strategic plan to adapt to changing circumstances.

This approach was beneficial in launching new services, as it allows monitoring the implementation of activities required for Customer Care, Business Analytics, and Marketing sectors after go-live. It also facilitates dividing complex, transformational programs into smaller, more manageable projects.

The Strategic team plays a critical role in providing ongoing support to the strategic initiative owner, helping them to monitor and report on the progress of their initiatives effectively. This coordination leads to the preparation of quarterly reports on the implementation of the strategic business plan, which serve as the basis for prioritizing projects and programs within the PPM process. The use of Power BI reports, as shown in Figures 3 and 4, further enhances the PPM process.

Fig. 3 shows a report for one strategic initiative (SI 1.4.) by portfolio components (6 projects are realizing according to plan, 1 project is late, and 2 projects have yet to start). Fig. 4 shows that

the late project has the flag "B" in the Portfolio Database, indicating the need for balancing this project at the Portfolio Sprint meetings. In this way, the necessary feedback from monitoring the strategic plan's implementation is provided to the PPM process. This loop enables comprehensive calibration between portfolio components and strategy implementation results at the company level through a joint and transparent assessment, which contributes to realizing the right things in the right way.

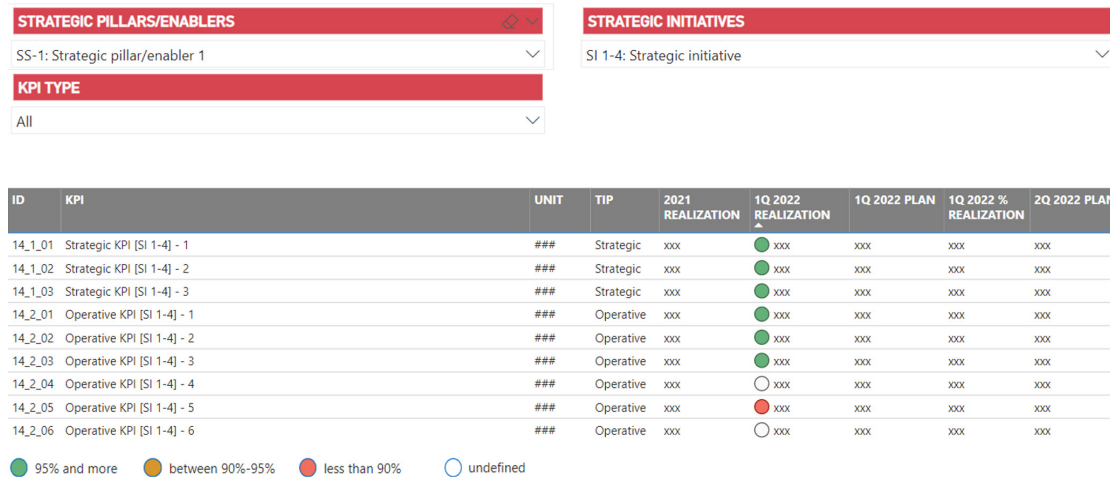


Fig. 3 Example of Strategic business plan report (KPIs)

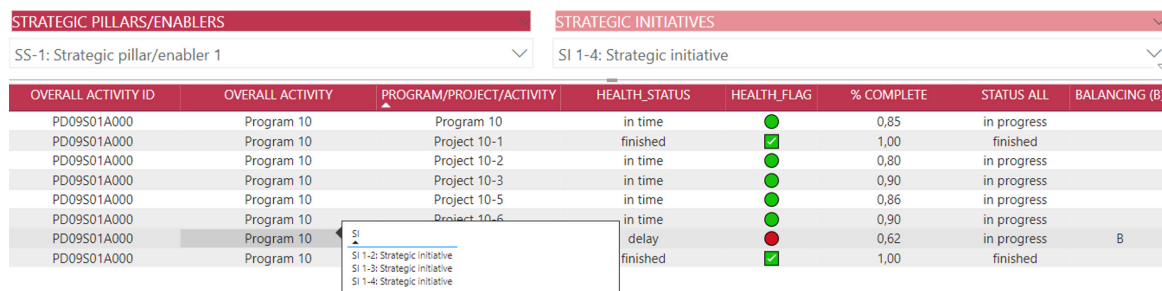


Fig. 4 Example of Strategic business plan report (Overall Activity)

Through this continuous process of analysis and refinement, PPM enables the company's operations to remain flexible and responsive to changing circumstances, thereby increasing the likelihood of successfully implementing the desired strategy.

3.5 Balancing long-term and short-term activities in the Stage-Gate PPM model

Balancing long-term and short-term activities involves carefully considering risk and value to prioritize projects based on their potential impact on the company [36]. This process aims to ensure that the company realizes the most suitable projects by carefully calibrating levelling [17], and harmonizing Risk/Value parameters at the company level through a joint and transparent assessment.

To achieve this, a Risk/Value model has been introduced, which involves assessing each project based on two criteria: value criteria for calculating the value of portfolio components which are determined by the company's strategic plan, and risk criteria for risk calculation which are determined based on architectural, organizational and investment complexity.

By calculating each project's value and risk scores and creating a Risk/Value Bubble diagram, it is possible to identify which projects are of the highest priority. The diagram is divided into four quadrants: (1) generic – low value and low risk, (2) bottleneck – low value and high risk, (3) leverage – high value and low risk, and (4) critical – the performance and value of the services in customers' hands; high value and high risk [34]. The bubble size corresponds to the project size (small, medium, large), and its position on the diagram reflects the calculated Risk/Value ratio. In Fig. 5, the example of the Risk/Value Bubble diagram (Scatter chart in Power BI) is given.

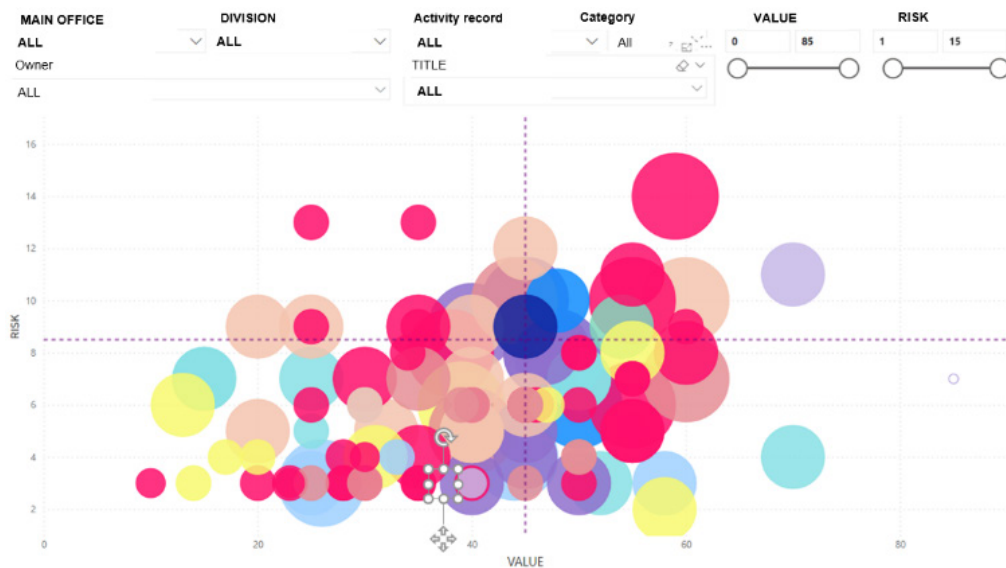


Fig. 5 Risk/Value diagram – Bubble diagram (Scatter chart in Power BI)

To achieve a balanced portfolio, it is essential to allow for the temporary postponement of long-term activities to prioritize short-term activities. During the prioritization process, evaluating the impact of any such postponement on the initial deadline of the long-term activity and maintaining a record of such changes is necessary. The aspiration is to achieve maximum portfolio components with a high-value and low-risk profile. This is often achieved with limited financial, human, and other resources, benefiting the company significantly. Activities with lower value should not be pursued if they entail a high level of risk. In such cases, it is imperative to minimize the risk by simplifying the requests or abandoning their realization altogether.

4. Key lessons learned

Key lessons learned from implementing Stage-Gate PPM are as follows:

- Top management support is essential for successfully establishing PPM process, but a bottom-up approach is necessary to include all company activities as portfolio components. It is critical to involve all relevant stakeholders in the process, as they are the ones who will ultimately contribute to the portfolio. A bottom-up approach ensures that all activities and projects are considered in the portfolio management process, which can lead to a more comprehensive and effective portfolio.
- It is necessary to define the Portfolio Governance Board to govern portfolio realization and provide centralized value and risk management, as well as optimize resources between portfolio components, with the support of portfolio managers and the portfolio team. The Portfolio Governance Board plays a critical role in PPM, providing oversight and guidance on portfolio components.
- The proposed PPM Stage-Gate model used in this case study is unique because it incorporates elements of Agile approaches such as Sprint meetings and artifacts and it can be adapted to different types of projects. The model is suitable for enabling iterative decision-making by narrowing choices in consequential phases. By breaking down the process into sequential stages, the PPM Stage-Gate model allows for a more focused and structured approach to decision-making, ensuring that each portfolio component is thoroughly evaluated before moving to the next stage. Through the continuous refinement in iterations in the third phase Stage-Gate PPM enables the company's operations to remain flexible and responsive to changing circumstances, thereby increasing the likelihood of successfully implementing the desired strategy. Additionally, the model is fully customizable in its fourth phase, allowing for flexibility and tailored solutions to each project's needs.

- A prerequisite for well-defined criteria of the Risk/Value model is a clearly defined strategic framework because the assessments of risks and values are based on the elements of the strategic framework (values are related to strategic initiatives and risks to complexity). The Risk/Value model is a widely used approach for evaluating portfolio components, but its effectiveness depends on the quality of the criteria used to assess risk and value.
- To ensure adequate scoring regarding the value of a portfolio component, it is necessary that the criteria for the valuation are tied to different strategic objectives (mutually exclusive). For example: prohibiting the same project improves revenue and user experience simultaneously. By ensuring that the criteria used for evaluation are mutually exclusive and tied to different strategic objectives, organizations can prioritize portfolio components that are most relevant to their goals.
- To monitor the realization of strategic goals, it is necessary to carry out balancing projects and programs based on the achieved values of KPIs of the strategic initiatives. In contrast, feedback for balancing short-term and long-term portfolio components is obtained from monitoring the implementation of the strategic plan. By using KPIs to evaluate the achievement of strategic initiatives, organizations can identify which projects and programs are contributing to the realization of strategic goals. By monitoring the implementation of the strategic plan, organizations can ensure that short-term and long-term portfolio components are appropriately balanced.
- A centralized data collection and processing system for reporting on portfolio components must be provided. Maintenance of the Portfolio Database is essential for correct decision-making. By ensuring that data is collected and processed centrally, organizations can make more informed decisions about portfolio components and their alignment with organizational objectives. By maintaining the portfolio database, organizations can ensure that portfolio components are evaluated consistently over time.

5. Conclusion and further research

The telecommunications industry faces various challenges, and successful companies must be innovative, agile and know how to operate with data. The Stage-Gate PPM model can help develop a new product/service or process improvement, but companies must be creative and know how to adapt it to their needs. Using E2E overview and unification at the level of aggregated activities, as well as linking portfolio components with monitoring the implementation of strategic initiatives within the strategic business plan, enabled the initial establishment of the portfolio balancing process.

The case study presented in this article highlights the importance of top management support, a well-defined governance structure, the use of the Risk/Value model, monitoring of KPIs, and a centralized data collection and processing system for successful Stage-Gate PPM.

This study contributes to the growing body of literature on PPM and provides practical insights into the integration of PPM with the Stage-Gate model. Practical examples of PPM integration with the Stage-Gate model are the missing link in the academic community researching PPM as a critical component of companies' success based on value delivery.

However, this study has some limitations. The case study was conducted in a single telecommunication company, and the findings may not be generalizable to other industries or companies. Further research is needed to test the effectiveness of the proposed Stage/Gate PPM model integration in other industries and companies. Additionally, the study focused on the initial implementation of PPM, and further research is needed to examine the long-term effects of PPM on business performance. Finally, this study did not assess the financial implications of implementing PPM, and future research should examine the impact of PPM on organizational performance.

Finally, future research should also focus on improving the Stage-Gate PPM model with methodologies, tools, and practices for building a sustainable business. For example, the Lean start-up and Design thinking methodologies could be integrated into the first stage of the Stage-Gate PPM model to enhance the ideation and validation of new ideas. Using AI in the second stage could help

improve decision-making and reduce time and resource consumption. Finally, ESG factors and project resilience could be incorporated into the third and fourth stages to ensure the sustainable development of projects and the company as a whole.

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References

- [1] Grand view research. Telecom services market size, share & trends analysis report by service type (mobile data services, machine-to-machine services), by transmission (wireline, wireless), by end-use, by region, and segment forecasts, 2023 – 2030, from <https://www.grandviewresearch.com/industry-analysis/global-telecom-services-market>, accessed February 15, 2023.
- [2] Salunkhe, O., Berglund, Å.F. (2022). Industry 4.0 enabling technologies for increasing operational flexibility in final assembly, *International Journal of Industrial Engineering and Management*, Vol. 13, No. 1, 38-48, doi: [10.24867/IJEM-2022-1-299](https://doi.org/10.24867/IJEM-2022-1-299).
- [3] Ciric, D., Lolic, T., Gracanin, D., Stefanovic, D., Lalic, B. (2020). The application of ICT solutions in manufacturing companies in Serbia, In: Lalic, B., Majstorovic, V., Marjanovic, U., von Cieminski, G., Romero, D. (eds.), *Advances in production management systems, Towards smart and digital manufacturing, APMS 2020, IFIP advances in information and communication technology*, Vol. 592, Springer, Cham, Switzerland, 122-129, doi: [10.1007/978-3-030-57997-5_15](https://doi.org/10.1007/978-3-030-57997-5_15).
- [4] Fiedler, S. (2010). Managing resistance in an organizational transformation: A case study from a mobile operator company, *International Journal of Project Management*, Vol. 28, No. 4, 370-383, doi: [10.1016/j.ijproman.2010.02.004](https://doi.org/10.1016/j.ijproman.2010.02.004).
- [5] Nagy, G., Vida, G., Boros, L., Ciric, D. (2019). Decision trees in environmental justice research – A case study on the floods of 2001 and 2010 in Hungary, *Open Geosciences*, Vol. 11, No. 1, 1025-1034, doi: [10.1515/geo-2019-0079](https://doi.org/10.1515/geo-2019-0079).
- [6] Teller, J., Unger, B.N., Kock, A., Gemünden, H.G. (2012). Formalization of project portfolio management: The moderating role of project portfolio complexity, *International Journal of Project Management*, Vol. 30, No. 5, 596-607, doi: [10.1016/j.ijproman.2012.01.020](https://doi.org/10.1016/j.ijproman.2012.01.020).
- [7] Petit, Y. (2012). Project portfolios in dynamic environments: Organizing for uncertainty, *International Journal of Project Management*, Vol. 30, No. 5, 539-553, doi: [10.1016/j.ijproman.2011.11.007](https://doi.org/10.1016/j.ijproman.2011.11.007).
- [8] Rank, J., Unger, B.N., Gemünden, H.G. (2015). Preparedness for the future in project portfolio management: The roles of proactiveness, riskiness and willingness to cannibalize, *International Journal of Project Management*, Vol. 33, No. 8, 1730-1743, doi: [10.1016/j.ijproman.2015.08.002](https://doi.org/10.1016/j.ijproman.2015.08.002).
- [9] Jerbrant, A., Karrbom Gustavsson, T. (2013). Managing project portfolios: Balancing flexibility and structure by improvising, *International Journal of Managing Projects in Business*, Vol. 6, No. 1, 152-172, doi: [10.1108/17538371311291071](https://doi.org/10.1108/17538371311291071).
- [10] Danesh, D., Ryan, M.J., Abbasi, A. (2018). Multi-criteria decision-making methods for project portfolio management: A literature review, *International Journal of Management and Decision Making*, Vol. 17, No. 1, 75-94, doi: [10.1504/IJMDM.2018.088813](https://doi.org/10.1504/IJMDM.2018.088813).
- [11] Lappi, T.M., Aaltonen, K., Kujala, J. (2019). Project governance and portfolio management in government digitalization, *Transforming Government: People, Process and Policy*, Vol. 13, No. 2, 159-196, doi: [10.1108/TG-11-2018-0068](https://doi.org/10.1108/TG-11-2018-0068).
- [12] Silva, C.S., Pereira, C., Magano, J. (2023). The value of project management to competitiveness: Key factors from a holistic and practical perspective, *International Journal of Managing Projects in Business*, Vol. 16, No. 1, 67-91, doi: [10.1108/IJMPB-02-2020-0042](https://doi.org/10.1108/IJMPB-02-2020-0042).
- [13] Chang, A., Chih, Y.-Y., Chew, E., Pisarski, A. (2013). Reconceptualising mega project success in Australian defence: Recognising the importance of value co-creation, *International Journal of Project Management*, Vol. 31, No. 8, 1139-1153, doi: [10.1016/j.ijproman.2012.12.005](https://doi.org/10.1016/j.ijproman.2012.12.005).
- [14] Uzakova, S.T., Shildibekov, Y.Z. (2021). Value in project management: New direction in theory and practice, *Central Asian Economic Review*, No. 6, 116-124, doi: [10.52821/2789-4401-2021-6-116-124](https://doi.org/10.52821/2789-4401-2021-6-116-124).
- [15] Bos-de Vos, M., Volker, L., Wamelink, H. (2019). Enhancing value capture by managing risks of value slippage in and across projects, *International Journal of Project Management*, Vol. 37, No. 5, 767-783, doi: [10.1016/j.ijproman.2018.12.007](https://doi.org/10.1016/j.ijproman.2018.12.007).
- [16] Green, S.D., Sergeeva, N. (2019). Value creation in projects: Towards a narrative perspective, *International Journal of Project Management*, Vol. 37, No. 5, 636-651, doi: [10.1016/j.ijproman.2018.12.004](https://doi.org/10.1016/j.ijproman.2018.12.004).
- [17] Maslennikov, V.V., Popova, E.V., Kalinina, I.A. (2022). Classic project management based on PMBOK 7.0, In: Popkova, E.G., Polukhin, A.A., Ragulina, J.V. (eds.), *Towards an increased security: Green innovations, intellectual property protection and information security, Lecture notes in networks and systems*, Vol. 372, 835-840, Springer, Cham, Switzerland, doi: [10.1007/978-3-030-93155-1_90](https://doi.org/10.1007/978-3-030-93155-1_90).

- [18] Martinsuo, M. (2013). Project portfolio management in practice and in context, *International Journal of Project Management*, Vol. 31, No. 6, 794-803, doi: [10.1016/j.ijproman.2012.10.013](https://doi.org/10.1016/j.ijproman.2012.10.013).
- [19] Müller, R., Martinsuo, M., Blomquist, T. (2008). Project portfolio control and portfolio management performance in different contexts, *Project Management Journal*, Vol. 39, No. 3, 28-42, doi: [10.1002/pmj.20053](https://doi.org/10.1002/pmj.20053).
- [20] Gutiérrez, E., Magnusson, M. (2014). Dealing with legitimacy: A key challenge for Project Portfolio Management decision makers, *International Journal of Project Management*, Vol. 32, No. 1, 30-39, doi: [10.1016/j.ijproman.2013.01.002](https://doi.org/10.1016/j.ijproman.2013.01.002).
- [21] Pinto, G., Silva, F.J.G., Fernandes, N.O., Casais, R., Baptista, A., Carvalho, C. (2020). Implementing a maintenance strategic plan using TPM methodology, *International Journal of Industrial Engineering and Management*, Vol. 11, No. 3, 192-204, doi: [10.24867/IJIEEM-2020-3-264](https://doi.org/10.24867/IJIEEM-2020-3-264).
- [22] Aristodemou, L., Tietze, F., Shaw, M. (2020). Stage gate decision making: A scoping review of technology strategic selection criteria for early-stage projects, *IEEE Engineering Management Review*, Vol. 48, No. 2, 118-135, doi: [10.1109/EMR.2020.2985040](https://doi.org/10.1109/EMR.2020.2985040).
- [23] Cooper, R.G. (1990). Stage-gate systems: A new tool for managing new products, *Business Horizons*, Vol. 33, No. 3, 44-54, doi: [10.1016/0007-6813\(90\)90040-I](https://doi.org/10.1016/0007-6813(90)90040-I).
- [24] Baker, M., Bourne, M. (2014). A governance framework for the idea-to-launch process: Development and application of a governance framework for new product development, *Research-Technology Management*, Vol. 57, No. 1, 42-48, doi: [10.5437/08956308X5701105](https://doi.org/10.5437/08956308X5701105).
- [25] Chenger, D., Woiceshyn, J. (2021). Executives' decision processes at the front end of major projects: The role of context and experience in value creation, *Project Management Journal*, Vol. 52, No. 2, 176-191, doi: [10.1177/8756972820977225](https://doi.org/10.1177/8756972820977225).
- [26] Weber, Y., Tarba, S.Y. (2014). Strategic agility: A state of the art, Introduction to the special section on strategic agility, *California Management Review*, Vol. 56, No. 3, 5-12, doi: [10.1525/cmr.2014.56.3.5](https://doi.org/10.1525/cmr.2014.56.3.5).
- [27] Krüssel, P. (2019). *Future Telco, Successful positioning of network operators in the digital age*, Springer, Cham, Switzerland, doi: [10.1007/978-3-319-77724-5](https://doi.org/10.1007/978-3-319-77724-5).
- [28] Kumar, R., Bose, P. (2022). Case study Telecom industry and competitive landscape in India: Will MTNL and BSNL successfully recover?, *IIM Ranchi Journal of Management Studies*, Vol. 1, No. 1, 82-98, doi: [10.1108/irjms-12-2021-0179](https://doi.org/10.1108/irjms-12-2021-0179).
- [29] Mustonen, E., Seppänen, J., Tolonen, A., Harkonen, J., Haapasalo, H. (2020). Product portfolio management strategic targets and kpis over life-cycle: A case study in telecommunications business, *Managing Global Transitions*, Vol. 18, No. 1, 5-23, doi: [10.26493/1854-6935.18.5-23](https://doi.org/10.26493/1854-6935.18.5-23).
- [30] Basulo-Ribeiro, J., Amorim, M., Teixeira, L. (2023). How to accelerate digital transformation in companies with Lean Philosophy? Contributions based on a practical case, *International Journal of Industrial Engineering and Management*, Vol. 14, No. 2, 94-104, doi: [10.24867/IJIEEM-2023-2-326](https://doi.org/10.24867/IJIEEM-2023-2-326).
- [31] Kim, M., Chai, S. (2022). The role of agility in responding to uncertainty: A cognitive perspective, *Advances in Production Engineering And Management*, Vol. 17, No. 1, 57-74, doi: [10.14743/apem2022.1.421](https://doi.org/10.14743/apem2022.1.421).
- [32] Cooper, R.G., Sommer, A.F. (2016). The agile – stage-gate hybrid model: A promising new approach and a new research opportunity, *Journal of Product Innovation Management*, Vol. 33, No. 5, 513-526, doi: [10.1111/jpim.12314](https://doi.org/10.1111/jpim.12314).
- [33] Brock, K., den Ouden, E., Langerak, F., Podoyunitsyna, K. (2020). Front end transfers of digital innovations in a hybrid agile-stage-gate setting, *Journal of Product Innovation Management*, Vol. 37, No. 6, 506-527, doi: [10.1111/jpim.12556](https://doi.org/10.1111/jpim.12556).
- [34] Gemino, A., Reich, B.H., Serrador, P.M. (2020). Agile, traditional, and hybrid approaches to project success: Is hybrid a poor second choice?, *Project Management Journal*, Vol. 52, No. 2, 161-175, doi: [10.1177/8756972820973082](https://doi.org/10.1177/8756972820973082).
- [35] Dakovic, M., Lalic, B., Delic, M., Tasic, N., Ciric, D. (2020). Systematic mitigation of model sensitivity in the initiation phase of energy projects, *Advances in Production Engineering & Management*, Vol. 15, No. 2, 217-232, doi: [10.14743/apem2020.2.360](https://doi.org/10.14743/apem2020.2.360).