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Product Portfolio Management and Firm Performance: A Systematic Review

Shimels Zewdie[1] and Alemayehu Bakalo[2]

[1]PhD, Associate Professor, in Management, Jimma University, College of Business and Economics, Department of Management shimmzz@yahoo.com.

[2]PhD student in Marketing Management, Jimma University, College of Business and Economics Department Management alemayehubakalo71@gmail.com

Abstract

Portfolio product management (PPM) involves analyzing, measuring, and optimizing a company's product portfolio to achieve business goals, identify expansion opportunities, and create a roadmap. The main goal of this study was to assess the effect of product portfolio management on firm's performance. This study employed a systematic review methodology, with 49 from 2010 to 2023 existing articles completed on product portfolio management and firm's performance based on an inclusion/exclusion criterion. The data was collected using a systematic strategy and analysed using content analysis from various sources such as Emerald, Google Scholar, Research Gate, Wiley online library, Tyler, and Francis. To select the article reviews used inclusion and exclusion criteria based on publication date, study design, population, intervention/exposure, outcome, language, and peer-review, ensuring systematic selection and reproducibility of articles. The findings of this study were collected using a thematic method, which involved extracting previous researchers' findings from the literature, classifying similar themes and findings, and drawing conclusions. The findings of this review, product portfolio management is crucial for maximizing return, gaining a competitive advantage, and efficiently allocating resources. Effective portfolio management is essential for performance optimization and risk analysis in the insurance and banking sectors. Strategic methods and portfolio maps positively influence portfolio performance. The review recommends that organizations should prioritize portfolio management practices to maximize profitability, balance business strategy, and support business strategy.

Keywords: Product Portfolio Management, Organizational Performance

1. Introduction

Portfolio product management is the process of managing a company's product portfolio. This comprises measuring analysing, and optimizing how existing products contribute to broader business goals. It also involves identifying opportunities to expand the portfolio and creating a product portfolio roadmap. Portfolio management was an essential means to accommodate this paradox (Nyasetia et al., 2023). Portfolio management, product development, and over-commitment, presenting a reference model and mind-set, besides supporting tools and tools for effective portfolio management (Behnam Khakbaz et al., 2020). Economics has a long history with product portfolio management. Harry Markowitz's finance theory is where it all started. A method for creating an ideal securities portfolio under uncertainty by Markowitz in 1952. The whole of an investor's financial assets is referred to as their portfolio in this context (Paletta, 2019). Very popular portfolio approaches in strategic management are the matrices of

The Boston Consulting Group (also known as “BCG-matrix”) or McKinsey (also known as “McKinsey Business Screen” or “McKinsey Matrix”) or Cooper's New Product Development Management specializes in new product development (Markowitz, 1952). According Jacobs & Swink, (2011) to portfolio theory (PT), the pooling of imperfectly or negatively linked returns from individual items within the portfolio reduces the volatility of financial returns. Portfolio management for product innovation has become one of the most important senior management functions as we move into the next century. Extreme global competition and increased technological advancements have resulted in shorter product life cycles. The success and survival of an organization depends largely on their PPM. Resources are limited and managers need to ensure that they spend their restructure and development funds on the right projects that will produce a well-balanced, high valued portfolio (Adeniran et al., 2010; Olagbenga & Ogunsakin, 2020; Villamil & Hallstedt, 2018)

Portfolio management is recognized as aggregate attention, given that companies are introducing several projects simultaneously (Mohammed, 2021). Product management selects the markets, goods, and technologies that a company should invest in strategically (Otten et al., 2015). Structure a varied PP aids in reducing the risk associated with depending only on a small number of hallmark items and gives new businesses the ability to adapt more readily to technological change and environmental

Product portfolio management (PPM) gives organizations the ability to obtain the utmost value from their product portfolios by applying portfolio management principles to the product development process (Planview, 2012). As stated by Doorasamy, (2015) during the process of producing new products (NPD), businesses should concentrate on the value that is being created for their organization. Many researchers emphasized the importance of studying product portfolio management in strategic decision-making (Jugend & Da Silva, 2014; Mantha, 2015; Udo-Imeh et al., 2012). Resource allocation (Behnam Khakbaz et al., 2020; Cooper & Edgett, 2001). Risk management (Olagbenga & Ogunsakin, 2020; Villamil & Hallstedt, 2018). Innovation and growth (Rubera et al., 2016) and competitive advantages (Bayus & Putsis, 2005; Behnam Khakbaz et al., 2020; Reguia, 2014).

Empirical data from the past demonstrates that novel product portfolio management initiatives, like the launch of new products, investments in R&D, and entry into new markets, typically have a beneficial impact on business success (Behnam Khakbaz et al., 2020; Doorasamy, 2015b; Tolonen, Harkonen, et al., 2014). Over the past few decades, researchers have been carrying out many investigations to improve product portfolio performance. These studies recommend the adoption of specific management practices, such as financial and scoring tools for decision-making by multifunctional teams, and systematization and formalization of such teams' activities (Cooper et al., 2000; McNally et al., 2013; Udo-Imeh et al., 2012; Yang & Xu, 2017).

This study investigates the impact of product portfolio management on firm performance and decision-support effectiveness. It discusses its role at the organizational level, its impacts, and the methodological approaches used. The review also explores potential future research directions. Moreover, the following objective will be meeting.

Objective of study: To assess the company's organizational performance through effective product portfolio management

2. Literature Review

2.1 Product Portfolio Management

The methodical and strategic administration of a business's assortment of goods and services is known as product portfolio management (Otten et al., 2015). PPM is a thorough examination of how to divide up a certain resource over a specified period among various goods while taking the company's strategic goals into account (Behnam Khakbaz et al., 2020; Killen, 2012). PPM mainly focuses on evaluating aspects of strategic, technological, market and marketing, risk, and economic return issues (Jugend & Da Silva, 2014). PPM can be divided into two major categories: 1) Concepts with a portfolio-analysis focus (portfolio analysis tools) and 2) Concepts with a focus on the managerial process (Paletta, 2019). A variety of portfolio analysis models have been developed since the 1960s, some of which are well known and commonly referenced as standard (Wind, Mahajan & Swire, 1983). Portfolio models like BCG, General Electric/McKinsey, Shell, Arthur D. Little, and Abell and Hammond provide a managerial process for generating the optimal portfolio, highlighting the difference between a picture and a movie (Kotler & Armstrong, 2010).

PPM enables organizations to adjust product portfolio investments based on market trends, competitive threats, regulatory requirements, resource capacity, and pipeline priorities, thereby maximizing return on investment (Adeniran et al., 2010; Barroso et al., 2019; Behnam Khakbaz et al., 2020). PPM decisions are responsible not only for determining the designs for new products but also for revisions, updates, and even decisions to discontinue products that are currently being produced and sold (Bukhari, 2017; Cooper, 1999). PPM helps business managers to consider the decision-making process related to the PPM aspect complex. Therefore, their decisions are associated with their political and corporate values (Kester, 2012). Most scholars agreed that PPM is a vigorous process that was involving to increase over time in product offerings to seal product space (Adeniran et al., 2010; Connor, 1998; Herzer et al., 2023; Moreno&Terwiesch, 2016)

PPM focus on product categories managing each product (Otten et al., 2015). Product life cycle (Tolonen et al., 2015; Tolonen, Kropsu-Vehkaperä, et al., 2014) Market share (Bayus & Putsis, 2005) Revenue and profitability (Opoku et al., 2014) and customer need and preference (Alberto et al., 2020). Successful portfolio management is essential for NPD. Making strategic decisions regarding the markets, goods, and technologies that our company will invest in is the essence of portfolio management (Bukhari, 2017; Cooper & Edgett, 2001). It is analyzing the worth of the right product portfolio and realizing the possible full potential that can be extracted by managing the product portfolio (McNally et al., 2013). A wise bank's portfolio management intentions are liquidness, protection, and income, which may require sacrificing other objectives. High profit may require safety and liquidity, while more safety and liquidity may require income (Kenyoru et al., 2016; Tolonen, Harkonen, et al., 2014).

2.2. Role of Product Portfolio Management

Portfolio management is a strategic approach that prioritizes effective resource allocation and financial competitive advantage (Cooper et al., 2000; Cooper & Edgett, 2001). The four core modules of PPM are project execution and management, pipeline resource and enablement, product value assessment and monitoring, and portfolio selection and optimization (Brown, 2010). Portfolio management's best practices are financial competitive advantage, and efficient distribution of organizational resources effectively (Alberto et al., 2020; Opoku et al., 2014; Rubera et al., 2016). The strategic work of portfolio management is arranging goods and services within an all-encompassing framework while weighing a company's technological capabilities against the demands of the market (Andersen, 2010; Ing, 2015).

The application of PPM in rapidly changing business environments is being questioned due to its unique practice and context (Abubakar et al., 2018). PPM is the organized and combined view of all products of a company to plan, prioritize, select, coordinate, and control them. Thus, PPM was established along the dimensions of strategy, organization, processes, and control to be successful (Amelingmeyer, 2009). PPM can be seen as a higher management-level decision-making process for managing uncertainty, active opportunities, planned goals, and interdependencies among portfolio items to obtain clear decisions based on agreed criteria(Cooper et al., 2001).

PPM maximizes each product's financial contribution to a firm's growth, recognizing that each product has varying financial impacts (Kotler & Armstrong, 2010). Product portfolio management is fundamental to the productivity of products (Kotler et al, 2006). According to Opoku et al., (2014), Few studies evaluate commercial banks' product portfolio performance, particularly in Ghana. Researchers have not assessed individual product portfolio items. Case companies often overlook portfolio balance, making it crucial to identify it as a target for optimal PPM practices (Bukhari, 2017). By integrating portfolio management concepts into the product development process, PPM enables businesses to get the maximum value from their product portfolios (Planview, 2012). The study evaluated the portfolio performance of four business types using six metrics, focusing on project allocation, timeline efficiency, high-value, profitable, balanced, long-term, high-risk, aligned, and spending breakdown (Cooper et al., 2000)

3. Research Methodology

A systematic review is research conducted using clear, consistent, and repeatable protocols to answer a specific question (Littell & Pillai, 2008). Systematic reviews collect all possible studies related to a given topic, and design, and review their result(Kang, 2015). This systematic review was a plan that the previous literature accurately and reliably analyzed the quality of peer-reviewed journals by preferred reporting items and consisting of a meta-analytical structure (PRISMA) (Liberati et al., 2009). PRISMA is a systematic review process that involves a four-stage flow diagram that outlines the sample identification, screening, eligibility testing, and inclusion of studies. It should clearly describe the process of report selection, including distinctive information, excluded records, potentially eligible reports, and reasons for exclusion (Bryła et al., 2022; Liberati et al., 2009). This review followed four steps, which include, establishing the inclusion/exclusion criteria for study selection, identifying relevant quality studies, evaluating the literature, and finally reporting the findings.

3.1. Selection of articles from the database: Databases like Scopus, Elsevier's Science Direct, Google Scholar, and Research Gate help determine article relevance. Journal ranking sites like Scimago and Google Scholar use variables like h index, impact factor, and dating trend to assess journal quality (Soledad et al, 2018). This review used many databases that published the related research in the English language from Emerald, Google Scholar, Research Gate, Wiley online library, Tyler and Francis, and Springer Link.

3.2. Identification and Selection of Articles: the review provides a comprehensive explanation and justification for the searching and managing steps, including the source of findings, search strategy, criteria, screening methods, inclusion decision, and statistical analysis methods (Piper, 2013). This review identifies and selects published articles related to product portfolio management (PPM) using search databases like Research Gate, Web of Science, Scopus, and Google Scholar. It includes reviews, reports, and research in English, including non-relevant records.

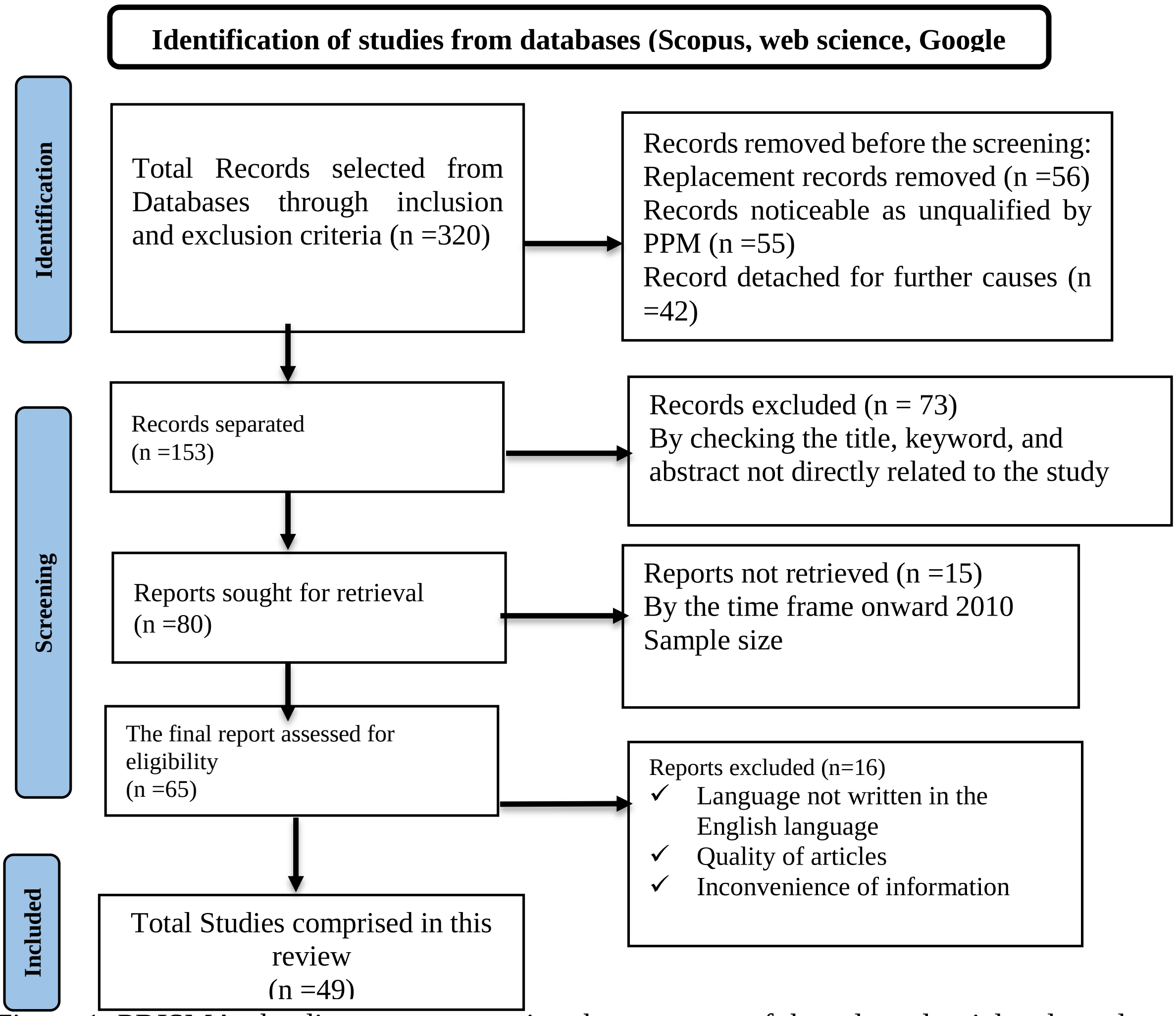
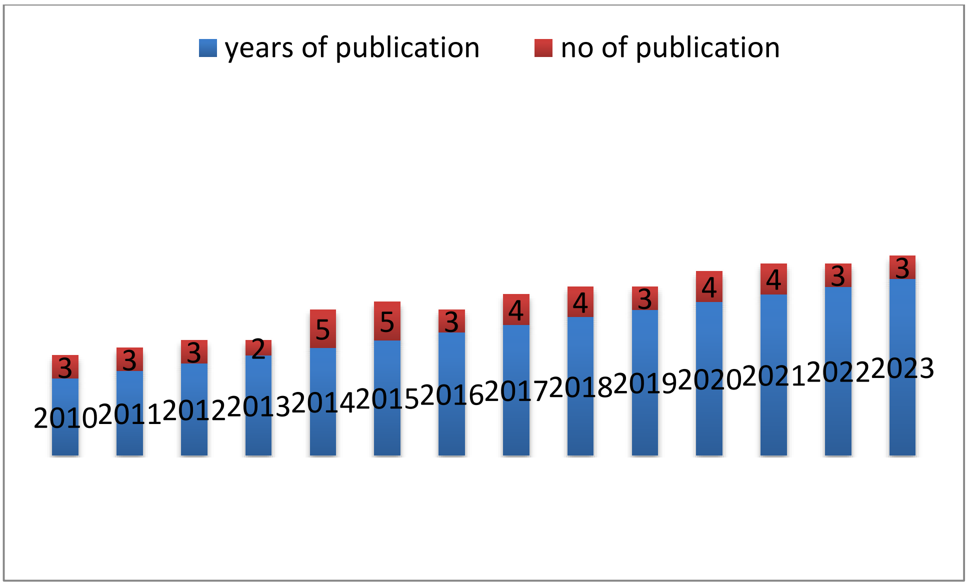


Figure 1: PRISMA–the diagram representing the summary of the selected article adopted from (Bryła et al., 2022)

4. Result

4.1. Publication distribution

This review included published articles on PPM and the firm's performance for the 2010–2023 periods. The figure below shows the year-wise publication of reviewed articles



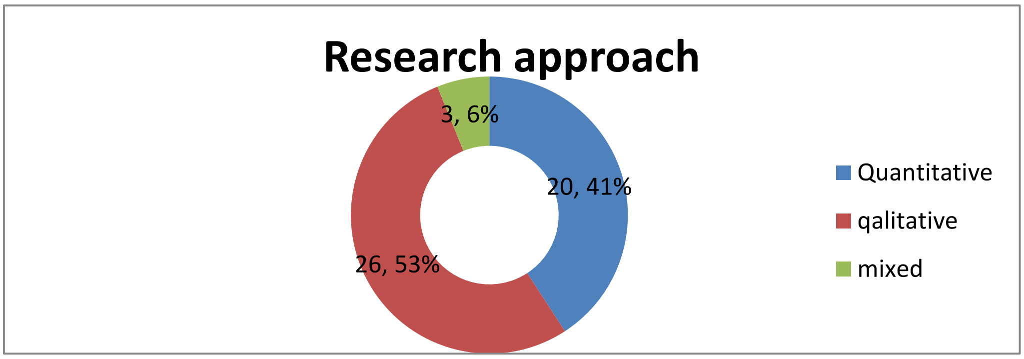
Source: Own compute via Excel, 2024

Figure 2 Documents of the year: source own elaboration

Figure 2 shows the year-wise distribution of published articles. It shows that articles published on the effect of product portfolio management on firms' performance increased, especially in 2014 and 2015. In general, the publication's selected title is a sharp rise from 2010–2023.

4.2. Research Approach Used

The research approach includes mixed, quantitative, and qualitative methodologies. The figure below shows the research approach used in selected articles.



Source: Own compute via Excel, 2024

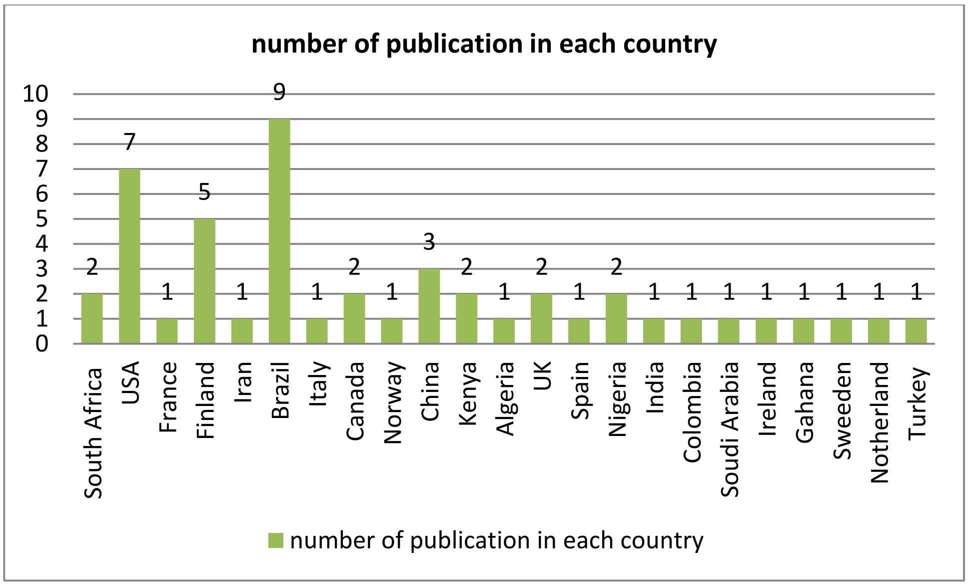
Figure 3: Methodologies used in selected studies

The above figure 3 shows that the majority (53%) of articles reviewed used a qualitative approach followed by a mixed research approach (41%) used a quantitative research approach and only (6%) of articles used a mixed research approach.

4.3 Data analysis adopted in selected articles

Data analysis primarily steps for big data analytical methodologies, methodical construction, data mining, and analysis tools(Abdul-Jabbar & K. Farhan, 2022). The distribution of data analysis methods utilized in a set of collected articles. The results show that the majority of the articles employed the case study, followed by structural equation and regression.

4.4 Geographical Distribution of Reviewed Articles



Source: Own compute via Excel, 2024

Figure 4: Country included in review article

The review article comprehensively explored studies from various countries to understand the PPM, encompassing studies from various regions and continents.

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5. Discussion

Portfolio management techniques aim to optimize resource allocation, return, and competitive advantage. PPM is crucial for enhancing market competitiveness and supporting the overall business strategy (Herzer et al., 2023). Effective PPM practices can optimize resource allocation, return, and competitive advantage (Doorasamy, 2015a). Incorporating sustainability dimensions into product portfolios can aid sustainable innovation, but challenges in implementing strategies exist (Villamil & Hallstedt, 2018).

Limitations and Challenges of PPM: Flaws in PPM processes can lead to failures in new product development (NPD) initiatives (Doorasamy, 2015a). Banks' financial results are influenced by product diversity, investment in technology equipment like ATMs, and the expansion of branches (Kenyoru et al., 2016). According to Ghorban & Hesaam, (2022), The product proliferation approach enhances consumer satisfaction by expanding the range of products offered, despite higher engineering expenses, to achieve commercial goals (Way et al., 2018). Product propagation decisions have both demand and supply implications (Bayus & Putsis, 2010). The company's success is attributed to its ability to create competitive advantages in its products, thereby gaining customer loyalty and expanding its market share through innovation (Reguia, 2014). The impact of effective project portfolio management on reduced pricing, measuring the impact of effective project PPM on market share, and evaluating the impact of effective project PPM on enterprise capital growth (Okechukwu & Egbo, 2017). PPM allows for scenario comparison, prioritizes projects in strategic or financial categories, establishes organizational focus, and eliminates efforts on product/project redundancies (Nyasetia et al., 2023). New product and product variation releases have occurred more quickly expanded and more sophisticated product offerings. More new goods are added to the catalogue than old ones are eliminated (Tolonen et al., 2015).

PPM has limitations that often prevent practical applications or require significant management intervention (Herzer et al., 2023). Product complexity, quality, and distribution can negatively impact delivery performance, time, cost, and quality (Trattner et al., 2019).

Strategies and Techniques to Improve PPM: Adopting techniques like Critical Chain Project Management (CCPM) can improve PPM performance and benefit product development programs (Luiz et al., 2019; Tolonen, Harkonen, et al., 2014). Digitalization and game-based techniques can enhance the use of sustainable design tools and methodologies, but careful testing is advised (Villamil & Hallstedt, 2018). Strategic methods and portfolio maps have the strongest positive influence on novel creation success rates (Doorasamy, 2015b; Tolonen et al., 2015).

Factors Affecting PPM Performance: The outcome of alliance portfolios on a firm's future performance varies and depends on its strategic positioning, making effective PPM challenging (Martynov, 2017; Medini et al., 2020). Financial techniques are the primary mechanism for deciding on a product portfolio, illustrating the desire to maximize value (Jugend & Leoni, 2015). PPM-related targets and metrics can be categorized as strategic fit, value maximization, and portfolio balance (Adeniran et al., 2010).

Impacts of Effective PPM: Effective PPM contributes to NPD performance and firm profitability (Yang & Xu, 2017). PPM can generate good technological and market opportunities, change dependent factors, and influence the performance of product portfolios (Jugend et al., 2017). Effective PPM can lead to reduced pricing, increased market share, and enterprise capital growth (Okechukwu & Egbo, 2017).

Organizational Considerations: Ensuring key capabilities and competencies are aligned with business strategy objectives is crucial for effective PPM (Mustonen et al., 2020). PPM is not consistently implemented, and only a few strategic and tactical PPM tools are utilized in some organizations (Kropsu-Vehkaperä, et al., 2014). Ensuring that key capabilities and competencies are in line with business strategy objectives, the PPM target setting should cover all phases of the product life cycle as well as the technical and commercial components of the product range (Mustonen et al., 2020). PPM is a strategy used by senior management to select new product development projects, aiming to maximize portfolio profitability, and balance, and support the corporate plan (Mantha, 2015). Product portfolio management as a concept and a tool for strategy implementation is not consistently implemented only a couple of strategic and tactical product portfolio management tools are utilized (Kropsu-Vehkaperä, et al., 2014). PPM aids sustainable innovation, but challenges in implementing strategies. Companies are considering incorporating sustainability dimensions into product portfolios for efficient communication and faster growth of viable explanations (Villamil & Hallstedt, 2018).

Digitalization and game-based techniques can work together to make sustainable design tools and methodologies easier to use, but careful testing is advised to avoid potential problems that could have the opposite impact (Villamil & Hallstedt, 2018). PPM strongly correlated with novel creation success rates, with strategic methods and portfolio maps having the strongest positive influence (Doorasamy, 2015b; Tolonen et al., 2015). The study makes known that the outcome of the alliance portfolios on a firm's future performance varies and depends on its strategic positioning, making effective portfolio management challenging (Martynov, 2017; Medini et al., 2020). Financial techniques serve as the primary mechanism for deciding on a PP; this not only illustrates the corporations' desire to maximize value but also confirms a global study on the topic (Jugend & Leoni, 2015). PPM-related targets and metrics can be categorized as strategic fit, value maximization, and the portfolio balance type of performance management areas (Adeniran et al., 2010).

Innovation literature suggests that non-promotional development (NPD) skills are crucial for businesses to efficiently utilize external ideas and technologies, demonstrating their exposure to various external resources (Barroso et al., 2019; Rubera et al., 2016). Portfolio management was gaining increasing attention from researchers and practitioners involved in innovation and product development (Jugend et al., 2016). Through the use of GPD practices, PPM generates good technological and market opportunities, changes dependent factors and control variables evaluated, and greatly influences the performance of product portfolios (Jugend et al., 2017). Portfolio of Products of the application of the indicators developed to select the product(s) to be obtained. PPM indicators can be applied, in many ways the economic potential indicator and, the energy indicator regarding the rupture of the raw material in smaller parts (Guerras et al., 2021). Portfolio management performance significantly contributes to NPD performance and firm profitability. Several studies have analyzed the influential factors of portfolio management performance based on empirical evidence, such as manager dispositions or management methods (Yang & Xu, 2017). PPM refuges fine the NPD phase of the product life cycle including related product portfolio management targets (Tolonen, Harkonen, et al., 2014). PPM is crucial for successful NPD and business objectives, as it defines projects, revisions, updates, and decisions regarding product discontinuation (Jugend & Da Silva, 2014). A portfolio that is managed and controlled effectively will allow the portfolio-managing organization to utilize and optimize its resources to support other strategic Projects, Programs, and Portfolios that are of significant value to the organization (Abubakar et al., 2018).

PPM was the strong suit of the product portfolio of the insurance companies (Ansari, 2012). Knowledge about the performance of each product by management of commercial banks is relevant to effective portfolio management (Opoku et al., 2014). NPPM decisions are an important research area because these decisions affect firm profitability but are difficult to make because of limited reliable information (McNally et al., 2013). The primary objective of the study was to examine the interaction between PPM and bank business success. Additionally, the study investigated the impact of loan risk monitoring, diversification, and analysis on bank performance (Olagbenga & Ogunsakin, 2020). Portfolio analysis is a tool that evaluates different companies' long-term potential and relative strengths and weaknesses. It helps strategic managers determine whether a portfolio is sufficient for long-term corporate growth and profitability (Udo-Imeh et al., 2012). Due to a lack of product portfolio management, or related ambiguities, some key product decisions are seen to be done only at the business line or product manager level, or even within customer account teams, without strategic analysis of product suitability to companies of product portfolio (Tolonen et al., 2015).

6. Conclusions

PPM is necessary to allocate resources effectively, maximize profit, and obtain a competitive edge. It facilitates project prioritization and decision-making. Product complexity has a detrimental effect on delivery performance, quality, cost, and time. A greater portfolio is the outcome of a broader product offering. However, consistent implementation is lacking, especially in the insurance and banking sectors for performance optimization and risk analysis. Strategic methods and portfolio maps have a strong positive influence on portfolio performance, while financial methods may not lead to higher-value projects in the portfolio. Effective PPM is essential for the success of NPD and alignment with business objectives. Portfolio management is in charge of ensuring balance, optimizing profitability, and bolstering the organization's overarching plan. The lack of PPM can lead to critical product decisions being made without strategic research, potentially compromising the acceptability of goods within the portfolio. PPM can contribute to sustainable innovation and the inclusion of sustainability dimensions in the product portfolio, aiding in communicating sustainability performance and accelerating the development of more sustainable solutions. PPM practices may have a stronger correlation with portfolio management performance than traditional methods, potentially indirectly contributing to product development programs.

NPD failures may indicate flaws in portfolio management. Financial methods and portfolio analysis are crucial for decision-making, influencing profitability. Limited reliable information can hinder these decisions, but they provide strategic insights.

7. Recommendations

Organizations should prioritize effective portfolio management practices to maximize profitability, and balance, and support the overall business strategy i.e. Portfolio management practices help maintain a balanced mix of projects, considering factors such as risk, return, and alignment with the organization's objective and allocating them to different projects based on their strategic importance and potential impact. This includes utilizing strategic and tactical tools to assess projects, comparing scenarios, and establishing clear target settings. Sustainability integration should be incorporated into the product portfolio to enhance long-term competitiveness and recognition. Collaboration and information sharing should be fostered within the organization, involving cross-functional teams and leveraging expertise from different departments. In industries like insurance and banking, effective portfolio management is critical for risk analysis and monitoring. Regular strategic portfolio analysis helps evaluate the portfolio's adequacy for long-term corporate growth and profitability.

8. Future Research Direction

Future researchers will explore long-term implications of different PPM techniques and their impact on organizational performance over an extended period. Investigate the effectiveness of integrating sustainability dimensions into product portfolios and how it can contribute to sustainable innovation. Analyze the role of organizational culture and leadership in the successful implementation of comprehensive PPM practices. Develop advanced analytical tools and decision-making frameworks to support more informed and data-driven PPM decision-making. It is better to examines how portfolio management principles can be adapted to support iterative and adaptive product development approaches, manage risk and balance portfolios, and integrate with strategic planning processes to align portfolio composition and resource allocation with organizational objectives.

References

Abdul-Jabbar, S. S., & K. Farhan, A. (2022). Data Analytics and Techniques. *Aro-the Scientific Journal of Koya University*, *10*(2), 45–55. https://doi.org/10.14500/aro.10975

Abubakar, S. G., Dalibi, S. G., & Wang, Y. (2018). Factors Shaping Project Portfolio Management in the Nigeria's Built Environment. *International Journal of Economics, Commerce and Management United Kingdom*, *VI*(3), 512–533. http://ijecm.co.uk/

Alberto, C., Torre, M., & Kumar, R. (2020). *Analysis of the impact of the product portfolio on the financial performance*. *June*.

Amelingmeyer. (2009). *Gestaltungsfelder und Herausforderungen des Produktportfoliomanagements; in: Schmahl, Christian M.; Gleich, Ronald (Eds.): Produktportfoliomanagement; p. 3-22; Lichtenberg 2009*.

Ansari, Z. A. (2012). An Empirical Analysis of The Product Portfolio And Employee Participation In Product Development Process In Insurance Companies of Saudi Arabia. *International Journal of Economics and Management Sciences*, *1*(10), 31–38. www.managementjournals.org

Barroso, A., Giarratana, M. S., & Pasquini, M. (2019). Product portfolio performance in new foreign markets: The EU trademark dual system. *Research Policy*, *48*(1), 11–21. https://doi.org/10.1016/j.respol.2018.07.013

Bayus, B. L., & Putsis, W. P. (2005). Product Proliferation: An Empirical Analysis of Product Line Determinants and Market Outcomes. *SSRN Electronic Journal*, *May 1999*. https://doi.org/10.2139/ssrn.244098

Behnam Khakbaz, S., Shahhoseini, M. A., Divandari, A., & Rabiee, H. (2020). Dynamic Product Portfolio Management Modeling for the Financial Technology Industry. *Iranian Journal of Finance*, *4*(3), 49–79. https://doi.org/10.22034/ijf.2020.209903.1092

Bryła, P., Chatterjee, S., & Ciabiada-Bryła, B. (2022). The Impact of Social Media Marketing on Consumer Engagement in Sustainable Consumption: A Systematic Literature Review. *International Journal of Environmental Research and Public Health*, *19*(24). https://doi.org/10.3390/ijerph192416637

Bukhari, S. A. (2017). *Performance Management for Product Portfolio Management, New Product Development & Rapid Product Development*. *August*. https://pdfs.semanticscholar.org/4cad/0c71f110c4c4b413de0f97105c225285d6c3.pdf

Connor. (1998). *"Food product proliferation: a market structure analysis". American Journal of Agricultural Economics, 63 (4), pp. 607-617*.

Cooper. (1999). *Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J., 1999. New product portfolio management: practices and performance. Journal of Product Innovation Management 16 (4) 331-351*.

Cooper, R. G., & Edgett, S. J. (2001). Product Innovation Best Practices Series Portfolio Management for New Products : Picking The Winners. *Product Development Institute*, *June*, 1–16.

Cooper, R. G., Edgett, S. J., & Kleinschmidt, E. J. (2000). New product portfolio management:

Practices and performance. *IEEE Engineering Management Review*, *28*(1), 13–29. https://doi.org/10.1111/1540-5885.1640333

Doorasamy, M. (2015a). Product portfolio management: An important business strategy. *Foundations of Management*, *7*(1), 29–36. https://doi.org/10.1515/fman-2015-0023

Doorasamy, M. (2015b). Product portfolio management for new product development. *Problems and Perspectives in Management*, *13*(4), 102–114.

Ghorban, S. H., & Hesaam, B. (2022). *Product Portfolio Management in Competitive Environments*. *2000*, 1–10. http://arxiv.org/abs/2210.02772

Guerras, L. S., Sengupta, D., Martín, M., & El-Halwagi, M. M. (2021). Multilayer approach for product portfolio optimization: Waste to added-value products. *ACS Sustainable Chemistry and Engineering*, *9*(18), 6410–6426. https://doi.org/10.1021/acssuschemeng.1c01284

Herzer, R., Korzenowski, A. L., Richter, C., De Medeiros, J. F., Goecks, L. S., & Mareth, T. (2023). Multivariate Profile Monitoring Method: An Application in Product Portfolio Management. *Periodica Polytechnica Social and Management Sciences*, *31*(1), 52–62. https://doi.org/10.3311/PPso.19992

Ing, -Ing. Dipl.-Wirt. (2015). *Product and*. *December 2017*.

Jacobs, M. A., & Swink, M. (2011). Product portfolio architectural complexity and operational performance: Incorporating the roles of learning and fixed assets. *Journal of Operations Management*, *29*(7–8), 677–691. https://doi.org/10.1016/j.jom.2011.03.002

Jugend, D., & Da Silva, S. L. (2014). Product-portfolio management: A framework based on methods, organization, and strategy. *Concurrent Engineering Research and Applications*, *22*(1), 17–28. https://doi.org/10.1177/1063293X13508660

Jugend, D., da Silva, S. L., Salgado, M. H., & Miguel, P. A. C. (2016). Product portfolio management and performance: Evidence from a survey of innovative Brazilian companies. *Journal of Business Research*, *69*(11), 5095–5100. https://doi.org/10.1016/j.jbusres.2016.04.086

Jugend, D., & Leoni, J. N. (2015). Product Portfolio Management in Brazilian Technology-based Companies: Case Studies in Medium and Large Companies. *Procedia Manufacturing*, *3*(Ahfe), 6528–6535. https://doi.org/10.1016/j.promfg.2015.07.947

Jugend, D., Rojas Luiz, J. V., Chiappetta Jabbour, C. J., a Silva, S. L., Lopes de Sousa Jabbour, A. B., & Salgado, M. H. (2017). Green Product Development and Product Portfolio Management: Empirical Evidence from an Emerging Economy. *Business Strategy and the Environment*, *26*(8), 1181–1195. https://doi.org/10.1002/bse.1977

Kang, H. (2015). Statistical considerations in meta-analysis. In *Hanyang Med Rev 2: Vols. 35: 23-32*.

Kenyoru, D. N., Chumba, G. K., Chumba, S. K., & Rotich, S. C. (2016). Effect of Product Diversification on Financial Performance of Selected Banks in Kericho Town. *European Journal of Business and Management Www.Iiste.Org ISSN*, *8*(22), 126–134. www.iiste.org

Kester. (2012). *L., Griffin, A., Hultink, E. J., & Lauche, K. "Exploring Portfolio Decision-Making Processes", Journal of Product Innovation Management, 28(5), pp. 641–661. https://doi.org/10.1111/j.1540-5885.2011.00832.x*.

Kotler&Armstrong. (2010). *Principles of marketing (13th ed.). Upper Saddle River, NJ: Pearson Education*.

Kotlereta. (2006). *, P, Armstrong, G, Brown, L, and Adam, S. (2006). Marketing, 7th Ed. Pearson Education Australia/Prentice Hall*.

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *BMJ (Clinical Research Ed.)*, *339*. https://doi.org/10.1136/bmj.b2700

Littell&Pillai. (2008). *.Systematic reviews and meta-analysis. New York: Oxford University Press.*

Luiz, O. R., Souza, F. B. de, Luiz, J. V. R., Jugend, D., Salgado, M. H., & Silva, S. L. da. (2019). Impact of critical chain project management and product portfolio management on new product development performance. *Journal of Business and Industrial Marketing*, *34*(8), 1692–1705. https://doi.org/10.1108/JBIM-11-2018-0327

Mantha, P. K. (2015). Portfolio Management. *Journal of Accounting & Marketing*, *04*(02), 2–7. https://doi.org/10.4172/2168-9601.1000130

Markowitz. (1952). *Portfolio Selection; in Journal of Finance, vol. 7 (1952), no. 1, p. 77-91*.

Martynov, A. (2017). Alliance portfolios and firm performance: the moderating role of firms' strategic positioning. *Journal of Strategy and Management*, *10*(2), 206–226. https://doi.org/10.1108/JSMA-01-2016-0003

McNally, R. C., Durmuşoğlu, S. S., & Calantone, R. J. (2013). New product portfolio management decisions: Antecedents and consequences. *Journal of Product Innovation Management*, *30*(2), 245–261. https://doi.org/10.1111/j.1540-5885.2012.00997.x

Medini, K., Wuest, T., Romero, D., & Laforest, V. (2020). Integrating sustainability considerations into product variety and portfolio management. *Procedia CIRP*, *93*(March), 605–609. https://doi.org/10.1016/j.procir.2020.04.147

Mohammed. (2021). *"The optimal project selection in portfolio management using fuzzy multi-criteria decision-making method_ology", Journal of Sustainable Finance & Investment. https://doi.org/10.1080/20430795.2021.1886551*.

Moreno&Terwiesch. (2016). *"The effects of product line breadth: Evidence from the automotive industry". Marketing Science, 36 (2), pp. 254-271*.

Mustonen, E., Tolonen, A., Harkonen, J., & Haapasalo, H. (2020). *Study in Telecommunications Business*. *18*(Porter), 23–42.

Nyasetia, N. F., Iravo, P., Amuhaya, M., Muchelule, D., & Wanjala, Y. (2023). Project Portfolio Management Practices and Performance of Water Service Boards in Kenya. *Grandmarkpublishers.Com*, *5*(1), 182–194.

https://grandmarkpublishers.com/index.php/ijmbr/article/view/8

Okechukwu, E. U., & Egbo, D. E. (2017). Effect of Project Portfolio Management on the Performance of Business Organizations in Enugu Nigeria. *International Journal of Academic Research in Business and Social Sciences*, *7*(9), 591–604. https://doi.org/10.6007/IJARBSS/v7-i9/3345

Olagbenga, A. A., & Ogunsakin, Y. O. (2020). Portfolio Management and Bank Performance in Nigeria. *International Journal of Empirical Finance and Management Sciences*, *02*(04), 20–25. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3951800

Opoku, E., Opuni, F., & Kwapong, L. (2014). An Empirical Study on Products Portfolio Performance among Commercial Banks in Ghana: A Return on Investment Perspective. *International Journal of Business Management & Research (IJBMR)*, *4*(5), 61–72.

Otten, S., Spruit, M., & Helms, R. (2015). Towards decision analytics in product portfolio management. *Decision Analytics*, *2*(1). https://doi.org/10.1186/s40165-015-0013-7

Paletta, M. (2019). A Modern Approach to Product Portfolio Management for the ICT-Industry. *International Journal of Innovative Studies in Sciences and Engineering Technology*, *5*(3), 51–63. www.ijisset.org

Piper, A. R. J. (2013). *How to write a systematic literature review : a guide for medical students How to write a systematic literature review : a guide for medical students*.

Planview. (2012). *Third Product Portfolio*.

Reguia, C. (2014). Product Innovatıon And The Competıtıve Advantage. *European Scientific Journa*l, *1*(June), 140–157.

Roach, D. C. (2011). The impact of product management on SME firm performance. *Journal of Research in Marketing and Entrepreneurship*, *13*(1), 85–104. https://doi.org/10.1108/14715201111147969

Rubera, G., Chandrasekaran, D., & Ordanini, A. (2016). Open innovation, product portfolio innovativeness, and firm performance: the dual role of new product development capabilities. *Journal of the Academy of Marketing Science*, *44*(2), 166–184. https://doi.org/10.1007/s11747-014-0423-4

Soledad, C. (2018). *Methodology for Systematic Literature Review Applied to Engineering and Education*. *April*. https://doi.org/10.1109/EDUCON.2018.8363388

Tolonen, A., Harkonen, J., & Haapasalo, H. (2014). Product Portfolio Management—Governance for Commercial and Technical Portfolios over Life Cycle. *Technology and Investment*, *05*(04), 173–183. https://doi.org/10.4236/ti.2014.54016

Tolonen, A., Kropsu-Vehkaperä, H., Haapasalo, H., & Kropsu-Vehkapera, H. (2014). Product Portfolio Management - Current challenges and preconditions. *International Journal of Performance Measurement*, *4*(2), 69–90. https://www.researchgate.net/publication/277837634

Tolonen, A., Shahmarichatghieh, M., Harkonen, J., & Haapasalo, H. (2015). Product portfolio management - Targets and key performance indicators for product portfolio renewal over the life cycle. *International Journal of Production Economics*, *170*, 468–477.

https://doi.org/10.1016/j.ijpe.2015.05.034

Trattner, A., Hvam, L., Forza, C., & Herbert-Hansen, Z. N. L. (2019). Product complexity and operational performance: A systematic literature review. In *CIRP Journal of Manufacturing Science and Technology* (Vol. 25, Issue February). https://doi.org/10.1016/j.cirpj.2019.02.001

Udo-Imeh, P., Edet, W., & Anani, R. (2012). Portfolio Analysis Models: A Review. *European Journal of Business and4*(18), 101–121. http://iiste.org/Journals/index.php/EJBM/article/view/3228

Villamil, C., & Hallstedt, S. I. (2018). Sustainability Product Portfolio: A Review. *European Journal of Sustainable Development*, *7*(4), 146–158. https://doi.org/10.14207/ejsd.2018.v7n4p146

Yang, Y., & Xu, D. L. (2017). A methodology for assessing the effect of portfolio management on NPD performance based on Bayesian network scenarios. *Expert Systems*, *34*(2). https://doi.org/10.1111/exsy.12186