

THE EVOLVING ROLE OF PRODUCT MANAGER - A SYSTEMATIC REVIEW

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Abstract: This systematic review examines the evolving role of product manager (PM), from its inception in the early 20th century to its current state, with a focus on how technological advancements, shifting market dynamics, and evolving company's strategy have shaped the profession. While numerous studies have explored the responsibilities of PMs, there has been little consolidation of these insights, leading to an unclear understanding of the role's full scope. This review synthesizes the existing literature to clarify the key responsibilities of PMs in various contexts, including business-to-business (B2B) and business-to-consumer (B2C) environments, large enterprises (LEs) and small-medium enterprises (SMEs), Waterfall and Agile methodologies, and the unique challenges posed by artificial intelligence (AI)-driven products. By consolidating these insights, the paper provides a clearer understanding of the current state of product management and offers direction for future research to further define and enhance the role in an increasingly AI-centric world.

Keywords: Product Manager Roles, Agile Product Management, AI in Product Management, Evolving Product Management, Contextual Product Management.

JEL Classification: L26, L86, M15, O32.

1 Introduction

The concept of product management has evolved significantly since its inception, adapting to changing market dynamics, technological advancements, and customer needs (Maglyas, et al., 2017). Initially rooted in brand management principles, the product management role has expanded to encompass a diverse set of responsibilities, including strategic planning, market analysis, customer insights, and technological integration (McDaniel and Gray, 1980; Maglyas, et al., 2013). This evolution has been particularly pronounced in the software industry, where rapid innovation demands a high degree of agility and data-driven decision-making (Fricker, 2012). Today, product managers (PMs) are not only responsible for a product's market success, but also for aligning product strategies with broader business goals, responding to customer feedback, and integrating emerging technologies such as artificial intelligence (AI) (Tkalich, et al., 2022). Understanding the historical evolution of the product management role is crucial, as it provides valuable context and insights for navigating the complexities of modern product development and strategic decision-making (Geracie and Eppinger, 2013; Maglyas, et al., 2017). This section reviews the key historical milestones that

have shaped product management, tracing its journey from brand management in the early 20th century to the strategic, AI-focused function it has become today.

Historical Milestones of Product Management: Understanding the evolution of product management is crucial, as it highlights how the role has adapted to changing market dynamics, technological advancements, and customer needs. This historical perspective provides valuable insights for current and future PMs, helping them navigate the complexities of modern product development and strategic decision-making.

The journey of modern product management began in 1931 when Neil H. McElroy, who later became the President of Procter and Gamble, introduced the concept of the "Brand Man" in his famous memo. This memo proposed assigning dedicated roles to manage individual brands, linking product success to specific individuals. McElroy's idea was revolutionary at the time and laid the foundation for modern product management by emphasizing accountability for a product's success (McDaniel and Gray, 1980).

In the 1940s, Hewlett-Packard (HP) brought product management into the technology industry. HP assigned PMs the responsibility of working closely with engineering teams, while keeping a focus on customer needs and market alignment. This role bridged the gap

between technical development and market demand, establishing PM as the internal voice of the customer (Eriksson, 2015).

The 1950s saw a significant shift with the introduction of the Toyota Production System, which revolutionized manufacturing processes by emphasizing efficiency, minimal waste, and high-quality output. PMs played a critical role in overseeing these processes, ensuring that production aligned with customer demand. The role of PMs evolved further as companies began to realize the importance of streamlining operations to meet market needs (Eriksson, 2015).

In 1965, Theodore Levitt introduced the concept of the product life cycle (PLC), outlining the stages of market development, growth, maturity, and decline. This model required PMs to make strategic decisions about product development, marketing, and phasing out products throughout these stages. Although PLC was initially sales focused, it became a widely adopted framework in product management to guide strategy and decision-making across the product's life cycle (Geracie and Eppinger, 2013).

The period from the 1970s to the 1990s marked the increasing recognition of product management as a cross-functional role. Researchers like McDaniel and Gray (1980) and Lysonski (1985) highlighted the importance of boundary-spanning behaviors, as PMs began to work across departments to ensure cohesive product strategies. The formation of the Product Development and Management Association (PDMA) in 1976 further formalized the discipline by promoting best practices and providing a collaborative platform for PMs.

By the 1990s, product management had become a key role in technology companies like Google, Microsoft, and Amazon. PMs were expected to operate at the intersection of business, technology, and customer experience, with an expanded focus on user interface (UI) and user experience (UX) design. The role now involved not only managing the product's technical aspects, but also ensuring a seamless customer experience (Fricker, 2012; Eriksson, 2015).

The publication of the Agile Manifesto in 2001 marked another significant milestone, fundamentally changing how products were developed. Agile methodologies

emphasized iterative progress, customer feedback, and cross-functional teamwork. PMs adapted to these methodologies by often taking on the role of product owners, collaborating with engineers to ensure continuous value delivery to customers (Kittlaus, 2012; Tkalich, et al., 2022).

A critical milestone in the evolution of product management, particularly for software products, was the establishment of the International Software Product Management Association (ISPMA). Founded in 2009, ISPMA aimed to address the growing complexity of software product management (SPM) by creating a comprehensive body of knowledge tailored specifically for the software industry. ISPMA developed the SPM framework, a result of comprehensive academic research and industry collaboration. This framework has become a cornerstone in defining roles, activities, and competencies for successful product management in software environments (Kittlaus and Fricker, 2017). Unlike earlier models that primarily focused on physical products, the ISPMA framework provides detailed guidance on managing the entire software product life cycle—from ideation and development to market introduction and eventual retirement.

By the 2010s, extensive research had been conducted with a focus on SPM highlighted in Section 2. The product management evolved into a strategic function, influencing not just product development but also overall business strategy. The rise of AI and machine learning in the 2020s added new layers of complexity and opportunity, requiring PMs to be more tech-savvy, customer-centric, and agile in their approach. Today, PMs are responsible not only for managing products, but also for driving innovation, staying ahead of AI advancements, and ensuring their products meet evolving market demands (Tkalich, et al., 2022; Finch, et al., 2023; Parikh, 2024).

Today, product management continues to evolve as AI and machine learning introduce new layers of complexity. PMs are now required to manage not only the technical and strategic aspects of their products, but also the ethical, data-driven, and continuously evolving nature of AI technologies (Parikh, 2024). The role has expanded from its origins in brand management to become a critical, cross-functional driver of business success in the modern, AI-driven world.

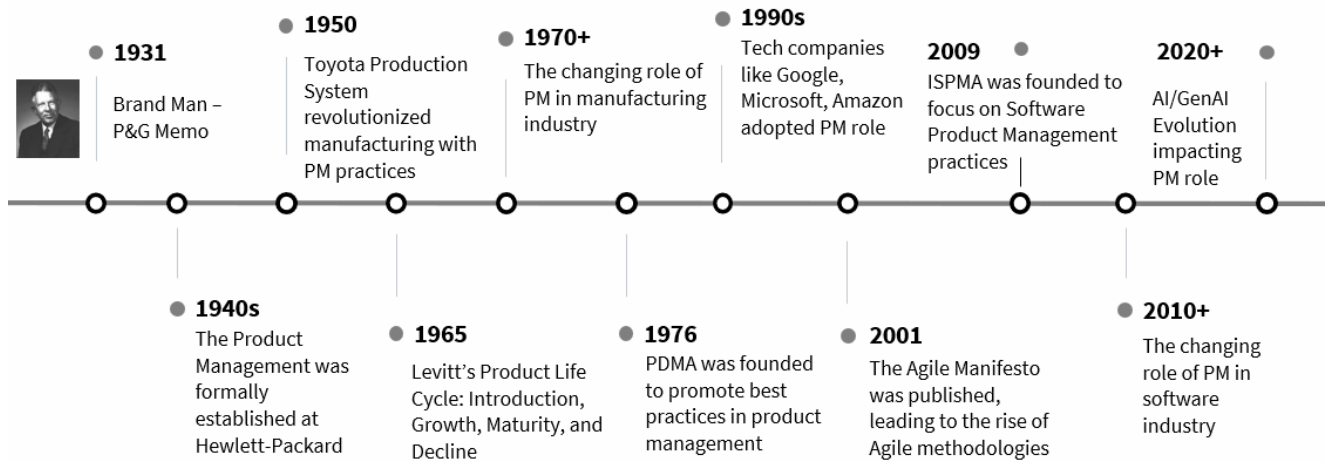


Figure 1. Evolution of Product Management
(Source: Author's own elaboration)

Figure 1 illustrates the evolution of the product management.

Product management is essential at every stage of PLC, yet there is no universally accepted model defining this process. Levitt (1965) introduced the four-stage model-market development, growth, maturity, and decline-focused mainly on the product's life after its launch. Later, Cooper (2008) proposed the stage-gate process, covering new product development from ideation to launch, but leaving the post-launch phase unaddressed. Recent definitions of product life cycle management (PLM) by Stark (2020) and Haines (2014) encompass the entire life cycle, from ideation to retirement. However, these frameworks mainly address physical products and do not fully capture the iterative and unique nature of SPM. Geracie and Eppinger (2013) offered a more comprehensive framework, but often blurred the distinction between product management and marketing roles, leading to ambiguity around the specific responsibilities of PMs.

Problem Statement: A top reason for product management failure is a lack of clarity in PMs' roles and responsibilities (Springer and Miler, 2022). Despite the considerable evolution of the role of PM, particularly with the advent of frameworks such as Agile and emerging technologies like AI, there remains significant ambiguity regarding PM responsibilities. Existing studies, while extensive, have focused on isolated aspects of the role of PM without consolidating their findings, leading to fragmented views and a lack of

clarity on the full scope of PM responsibilities. These inconsistencies are especially prevalent when comparing PMs' activities in different organizational sizes (e.g., SMEs vs. large enterprises [LEs]), product segments (business-to-business [B2B] vs. business-to-consumer [B2C]), and development methodology (Waterfall vs. Agile). As AI and Agile continue to reshape product management, the lack of a unified understanding of the evolving role of PM presents challenges for both academic research and practical implementation. This systematic review aims to address this gap by synthesizing the current literature, clarifying PMs' responsibilities, and providing insights into how technological advancements, shifting market dynamics, and evolving company's strategy are reshaping the role.

2 Relevant study

PM coordinates with the company's cross-functional teams to align the product with organizational processes and activities (Fricker, 2012). PM ensures that the product and stakeholders' activities align with the product strategy. The role involves close cooperation with marketing management for market success and with the product development team to successfully execute a product or incremental product feature for the product release. For the launch and delivery of a product release, PM collaborates with the operations team. PM also collaborates with sales to enable the customers to take advantage of the product's values. In

addition, PM works with customer service and support to deliver user training, consultancy, maintenance service, and upgrades, and with legal, who provides advice regarding license use and protection and defense for the product against competitors and new market entrants.

As per Maglyas, et al. (2017), the ISPMA SPM framework draws on reference frameworks (Weerd, et al., 2006; Ebert, 2009; Kittlaus and Clough, 2009; Fricker, 2012). This framework represents the latest viewpoint on the organization and evolution of SPM. It is important to highlight that the referenced scientific research contributes to the ISPMA SPM framework, but does not inherently render the ISPMA SPM framework scientific in itself. Kittlaus and Fricker (2017) and other sources (Geracie and Eppinger, 2013; Steinhardt, 2017; Pragmatic Institute, 2022;) have focused on the entire product management framework, but they often mix roles and responsibilities with other functions, such as marketing, leaving PMs in a gray area. None of the aforementioned studies have a clearly defined framework for PMs that differs from the broader framework for product management.

The Agile Manifesto and the Scrum Guide focus on software development (Kittlaus, 2012). The Agile Manifesto is an umbrella for several methods. The Scrum Guide is the most popular, with 56% adoption (COLLAB.NET VERSIONONE, 2017). Another vertical, called the Scaled Agile, has the same Agile principles and values, but focuses on LEs. SAgE is the most popular scaled Agile framework (CPRIME, 2017). Agile does not have a defined PM role, but scaled Agile does. This study uses the SAgE framework to compare a traditional PM to an Agile PM due to its popularity. The product owner's role differs from that of PM, as the product owner delivers Agile values with PM.

Agile products impact the role of PM, and the product owner's role is often confused with the role of PM (Tkalic, et al., 2022). Tkalic, et al. found that PMs' responsibilities in the academic literature did not align with how PMs functioned in Agile organizations. The authors identified three groups of activities in which PMs engage: product related, team related, and supporting. Tkalic, et al. argued that PMs should be a continuous link between business needs and software development, which is the essence of product

management, regardless of the company context. They suggested choosing product management practices based on their contribution to achieving this goal. However, Tkalic, et al. did not clarify how these activities differ from traditional PM activities. In addition, there is no implication defined in the extant body of knowledge, such as the ISPMA SPM Framework or ProdBOK®.

PM roles and responsibilities vary based on company size (Tyagi and Sawhney, 2010; Maglyas, et al., 2017; Springer and Miler, 2018; Finch, et al., 2023). Springer and Miler (2018) identified different approaches to SPM depending on organization size. In a company's early stages, the founders and core team members share responsibilities. As the company expands, the leaders often hire dedicated software PMs. Springer and Miler (2018) suggested that product characteristics also influence the software PM's role. For example, the B2B model requires negotiating with clients and creating additional documents for business clients. Software PMs in the B2B model use specific techniques (e.g., client workshops). In contrast, the B2C model requires understanding the users, their segmentation, sources of origin, and behaviors to adapt the product to the target group with the highest business potential. Similarly, Finch, et al.'s (2023) findings highlight that the resources organizations seek when recruiting PMs are shaped by contextual factors such as firm size, sector, and organizational age. These factors influence the priority placed on different competencies. Larger firms or more mature companies may emphasize different skills compared to startups, especially regarding agility, innovation, and strategic alignment.

The existing literature offers a fragmented perspective to practitioners, and no comprehensive systematic review has been conducted to consolidate the evolving role of PMs, address limitations, and outline future research directions.

3 Review Questions

The following research questions (see Table 1) were the center of the systematic review study.

Table 1. Research Questions and Motivation
(Source: Author's own research)

Research questions	Motivation
1. What are the evolving responsibilities of a software PM?	Software product management is a continuously evolving field, and more and more organizations are adopting the discipline. Keeping track of how a PM's role is evolving is imperative
2. How do organizational and product factors—such as B2B versus B2C, large enterprises (LEs) versus small-medium enterprises (SMEs), Waterfall versus Agile methodologies, and AI—impact PM's role?	Understanding how different organizational structures, product segments, development methodologies, and technological advancements shape the product manager's role is essential for both practitioners and researchers. These factors influence day-to-day responsibilities, decision-making processes, and strategic focus, providing insights into how product managers can adapt their approaches to fit specific business environments and emerging trends. This question seeks to clarify these influences, offering a comprehensive view of how the PM role is evolving across diverse contexts

Table 2. Database Sources and Search Strings
(Source: Author's own research)

No.	Source	Search string	Number of results
1	Google Scholar	allintitle: (Role OR Roles OR Responsibility OR Responsibilities) AND ("Product Manager" OR "Product Managers" OR "Product Management")	50
2	ACM Digital Library ¹	(role* OR responsibilit*) AND Product AND manage*	5
3	EBSCOhost ²	TI (role* OR responsibilit*) AND TI ("product manage*")	30
4	IEEE Xplore	("Document Title":product manage*) AND ("Document Title":role* OR "Document Title":responsibil*)	10
5	ProQuest Central ³	ti(role*) AND ti("product manage*")	91
6	Springer Link	(role* OR responsibilit*) NEAR/1 "product manage*"	147
7	ResearchGate	(role* OR responsibilit*) AND "product manager"	19
8	Books	-	4
Total			356

Note. All the data sources returned results based on the search strings. However, there were additional steps taken for the data sources:

1For the ACM Digital Library, the advance search option was selected, and the search string “role* AND product AND manage*” (without quotes) was used in the title search.

2For EBSCOhost, the following databases were used: Academic Search Premier, Business Source Premier, eBook Collection, Education Resource Information Center (ERIC), and Applied Science and Technology Source. The search showed 26 results initially; when the page option was selected to 20 results per page to export citations, the website removed duplicates and showed 13 results.

3For ProQuest Central, the full-text filter was applied and excluded trade journals; wire feeds; newspapers; magazines; and blogs, podcasts, and websites from the Source type.

4 Review methods

The research is based on a systematic literature review (SLR). SLR followed the guidelines of Kitchenham and Charters (2007). The reasons for undertaking an SLR include summarizing the current research, identifying gaps in the recent literature, providing future direction, and avoiding bias in resource selection and result representation (Kitchenham and Charters, 2007). In this study, SLR showed the comprehensive roles and responsibilities of a software PM. ISPMA (2022) body of knowledge is used to synthesize PM's activity names.

In this study, SLR and snowball sampling techniques found a total of 14 results for the analysis, as shown in Appendix A.

4.1 Data sources and search strategy

A search was performed to collect literature from databases (see Table 2) to study the current state of the research. Source selection occurred based on academic preferences and resource availability. The search strings were based on the research questions and keywords, role OR product management. Few keywords returned numerous resources related to the core topics. The sources included peer-reviewed articles, journals, conference documents, and books related to product management body of knowledge. Comprehensive sources were selected to reduce publication bias and perform a thorough SLR.

4.2 Study selection

Table 3 shows each data source's search criteria (inclusion and exclusion). The goal was to collect information for all years, all sources, full text, and in the English language only. The preliminary result contained 89 sources. Further exclusions occurred based on the duplicates, title scan, abstract review, and full article review (see Table 3 and Figure 2).

Wohlin's (2014) snowballing technique occurred after the database searches and filtering. Stage 6 (Figure 2) results were an initial set for the snowballing technique (see Figure 3). One of the main advantages of snowballing is that it finds further references from relevant papers. Snowball sampling involves scanning study

references to identify relevant papers. The citation analysis could result in examining many papers, especially those with numerous citations. In this study, snowball sampling found additional resources, for a total of 14 results for the analysis as shown in Appendix A.

4.3 Data extraction

Data extraction and synthesis was performed with Atlas.ti tool, with all copies of the full-text resources imported into the tool. Next, each article underwent analysis and coding for relevant information. The coding involved labeling information to find activities based on the PM's role.

The data extracted from each paper included

- the different produce manager roles and
- PM activities.

4.4 Data synthesis

4.4.1 Synthesis of PM Roles

The data extraction process showed the different PM roles used in the literature review. The roles included Product Leader, strategic PM, Agile product owner, technical PM, and product marketing manager (Maglyas, et al., 2013; Geracie and Eppinger, 2013; Tkalich, et al., 2022).

Product Leader

Maglyas, et al. (2013) define this role as a leader who has a high level of authority and decision-making power, involvement in both strategic and tactical decisions, access to necessary resources, including budget and personnel, a balanced role, managing both strategic vision and implementation of that vision through various departments like engineering, sales, and marketing. Leader PMs have authority over resource allocation and can actively influence the success of the product by ensuring alignment between the strategy and its execution. They act as true product owners (distinct from Agile product owners) and are also referred to as vice presidents (VPs) of the product, taking responsibility for outcomes and steering the product from development to market.

Table 3. Database Sources and Inclusion/Exclusion Criteria
(Source: Author's own research)

No.	Source	Search criteria (inclusion/exclusion)	Number of results after applying the criteria
1	Google Scholar	Inclusion: any time (default selection); any type (default selection) Exclusion: include citations (custom selection)	27
2	ACM Digital Library	Inclusion: ACM full-text collection (default); all dates (default)	5
3	EBSCOhost	Inclusion: full text (custom); all time (default) Exclusion: magazines, trade publications	13
4	IEEE Xplore	Inclusion: all years (default)	10
5	ProQuest Central	Inclusion: full text (custom) Exclusion: source type: blogs, podcasts, and websites; trade journals; wire feeds; newspapers (custom); magazines	9
6	Springer Link	Inclusion: discipline: computer science Exclusion: preview-only content	16
7	ResearchGate	Inclusion. full-texts only Exclusion: data, preprints, presentations, posters	5
8	Books	Selection by credible authors	4
Total			89

Note. In this table, the default selection indicates that the selection was made by default from the source, while the custom selection indicates the author explicitly made the selection.

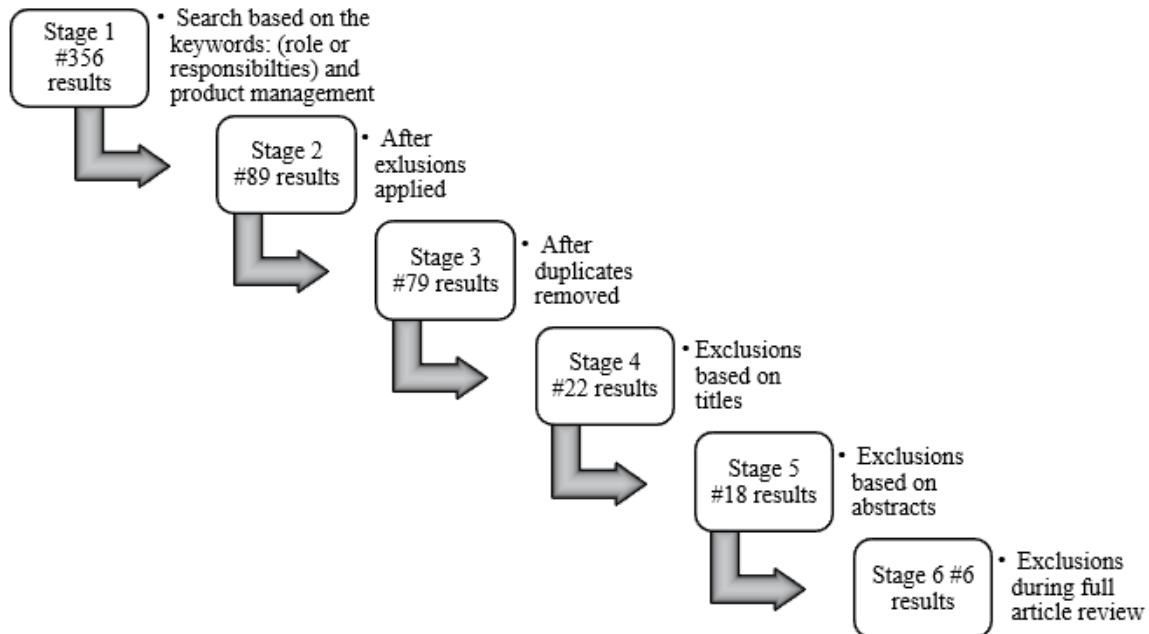


Figure 2. Study selection procedure
(Source: Author's own study)

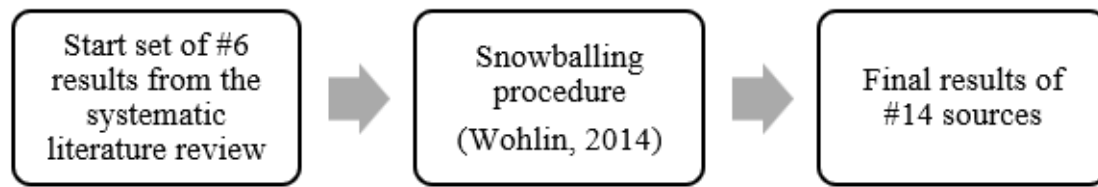


Figure 3. Snowballing Procedure
(Source: Author's own study)

Product Manager (Strategic)

PM is a general role for a team member who manages one or more products within an organization. PMs channel market needs into the organization and seek an optimal balance between customers' needs and the organization's capabilities. Maglyas, et al. (2013) define this role as a strategist who focuses on defining the product vision, strategy, roadmap, and shaping the product's direction, but often without full control over resources. PMs play an important role in maximizing the return on an organization's investment over the product life cycle (Geracie and Eppinger, 2013). PMs have a boundary role at the intersection of the market and the organization (Lysonski, 1985). Hence, it is also called a market-facing or outbound role. So, PM, strategic PM, and market-facing PM are all the same role with different titles.

Agile Product Owner

There has been a PM role since 1931, when Neil H. McElroy introduced the role. The product owner role became more popular in 2001 with its introduction in the Agile manifesto. The Agile method has a clearly defined product owner role, and PM maximizes the business value of the output of the scrum development team. In most environments, the product owner and PM have separate roles, but remain linked for optimal communication. They have clearly defined and distinct tasks and responsibilities comparable to those of the strategic and technical PMs (ISPMA, 2022). None of the sources in this study showed the distinction between the technical PM and product owner; instead, they presented the roles as overlapping and necessary in an organization. This study reveals that activities performed by the technical PM and Product Owner are almost aligned, and hence both roles should be considered as a single role. While the Product Owner is

Agile-specific role, the technical PM is a widely accepted, generic, and development-methodology-independent role.

Technical PM

Maglyas, et al. (2013) define this role as an expert who has deep technical expertise, typically focused on a specific area, such as product development, engineering, or feature prioritization, has limited involvement in broader strategic planning and resource management, and has a strong understanding of the product's technical details and how these align with customer needs and business goals. The technical PM commonly partners with market-facing PMs to serve the market's needs. Technical PMs spend significant time supporting the product development team. Hence, any activities which require product engineering collaboration should be considered as the technical PM's responsibility.

Product Marketing Manager

The product marketing manager's role focuses on go-to-market activities, dividing the product life cycle into separate parts as the company expands. PM, who used to manage the entire product life cycle, now handles prelaunch activities in the product life cycle, while the product marketing manager assumes responsibility for postlaunch activities (Geracie and Eppinger, 2013). Kittlaus and Fricker (2017) indicate that the product marketing manager's role is separate from that of the strategic PM. However, in some organizations, one person takes on both roles as a strategic PM or product marketing manager. This study's purpose was to define a PM's role as distinct from other roles. Thus, the study did not include the product marketing manager's role due to the assumption that software organizations have a separate role for product marketing.

4.4.2 Synthesis of PM Activities

Synthesis of the PM activities was the most exhausting task of the research. The biggest challenge was the lack of common activity namings for PMs in the literature review. Therefore, synthesizing PM responsibilities and accountabilities was difficult. The first action was to find the activity naming standards most researchers and authors used. ISPMA (2022) was the reference for categorizing the activities found in the research. Most activities fell under the ISPMA super activity name (see Appendix B). However, a few changes were made to the ISPMA activity category to distinguish PMs' activities. For example, ISPMA's full product management framework has an activity called development execution that falls under development (product engineering). However, supporting the product engineering team is a responsibility specific to PMs. Therefore, the activity was changed to supporting the product engineering team. Appendix B presents the activity naming standards and the rationale for changing certain ISPMA activities to focus on PMs.

Many researchers and authors considered identifying solution as a technical PM's responsibility. The technical PM shares this responsibility with the product engineering team. However, ISPMA (2022) does not have a separate category for identifying solution, as this activity falls under the product definition. With several studies, including Geracie and Eppinger (2013), it was necessary to illuminate the activity as a separate category before presenting the product definition in the life cycle. ISPMA does not have a category for a product's end-of-life (EOL) plan. Therefore, another new activity was created.

Appendix B identifies two key super activities which are not illuminated in ISPMA (2022). One is Identify Solution and Another is product EOL. Furthermore, the synthesis via literature review illuminated 18 PM's activities and how they are impacted by various organizational and product contexts.

The following is a synthesis of each activity, showing the responsibilities of PMs.

Market Analysis. Market research is a multifaceted process essential for successful product development and positioning. It begins with user research, where in-depth insights into user behaviors, needs, and pain points are gathered (Springer and Miler, 2018).

Product discovery, or product ideation, follows, involving the generation and validation of ideas to create innovative solutions (Tkalich, et al., 2022). PMs conduct thorough market research and competitor analysis to understand trends, customer preferences, and emerging technologies. Maglyas, et al. (2012) found that all LEs had separate departments for market and customer analyses that provided necessary data to PMs. Maglyas, et al. (2017) perceived the market analysis as sporadic and informal in small-medium enterprises (SMEs).

In B2C, PMs analyze market trends, consumer behavior, and preferences using surveys, A/B testing, and user feedback to identify opportunities. In contrast, B2B PMs focus on industry trends, competitor analysis, and specific client requirements, often engaging directly with corporate clients and conducting in-depth research to meet business needs (Springer and Miler, 2018).

For PMs who manage AI products, market analysis heavily relies on the availability of high-quality data that adds data sourcing and acquisition activities, in addition to the traditional PM activities (Parikh, 2024). However, generative AI significantly speeds up tasks like secondary research, competitive analysis, and gathering user feedback, making it easier to identify market opportunities while reducing the manual workload (Parikh, 2023).

Customer Insight. PMs interact with customers to gather requirements and feedback (Tkalich, et al., 2022). ISPMA defines customer insight in the product planning phase. However, customers are involved throughout PLC. The conceive phase involves customers in a market analysis activity to understand their pain points and validate solutions/prototypes. In the development phase, customers validate incremental delivery (sprint demo) as part of the user stories acceptance criteria, an Agile-specific activity. In the qualify phase, customers get involved in product verification/user acceptance testing, a traditional Waterfall activity. In launch and delivery, customers provide feedback and complete a satisfaction survey as part of the continuous market analysis activity.

Identify Solution. Identifying solutions or concept is a crucial process that involves proposing and evaluating potential answers to identified needs and problems. It begins with proposing solutions that align with the

initial requirements and objectives (Springer and Miler, 2018). These proposed solutions are then subject to idea evaluation through mock-ups or working prototypes, allowing for a tangible representation of the concept (Tkalic, et al., 2022). Throughout this process, identifying detailed requirements remains critical, as it helps to refine the solution and ensure it addresses all necessary aspects and constraints (Bekkers, et al., 2010). This systematic approach to solution identification ensures that the final product is both viable and aligned with user needs and business goals.

For AI-based products, the identify solution activity becomes more nuanced, as it involves not just creating a new feature, but also ensuring that the AI model can effectively address the problem. This phase requires evaluating data availability, model feasibility, and ethical considerations (Parikh, 2024).

Positioning and Product Definition. Positioning and product definition are essential steps in ensuring a product's market success. This process begins with proposing solutions aligned with the strategic vision (Springer and Miler, 2018; Tkalic, et al., 2022) and identifying detailed requirements (Bekkers et al., 2010). Creating a compelling product vision and articulating a future vision inspire and guide the development team (Maglyas, et al., 2017). PM defines the product vision by understanding market trends, consumer needs, and technology, guiding development.

Cross-Functional Collaboration. PMs coordinate between departments like marketing, engineering, sales, and finance, ensuring alignment with the product strategy and vision. They facilitate communication, bridge gaps, resolve conflicts, and ensure all teams align with the product's goals and broader business objectives (McDaniel and Gray, 1980). Lyonski and Woodside (1989) explored the concept of boundary spanning in product management. They emphasize the unique position of PMs in handling role conflicts, particularly in industries where organizational boundaries are rigid. Their findings highlight the need for PMs to adeptly manage stakeholder relationships and navigate conflicting expectations from different departments. SAFe (2023) indicates that PMs provide support and enable key functions in the operational value stream to realize the full value of every release.

AI products introduce an additional layer of cross-functional collaboration by requiring PMs to work

closely with data scientists and machine learning engineers. This collaboration focuses on refining data quality, selecting appropriate models, and continuously monitoring AI performance to ensure it aligns with product goals and ethical standards (Parikh, 2024).

Sourcing. PMs identify resource gaps and constraints and predict upcoming resource shortages to enable timely action. In Waterfall, the project manager handles resource management or acquisition. SAFe (2023) does not indicate who should handle the resource management or acquisition. PMs often work with the responsible line manager, typically the development manager. An external website identified that poor resource planning is the top disadvantage of Agile (Lynn, 2023). Tkalic, et al. (2022) identified that PMs in many companies compete with each other to acquire resources. Bekkers, et al. (2010) highlighted PMs also engaged in build/buy/partner analysis. Sourcing is a shared responsibility between PMs and product engineering as per the given budget, and Leadership is consulted for Approval.

Financial Analysis. Tkalic, et al. (2022) describe that PMs are responsible for profitability of the product. PM puts together pricing, revenue, and cost in a financial business case. PM consults the marketing or pricing manager (if available) for pricing, product engineering for the cost to build, and sales for revenue forecast. PM influences the pricing determination in product-led organizations; however, in the sales-led organization, it may be sales that drive the pricing. In software products, marketing has less influence on product pricing. SAFe (2023) indicates that PM finds economically viable solutions with more value than costs. However, the business owner creates a lean business case containing financial aspects such as cost and revenue forecasts. If the business owner is not in a separate role, PM handles financial analysis in Agile. Furthermore, in LEs, PMs make decisions and lead the product independently. PM addresses financial management while consulting with the leader. In SMEs, leaders handle financial analysis and PMs are informed optionally.

Legal and Compliance Management. Geracie and Eppinger (2013) and other sources did not provide legal and compliance management details, but briefly addressed the need for legal contracts and documents. ISPMA (2023) suggested that software PMs are

usually not legal experts and do not have to be. However, legal risks can significantly impact a product's success. Therefore, PMs should remain aware of and take action to avoid or mitigate legal risks. PMs can turn to legal experts for guidance, but should know the important questions to ask the legal experts (ISPMA, 2022).

Roadmapping. Tkalich, et al. (2022) found that PMs in a large company are more committed to the roadmaps than PMs in a smaller company, which flexibly apply their roadmaps. Agile has flexible roadmaps that continuously change as organizational objectives and customer needs change (SAFe, 2023b), while Waterfall is a more predictable, long-term roadmap, but less agile.

Release Planning. According to ISPMA (2022), release planning defines the detailed contents of a forthcoming product release to maximize the value of the release in relation to the product's success over its life cycle. In Agile, releases are broken into sprints to deliver incremental value. The technical PM or product owner works with the engineering team on the detailed release and sprint planning.

In B2C, release planning involves shorter cycles and frequent updates driven by market feedback, allowing quick iterations to match changing consumer preferences. In contrast, B2B PMs follow longer release cycles, prioritizing stability and aligning with client schedules to address specific business needs (Springer and Miler, 2018).

Product Requirements Engineering (or Prioritized Product Backlog in Agile). Product requirements engineering is a structured process involving the meticulous analysis and documentation of product needs to ensure alignment with customer and business objectives. This begins with the detailed analysis of requirements (Springer and Miler, 2018) and extends to the gathering of comprehensive information from stakeholders (Bekkers, et al., 2010). Managing the backlog and writing user stories further break down these requirements into actionable tasks, facilitating an iterative and responsive development process (Kittlaus, 2012). PMs are responsible for gathering of requirements from different sources (e.g., sales, support, and evolving market needs). Changing requirements throughout the life cycle are often specified in standardized documents (in Waterfall) or sorted lists called backlogs (in Agile). Sales, customer service, and

support teams are consulted to understand customer pain points and generate opportunities, which turns into product requirement engineering. Technical PM helps manage requirements regarding prioritization, elaboration, and roadmapping.

Supporting the Product Engineering Team. PMs play a pivotal role in supporting the product development team by fostering close cooperation and providing continuous guidance throughout the development process (Springer and Miler, 2018). They ensure that individuals on the team are consistently followed up to address any concerns and maintain alignment with project goals (Tkalic, et al., 2022). Supporting the team in their delivery efforts is crucial, as it involves removing obstacles and facilitating a smooth workflow (Tkalic, et al., 2022). Effective product development requires managing scope changes adeptly, ensuring that any modifications are well communicated and do not disrupt the project timeline or objectives (Bekkers et al., 2010). By integrating these responsibilities, PMs ensure that the development team is well supported, motivated, and capable of delivering high-quality products (Maglyas, et al., 2017). In SMEs, the software PM may assume the product owner role; however, that construct does not scale up. In larger environments, additional team members cooperating with the strategic PM fill the product owner role (Kittlaus, 2012).

Detailed Requirements Engineering (or Define User Stories, Acceptance Criteria, and Prioritized Backlog in Agile). Detailed requirements engineering is part of the development phase. After defining the release contents, PM submits and refines the corresponding product requirements for development (ISPMA, 2022). The phase also includes UX development. The UX design scope and product expectations fall under the product definition activity, which happens in the conceive phase. The minor UI/UX enhancements are handled as a part of ongoing development. Detailed requirements engineering is a shared responsibility of the technical PM and product engineering team. The technical PM coordinates with UX and developers. In Agile, the product owner writes functional stories and the product engineering team writes nonfunctional stories. The user stories contain detailed acceptance criteria, including UX considerations.

Product Verification (and/or Accept User Stories in Agile). PM gets heavily involved in product

verification testing as a proxy user to ensure the overall functionality. Many PMs review and prioritize quality issues to determine which issues to correct before launch. PMs may also handle formal acceptance and approval with the test team. PM may also become involved with the customer in planning and creating user acceptance testing (Geracie and Eppinger, 2013). In Waterfall, the customer participates in the qualify phase to validate the whole product. However, in Agile, the customer participates in the development phase to validate incremental features and in the qualify phase for the whole product verification. Typically, the quality engineering team (a part of product engineering) handles detailed product testing and ensures quality assurance, while PMs handle the whole product or release signoff. Technical PMs or product owners address user stories acceptance.

Operations Readiness. PMs support and enable key functions (e.g., marketing, sales, legal and compliance, customer service and support) to ensure the full value of every release (SAFe, 2023b). Product support readiness enables the support team to maintain the product after the sale. According to ISPMA (2022), support consists of the product-related services provided to existing customers, such as maintenance, training, operations, and the user help desk. Kittlaus and Fricker (2017) indicated that product-specific training is important to product success. The company's sales and marketing, technical support, and, if applicable, customers should receive product-specific training. In larger companies, training requires a multiplier approach. Developers and PMs conduct initial training for the staff (i.e., by training the trainers) who subsequently conduct the training.

Orchestrate Product Launch. PMs are responsible for creating and executing the product launch strategy, collaborating with sales and marketing to ensure proper market positioning and messaging. They oversee comprehensive launch preparations, coordinating efforts across various teams to ensure readiness and alignment with launch goals (Bekkers, et al., 2010).

Product Performance Management. Product performance management is a critical responsibility for PMs, involving continuous assessment and adjustment to ensure product success. This begins with assessing risks to identify potential issues that could impact the product's performance (Tkalic, et al., 2022).

Monitoring the product and making necessary adjustments are essential to respond to real-time data and feedback (Tkalic, et al., 2022). SAFe (2023) does not present product performance management as PM's responsibility. However, Tkalic, et al. (2022) found that product monitoring and adjustment occurred in all companies with Agile PMs.

In AI-driven products, performance monitoring becomes even more critical, as it involves tracking not only user interactions, but also the performance of the AI models themselves. This includes continuously assessing model accuracy, detecting bias, monitoring drift over time, and ensuring the ongoing effectiveness of AI models to maintain the product's value and trustworthiness (Parikh, 2024).

EOL Plan. Jansen, et al. (2011) explored the critical aspects of managing the EOL phase for products, emphasizing the importance of strategic planning and execution. Their findings highlight that EOL management involves not only the cessation of production, but also the careful consideration of customer support and communication strategies. Effective EOL management can mitigate risks associated with product discontinuation, such as customer dissatisfaction and potential market gaps. The study underscores the necessity for companies to develop comprehensive EOL plans that address both internal and external stakeholders' needs, ensuring a smooth transition and maintaining customer trust even as a product exits the market. Legal considerations and contract terms can indicate the appropriate approach and timing for the product's retirement. Another important factor is product support. While company leaders may choose to withdraw a product from the market, they may maintain some product support past the point of the product's retirement. A well-thought-out plan enables customers to plan and manage their transition to alternative products (Geracie and Eppinger, 2013). While PM outlines the strategic EOL for customers, the technical PM outlines the technology decommissioning plan with the engineering consultants.

5 Findings and discussion

SLR revealed a comprehensive set of roles and responsibilities for software PMs, synthesizing findings from various sources. Key roles identified include Product

Leader, Strategic PM, Agile Product Owner, and Technical PM (Maglyas, et al., 2013; Geracie and Eppinger, 2013; Tkalic, et al., 2022). The strategic role is customer facing and impacts the product, while the technical role is internal, except in Agile, where it extends to gathering customer feedback during sprints. The technical PM influences team product engineering. Strategic activities require strong business acumen, customer communication, and product management skills, whereas technical activities require technical knowledge and an understanding of the development environment. The strategic PM focuses on product discovery through continuous market analysis, while the technical PM focuses on continuous delivery. Agile Product Owner and Technical PM turned out to be the same role working close with product development team and delivery. The extant literature review has focused on Strategic PM role as an ideal persona. However, there is still lack of clarity with the Product Leader role in the literature.

SLR identified how AI, product segment, organizational size, and Agile methodology shape the evolving role of PMs.

5.1 AI Impact on Product Management

AI has added new dimensions to PM's role, particularly in market analysis, solution identification, and performance monitoring. AI products require PMs to ensure data availability and quality for model training and deployment (Parikh, 2024). Generative AI enhances secondary research by quickly synthesizing user feedback and market trends (Parikh, 2023). In addition, PMs must work closely with data scientists and machine learning engineers, focusing on ethical considerations and the ongoing monitoring of AI model accuracy, bias, and drift.

5.2 Product Segment

The responsibilities of PMs differ significantly between B2C and B2B products, impacting their daily activities and strategic focus. In B2C environments, PMs emphasize rapid iteration, user-centric design, and market adaptability, requiring them to be agile and responsive to consumer feedback (Springer and Miler, 2018). They focus on market analysis, user research,

and frequent release planning to quickly respond to changing trends and preferences. Conversely, B2B PMs must navigate longer development cycles, prioritize stability, and align features with specific client needs (Springer and Miler, 2018). Their responsibilities include direct client interactions, detailed requirement gathering, and coordinating complex customizations, which often involves balancing multiple stakeholders and ensuring long-term client satisfaction. This difference in focus requires B2C PMs to be more market-driven, while B2B PMs need to be adept at managing relationships and tailored solutions.

5.3 Organizational Size

Organizational size significantly affects the distribution of product management roles. In LEs, roles are more specialized, with dedicated teams for market research, customer analysis, and product strategy (Maglyas, et al., 2017). SMEs often combine these functions, resulting in a more flexible yet informal approach to product management activities. LEs tend to have formal processes for market analysis and cross-functional collaboration, while SMEs rely on adaptability and resource sharing among PMs.

5.4 Agile methodology

Agile practices have redefined PM's role, emphasizing collaboration, iterative development, and flexibility. The introduction of the Agile Product Owner role has aligned technical PMs with the development team, focusing on backlog prioritization and sprint planning. PMs operating within Agile environments must adapt to ongoing changes, integrate customer feedback regularly, and work closely with engineering to ensure rapid, value-driven product iterations. This methodology has broadened PMs' involvement across the product life cycle, requiring continuous market and performance assessments.

6 Discussion and Conclusions

This SLR found 18 key responsibilities for PMs. This study found that a technical PM has similar responsibilities as a product owner, a role in the Agile methodology.

The study synthesizes key research from various sources on PM's roles and responsibilities, along with the influence of organizational factors on these roles. Therefore, this SLR represents the most current perspective on the studies discussed in the related literature section.

The literature review reveals that the PM's role is complex and multifaceted, shaped significantly by factors such as AI integration, product segment, organizational size, and Agile methodologies. AI has fundamentally impacted product management, adding new responsibilities related to data quality, model feasibility, and ethical considerations. On the other side, GenAI has been optimizing PM's day-to-day responsibilities. PMs now collaborate more closely with data scientists and machine learning engineers, highlighting the need for cross-functional expertise. The use of generative AI further enhances market analysis and solution identification, allowing PMs to quickly synthesize market trends and generate actionable insights.

Product segment-whether B2C or B2B-dictates the PM's strategic focus and daily activities. B2C PMs emphasize rapid iteration, user-centric design, and market adaptability, while B2B managers prioritize stability, longer development cycles, and client-specific requirements. These differences necessitate distinct skill sets, with B2C managers being market-driven and B2B managers excelling in client relationship management and custom solutions.

Organizational size also influences PM's role. In LEs, product management roles are more specialized and segmented, supported by dedicated teams for market analysis and product strategy. In contrast, SMEs often adopt a more flexible, informal approach, where PMs wear multiple hats and engage in a wider range of activities.

The adoption of Agile methodologies has redefined product management practices by promoting flexibility, iterative development, and continuous customer feedback. The introduction of the Agile Product Owner role aligns closely with technical product management, requiring collaboration with engineering teams to prioritize backlogs and plan sprints. This has expanded the scope of PMs' involvement across the product life cycle, requiring constant market assessment, performance monitoring, and adaptation to changing customer needs.

7 Limitations and Future Research

While this systematic review provides a comprehensive understanding of the evolving role of PMs across various contexts, it is not without its limitations. First, the literature reviewed primarily focuses on the software and technology sectors, which may limit the applicability of the findings to other industries such as health care or manufacturing. The study also lacks empirical validation through interviews or case studies, which could provide practical insights into how PM roles are implemented in real-world settings. Future research should address these limitations by exploring the role of PMs in diverse industries and organizational structures, as well as incorporating empirical research to validate the synthesized activities and responsibilities. In addition, there is a need to investigate how emerging technologies, such as AI, continue to reshape PM's role.

The additional future research should address the following key topics:

Clarification of the Product Leader Role: Extant studies primarily focus on the activities performed by PMs as a strategic role, often overlooking activities performed by Product Leaders. While PMs handle the day-to-day execution of product strategies, Product Leaders play a pivotal role in steering the overall vision and ensuring that the product's strategic direction is in harmony with broader business objectives. Unlike traditional PMs, Product Leaders are responsible for high-level decision-making, resource allocation, and fostering innovation, which are essential for navigating complex product ecosystems in dynamic markets. Their activities are essential for maintaining coherence between a product's vision and its realization, an area that remains underexplored in existing literature. Future studies could delve deeper into this role, potentially through empirical research, to provide more detailed insights.

Need for Clear Role Definitions in Product Management Frameworks: The current product management frameworks present comprehensive activities, but often fail to clearly distinguish the specific roles and responsibilities of different types of PMs, such as Product Leaders, PMs, and technical PMs. There is a need to revise these frameworks to provide clearer definitions of each role and its associated responsibilities.

Evaluating the Criticality of the Activities: Furthermore, additional quantitative studies examining the importance of these activities would provide greater clarity on the role's overall scope.

Explore the Impact of Lean Product Management Practices on PM's roles and responsibilities: An important area for future research is the impact of Lean Product Management on the role and responsibilities of PMs in software development. While Lean has been extensively studied in the context of physical products, Lean's emphasis on value delivery remains underexplored in the software context. Future studies could examine how Lean integrates with Agile, its challenges in software environments, and its influence on PMs' roles. Addressing this gap would provide valuable insights into how Lean practices shape the evolving responsibilities of software PMs.

This study concludes the current state of PM's roles and responsibilities with limitations and future research recommendations.

8 References

- [1] Geracie, G., and Eppinger, S.D. (Eds.). 2013. *The Guide to the Product Management and Marketing Body of Knowledge (ProdBoK®)*. Product Management Educational Institute.
- [2] Haines, S., 2014. *The Product Manager's Desk Reference*. McGraw-Hill Education.
- [3] Steinhardt, G., 2017. *The Product Manager's Toolkit*. Springer.
- [4] Stark, J., 2020. *Product Lifecycle Management: Volume 1: 21st Century Paradigm for Product Realisation* (4th ed.). Springer. <https://doi.org/10.1007/978-3-030-28864-8>.
- [5] Kittlaus, H.B., and Clough, P.N., 2009. *Software Product Management and Pricing: Key Success Factors for Software Organizations*. Springer.
- [6] Kittlaus, H.B., and Fricker, S.A., 2017. *Software Product Management (ISPM)*. Springer. <https://doi.org/10.1007/978-3-642-55140-6>.
- [7] Kittlaus, H.B., 2012. Software Product Management and Agile Software Development: Conflicts and Solutions. In A. Maedche, A. Botzenhardt, and L. Neer (Eds.), *Software for People: Fundamentals, Trends and Best Practices*, pp.83-96. Springer. https://doi.org/10.1007/978-3-642-31371-4_5.
- [8] Bekkers, W., van de Weerd, I., Spruit, M., and Brinkkemper, S., 2010. A Framework for Process Improvement in Software Product Management. In A. Riel, R. O'Connor, S. Tichkiewitch, and R. Messnarz (Eds.), *Systems, Software and Services Process Improvement. EuroSPI 2010. Communications in Computer and Information Science*, pp.1-12. Springer. https://doi.org/10.1007/978-3-642-15666-3_1.
- [9] Cooper, R.G., 2008. Perspective: The Stage-Gate® Idea-to-Launch Process-Update, What's New, and Next-Gen Systems. *Journal of Product Innovation Management*, 25, pp.213-232. <https://doi.org/10.1111/j.1540-5885.2008.00296.x>.
- [10] Ebert, C., 2007. The Impacts of Software Product Management. *Journal of Systems and Software*, 80, pp.850-861. <https://doi.org/10.1016/j.jss.2006.09.017>.
- [11] Ebert, C. 2009. *Software Product Management. Crossstalk*, 22, pp.15-19.
- [12] Finch, D.J., Levallet, N., McIntyre, S.M., and Pyde, K., 2023. What makes a product manager? A dynamic capabilities view of product management. *International Journal of Product Development*, 27(3), pp.213-244.
- [13] Fricker, S.A., 2012. Software Product Management. In A. Maedche, A. Botzenhardt, and L. Neer (Eds.), *Software for People: Fundamentals, Trends and Best Practices*, pp. 53-81. Springer.
- [14] Jansen, S., Popp, K.M., and Buxmann, P., 2011. The Sun Also Sets: Ending the Life of a Software Product. In B. Regnell, I. van de Weerd, and O. De Troyer (Eds.), *International Conference of Software Business*, pp. 154-167. Springer. https://doi.org/10.1007/978-3-642-21544-5_13.
- [15] Kitchenham, B., and Charters, S., 2007. Guidelines for Performing Systematic Literature Reviews in Software Engineering. Technical Report EBSE-2007-01, Software Engineering Group, School of Computer Science and Mathematics, Keele University. [online] Available at: <https://www.el-sevier.com/_data/promis_misc/525444systematicreviewsguide.pdf>.
- [16] Lyonski, S., and Woodside, A.G., 1989. Boundary role spanning behavior, conflicts and performance of industrial product managers. *Journal of Product Innovation Management: an international publication of the product development and management association*, 6(3), pp.169-184.
- [17] Lyonski, S., 1985. A Boundary Theory

- Investigation of the Product Manager's Role. *Journal of Marketing*, 49, pp.26-40. <https://doi.org/10.1177/002224298504900103>.
- [18] Maglyas, A., Nikula, U. and Smolander, K., 2013. What Are the Roles of Software Product Managers? An Empirical Investigation. *Journal of Systems and Software*, 86, pp.3071-3090. <https://doi.org/10.1016/j.jss.2013.07.045>.
- [19] Maglyas, A., Nikula, U., Smolander, K. and Fricke, S.A., 2017. Core Software Product Management Activities. *Journal of Advances in Management Research*, 14, pp.23-45. <https://doi.org/10.1108/JAMR-03-2016-0022>.
- [20] Maglyas, A., Nikula, U. and Smolander, K., 2012. Comparison of software product management practices in SMEs and large enterprises. In *Software Business: Third International Conference, ICSOB 2012, Cambridge, MA, USA, June 18-20, 2012. Proceedings 3*, pp.15-26. Springer Berlin Heidelberg.
- [21] McDaniel, C. and Gray, D.A., 1980. The product manager. *California Management Review*, 23(1), pp.87-94. <https://doi.org/10.2307/41164908>.
- [22] Parikh, N., 2024. Unveiling the Role of AI Product Managers: Shaping the Future. *TechRxiv*. <https://doi.org/10.36227/techrxiv.172504030.01820212/v1>.
- [23] Parikh, N.A., 2023. Empowering business transformation: The positive impact and ethical considerations of generative AI in software product management—a systematic literature review. *Transformational Interventions for Business, Technology, and Healthcare*, pp.269-293. <https://doi.org/10.4018/979-8-3693-1634-4.ch016>.
- [24] Springer, O. and Miler, J., 2018. The Role of a Software Product Manager in Various Business Environments. In *2018 Federated Conference on Computer Science and Information Systems (FedCSIS)*, pp.985-994. <https://doi.org/10.15439/2018F100>.
- [25] Springer, O. and Miler, J., 2022. A Comprehensive Overview of Software Product Management Challenges. *Empirical Software Engineering*, 27, Article No. 106. <https://doi.org/10.1007/s10664-022-10134-5>.
- [26] Tkalic, A., Ulfesnes, R. and Moe, N.B., 2022. Toward an Agile Product Management: What Do Product Managers Do in Agile Companies? In V. Stray, K. J. Stol, M. Paasivaara, and P. Kruchten (Eds.), *Agile Processes in Software Engineering and Extreme Programming. XP 2022. Lecture Notes in Business Information Processing*, pp.168-184. Springer. https://doi.org/10.1007/978-3-031-08169-9_11.
- [27] Tyagi, R.K. and Sawhney, M.S., 2010. High-Performance Product Management: The Impact of Structure, Process, Competencies, and Role Definition. *Journal of Product Innovation Management*, 27, pp.83-96. <https://doi.org/10.1111/j.1540-5885.2009.00701.x>.
- [28] Weerd, I., Brinkkemper, S., Nieuwenhuis, R., Versendaal, J.M. and Bijlsma, A., 2006. *A Reference Framework for Software Product Management*. Technical Report UU-CS, 2006(014).
- [29] Wohlin, C. 2014. Guidelines for Snowballing in Systematic Literature Studies and a Replication in Software Engineering. In *Proceedings of the 18th International Conference on Evaluation and Assessment in Software Engineering*, pp.1-10. Association for Computing Machinery. <https://doi.org/10.1145/2601248.2601268>.
- [30] COLLAB.NET VERSIONONE, 2018. The 12th Annual State of Agile Report. [online] Available at: <<https://www.qAgile.pl/wp-content/uploads/2018/04/versionone-12th-annual-state-of-Agile-report.pdf>>.
- [31] CPRIME, 2017. Scaling Agile Report 2017. [online] Available at: <https://www.cprime.com/wp-content/uploads/woocommerce_uploads/2017/09/cPrime-Scaling-Agile-Survey-17-Digital.pdf>.
- [32] Eriksson, M., 2015. The History and Evolution of Product Management. Mind the Product. [online] Available at: <<https://www.mindtheproduct.com/history-evolution-product-management/>>.
- [33] Levitt, T., 1965. Exploit the Product Life Cycle. *Harvard Business Review*, 43. [online] Available at: <<https://hbr.org/1965/11/exploit-the-product-life-cycle>>.
- [34] Lynn, R, 2023. Disadvantages of Agile. Planview. [online] Available at: <<https://www.planview.com/resources/articles/disadvantages-Agile/>>.
- [35] Pragmatic Institute, 2022. Pragmatic Framework™. [online] Available at: <https://www.pragmaticinstitute.com/wp-content/uploads/2020/08/Framework_Roles.pdf>.
- [36] SAFe, 2023. Product Management. [online] Available at:

<<https://www.scaledAgileframework.com/product-management/>>.

Effective Software Product Management.
[online] Available at: <<https://ispma.org/bok/>>.

[37] ISPMA, 2022. A Comprehensive Guide for

9 Appendix A

Table 4. Final Study Selection
(Source: Author's own research)

Source type	Author and year	Research Approach	Major focus
Journal article	Maglyas, et al. (2013)	Empirical research	Roles of software product managers
Conference paper	Springer and Miler (2018)	Interviews	Role of a software product manager in various business environments
Conference paper	Tkalich, et al. (2022)	Interviews	Agile product manager activities
Conference paper	Jansen, et al. (2011)	Interviews and Case studies	Ending the life of a software product
Journal article	Maglyas, et al. (2017)	Empirical studies	Core software product management activities
Conference paper	Bekkers, et al. (2010)	Action research/literature review/case studies/expert review	SPM competency model and maturity matrix
Book	Geracie and Eppinger (2013)	Product Management Community Collaboration	Body of knowledge (ProdBOK®)
Book	Kittlaus and Fricker (2017)	Research based	SPM body of knowledge (ISPMA BoK)
SAFe Website	SAFe (2023)	Industry-accepted SAFe practice	Agile Product Management
Journal article	Lyonski (1985)	Primary research based	Product Manager's boundary theory
Book chapter	Kittlaus (2012)	Primary research based	SPM and Agile software development
Journal article	McDaniel and Gray (1980)	Literature review	Product Manager
Journal article	Finch, et al. (2023)	Primary research based	What makes a product manager? A dynamic capabilities view of product management
Journal article	Lyonski and Woodside (1989)	Empirical study	Boundary role spanning behavior, conflicts, and performance of industrial product managers

Note. Please note that books are excluded from the literature review for the synthesis of product manager (PM) activities (refer to Appendix B).

10 Appendix B

Table 5. Activity Mapping to Common Naming
(Source: Author's own research)

No.	ISPMA naming	Different naming used by various sources	Explanation	Changed name
1	Market analysis	- User research (Springer and Miler, 2018) - Product discovery (product ideation) (Tkalich, et al., 2022) - Market Research (McDaniel and Gray, 1980)	ISPMA synthesizes well on all these concepts and comprises under the <i>Market Analysis</i> category	No change
2	-	- Proposing solutions (Springer and Miler, 2018) - Idea evaluation (mock-up, working prototype) (Tkalich, et al., 2022)	ISPMA consolidates solutioning with the Product Definition category. Geracie and Eppinger (2013) describes well to identify solution candidate via prototype validation, then create product definition. Hence, identify solution is separated out as an important activity to highlight	Identify solution
3	Customer insight	- Interacts with the customer (Tkalich, et al., 2022) - Gathering user feedback (Tkalich, et al., 2022) - Requirements identification (Bekkers et al., 2010)	ISPMA naming fits well	No Change
4	Positioning and product definition	- Strategic vision creation (Tkalich et al., 2022) - Product vision creation (Maglyas, et al., 2017) - Product vision and strategy (McDaniel and Gray, 1980)	ISPMA naming fits well However, Maglyas et al. (2017) proposed this category to change as vision creation. Here, both the terms are used for a better clarity and product vision is used instead of only vision to separate out from the company vision	No change
5	Ecosystem management	- Stakeholder management (Springer and Miler, 2018) - Engaging internal stakeholders (Tkalich, et al., 2022) - Cross-functional Leadership (McDaniel and Gray, 1980)	PMs collaborate with them cross-functional teams, instead of managing them. Hence, rename the activity to cross-functional collaboration	Cross-functional collaboration
6	Sourcing	- Make or buy decision (Bekkers, et al., 2010) - Acquiring resources (Tkalich, et al., 2022)	ISPMA naming and definition consolidates well on the resource planning and make versus buy decision regards to software components	No change

No.	ISPMA naming	Different naming used by various sources	Explanation	Changed name
7	Financial management	- Responsible for the profitability of the product (Tkalic, et al., 2022) - Partnering and contracting (pricing) (Bekkers, et al., 2010)	For simplicity, pricing is consolidated into the financial management category, and it is named as financial analysis	Financial analysis
8	Legal and intellectual property rights (IPR) management	- Project compliance (Tkalic, et al., 2022) - Partnering and contracting (service level agreements, intellectual property management) (Bekkers, et al., 2010)	The legal, IPR, and compliance-related activities are consolidated into a single category as they are related	Legal and compliance management
9	Performance and risk management	- Assessing risk (Tkalic, et al., 2022) - Product monitoring and adjustments (Tkalic, et al., 2022) - Post-launch evaluation and improvement (McDaniel and Gray, 1980)	Performance might be confusing with system performance; so, to be specific, product performance is used. Risk management applies to the entire product life cycle, so it is removed from the naming	Product performance management
10	Roadmapping	- Prioritizing projects or tasks (Springer and Miler, 2018) - Gathers and prioritizes features (Tkalic, et al., 2022) - Presents a prioritized product backlog (Tkalic, et al., 2022) - Requirements prioritization (Bekkers, et al., 2010) - Product roadmapping (Bekkers, et al., 2010) - Strategic planning (Maglyas, et al., 2017)	Universally accepted naming for a PM	No change
11	Release planning	- Define goals (Springer and Miler, 2018) - Communicates business needs to the development team (Tkalic, et al., 2022) - Decides release dates and content (Tkalic, et al., 2022) - Release definition (Bekkers, et al., 2010) - Release definition validation (Bekkers, et al., 2010) - Participating in sprint planning and reviews (Kittlaus, 2012) - Collaboration with product management on release planning (Kittlaus, 2012)	Universally accepted naming for a PM	No change
12	Product requirements engineering	- Analysis of requirements (Springer and Miler, 2018) - Requirements gathering (Bekkers, et al., 2010)	ISPMA naming is generally accepted, but more traditional. Geracie and Eppinger	Product requirements engineering or prioritized

No.	ISPMA naming	Different naming used by various sources	Explanation	Changed name
		- Requirements organizing (Bekkers, et al., 2010) - Managing the backlog (Kittlaus, 2012)	(2013) defines well with respect to Agile method (i.e., prioritized product backlog)	product backlog (in Agile)
13	Development execution	- Cooperation with the development team (Springer and Miler, 2018) - Individuals follow-up (Tklich, et al., 2022) - Supporting team delivery (Tklich, et al., 2022) - Product development (Maglyas, et al., 2017) - Scope change management (Bekkers, et al., 2010)	Many sources have confused the generic product development versus what PM is responsible for. The development execution is a stage of product life cycle and not the Product Manager responsibility	Supporting the product engineering team
14	Detailed requirements engineering	- Tactical planning (Kittlaus, 2012) - Just-in-time (JIT) story elaboration and acceptance (Kittlaus, 2012) - Product development and execution (McDaniel and Gray, 1980)	ISPMA naming looks universal, comprising all these activities. However, missing Agile-specific naming in or clause	Detailed requirements engineering or define user stories, acceptance criteria, and prioritized backlog (in Agile)
15	Quality management	- Build validation (Bekkers, et al., 2010)	Geracie and Eppinger (2013) naming looks more specific as PM's responsibility. ISPMA naming is a broader category	Product verification
16	Product launch	- Launch preparation (Bekkers, et al., 2010) - Training (Bekkers, et al., 2010) - Product launch (McDaniel and Gray, 1980)	PMs are not responsible for product launch itself. However, they are responsible for orchestrating the launch	Orchestrate product launch
17	Channel preparation value communication service planning and preparation	- Product support (Jansen, et al., 2011)	There were various activities related to the operations and support readiness, which are consolidated into a single category instead of having many	Operations readiness
18	-	- Product end-of-life (Jansen, et al., 2011)	ISPMA framework did not define any category for end-of-life, so the new category is created	End-of-life plan