The Transformation of Software Product Management and The Role of Product Manager in the Age of Generative AI

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Dedication

This work is dedicated to those who have been my constant source of strength, inspiration, and guidance.

To the memory of my late father, Arun Goel, whose strength, work ethic, and quiet wisdom laid the foundation for everything I strive to achieve. He may be gone, but his spirit and guidance continue to inspire me.

To my mother, Rita Goel, whose belief in me and endless blessings have guided me every step of the way.

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Abstract

The Transformation of Software Product Management and The Role of Product Manager in the Age of Generative AI

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In the era of rapid technological advancement, generative artificial intelligence (GenAI) is reshaping the landscape of software product management (SPM). This dissertation explores the multifaceted impact of GenAI on the role of product managers, team dynamics, ethical considerations, and the software development lifecycle. Through a mixed-methods approach involving quantitative surveys and qualitative interviews with over 100 professionals across diverse industries, the study investigates how GenAI adoption influences collaboration, decision-making, and strategic planning.

The findings reveal that GenAI significantly enhances team efficiency, creativity, and stakeholder satisfaction by automating routine tasks, accelerating prototyping, and enabling data-driven insights. Product managers are transitioning into AI-augmented strategists, requiring new competencies in prompt engineering, ethical oversight, and cross-functional collaboration. The study also highlights the ethical challenges posed by GenAI, including data privacy, algorithmic bias, and regulatory compliance, emphasizing the need for robust governance frameworks.

By integrating theoretical models such as the Technology Acceptance Model (TAM), Innovation Diffusion Theory, and Socio-Technical Systems Theory, the research provides a comprehensive framework for understanding and guiding the responsible integration of GenAI in product management. The dissertation concludes with actionable recommendations for organizations to upskill teams, redefine workflows, and foster ethical AI adoption.

Keywords: Generative AI, Software Product Management, Product Manager, Agile Product Development, Prompt Engineering, AI Adoption

"The best way to predict the future is to invent it." — Alan Kay

Table of Content

List of Figures

List of Tables

Chapter 1: Introduction

1.1 Overview

The domain of software product management is now experiencing significant disruption due to the advent of generative artificial intelligence. This shift presents several new possibilities and difficulties. The ongoing revolution is prompting a reevaluation of the product manager's role in several aspects. This activity aims to minimize the time necessary for the processes involved in product production.Thanks to the usage of prototypes and mockups produced by artificial intelligence, product managers can easily test concepts and, consequently, prototyping can be fastened. This also allows product managers to hasten concept testing. Generative artificial intelligence can be used to improve product roadmaps by analysing user feedback and making recommendations on features to prioritize. This can lead to a smooth backlog, hence, improving product road maps. This must help save time in communication between the design engineering and marketing departments as the outputs produced by artificial intelligence are an available methodology.

Generative artificial intelligence and its impact on software product management has become an important research topic, and a vibrant area of study within the field. The field is a combination of concepts in technology, business and human-computer interaction to assess their role in the environment surrounding the issue under study. Many reports have highlighted how the use of AI-based solutions like those of OpenAI (Codex) and Google (Bard) (Gemini) are transforming the traditional workflows through the automation of activities like code, documentation, and market research. Several studies have been done on these technologies. The revolution created by these technologies is triggering a change of traditional processes. According to the results of the study, the time spent by the software solutions to penetrate the market has reduced substantively because of the efficiency achieved through artificial intelligence. This is the conclusion that can be made based on the findings of the study. The challenges that are linked to the ethical application of artificial intelligence are widely researched over the years. The experiment was conducted to understand the application of product managers in the identification and removal of the prejudices. These roles cannot be done without their role. Their involvement needs to be analyzed. The Kingston, J. (2017) states that the laws comprise the General Data Protection Regulation (GDPR), California Consumer Privacy Act (CCPA), and the Artificial Intelligence Act (AI Act) all of which are currently

undergoing evolution. Other examples are the AI Act and other numerous rules. Studies have revealed that there is a necessity to conform to such limitations.

As seen in many studies, the artificial intelligence production is a particularly efficient method of the development of the customized customer experience. Interactive changes within the interface and suggestions of materials are provided in this area. The present contextual research uses a wide range of researches methodologies to explain the level of confidence people have in artificial intelligence systems in general. The topics that are frequently discussed revolve around transparency and customer trust towards aspects led by artificial intelligence. This paper will highlight the issues related to finding quality data to train generative artificial intelligence models.

This study explains how this challenge affects the development of the features. Studies have been conducted to analyze the financial prospects of generative artificial intelligence integration in software applications. These researches have particularly focused on the implications that will be faced by startups and small businesses. The topic of exploration of the intersection of generative artificial intelligence and product management is gaining traction as a rapidly developing research field with major consequences to the practical uses of the field.. Currently, the focus is on the many ways artificial intelligence may transform processes, decision-making, and user engagement. In the course of the future, it is anticipated that the study will dive more deeply into the long-term ramifications, social implications, and the co-evolution of human roles alongside applications of artificial intelligence. This is a projection that has been made.

1.2 Introduction to Software Product Management and the Role of Product Managers

As per the study in Mannuru, N.R., Shahriar, S., Teel, Z.A. et al. (2023), Generative artificial intelligence is a testimony to the revolutionary potential that artificial intelligence may possess at the time when the Defense Advanced Research Projects Agency (DARPA) is contemplating whether or not to shift from the second wave of advancements in artificial intelligence to the third wave in 2023. This particular occurrence takes place at the very time that DARPA is in the process of carrying out the transition decision. For the third generation of artificial intelligence, it is anticipated that it would be able to identify unexpected circumstances and react properly to them in a manner that is analogous to the way that humans think.

To be more specific, this is a prediction that has been produced. The first generation of artificial intelligence, on the other hand, was founded on rules that were preset. On the other hand, the second generation of AI used applications that utilize machine learning and deep learning. If we compare this to the first generation of artificial intelligence, we can see that there is a big difference. As per the study in Anantrasirichai, N. & Bull, D. (2021) Through the use of deep learning frameworks like Generative Adversarial Networks, generative artificial intelligence has the capability to generate one-of-a-kind content, whether it be text, photographs, or instrumental music. An application of GANs should be used in order to accomplish this goal. As a result of this, it is able to separate itself from the other two categories of technologies that go under the umbrella of artificial intelligence. Through the dissemination of each new piece of information that we uncover on this interesting topic, we have the potential to open up tremendous chances for the revolution in technology.

The phrase "*Generative AI*" denotes computers capable of producing wholly unique data, including images, text, or audio. A prevalent technique is acquiring insights from a significant volume of input data and generating output that demonstrates the patterns or attributes identified within that data. This can be accomplished without sacrificing precision. OpenAI's conversational AI system ChatGPT and their creative visual AI DALL-E2 exemplify how prominent technology businesses have garnered public interest in artificial general intelligence (AIGC) in recent years. These two examples represent just a fraction of many cases. As per Cao, C., and colleagues (2023) The advancement of deep generative artificial intelligence, based on neural networks, has led to significant improvement in these models during the last decade due to the evolution of neural networks. The generative adversarial network, often known as GAN, is the kind of generative artificial intelligence that has gained the most prominent level of recognition. To produce content of superior quality, it is composed of two neural networks that compete with one another. According to Radford et al. (2021), there are also additional examples of generative artificial intelligence systems that have shown specialized ability in the production of literary output that is similar to that produced by humans. These systems consist of variational autoencoders (VAE) and transformers, with OpenAI's GPT-3 serving as an example of the former.

Based on Dehouche, N. (2021) Software product management is defined as the coordination of all activities that are related to the production, release, and maintenance of software. This coordination is included in the definition of software product management. The existence of this component is directly linked to the success of any software firm that is now

operating. Those software product managers who are well-prepared to tackle the difficulties of product strategy, planning, development, and management are those who correspond to the criteria defined by the International Software Product Management Association (ISPMA).

These were intended as guidelines for optimizing the execution of computer product management. The ISPMA was the organization responsible for formulating these concepts. Software product management is a strategy that entails the effective optimization of product features, prioritization of requirements, coordination of cross-functional teams, and overall efficient management of the product lifecycle to align with the company's objectives and customer needs. The international software product management association (ISPMA) seeks to offer software product managers with an overarching framework that promotes innovation and collaboration, as well as maintain success in the rapidly changing software sector. The research outlines the overall mission statement of the company. To do this efficiently, it is essential to concentrate on three domains: user centrality, value creation, and agile approaches.

The software product management roles are relatively diverse. Other than support and services, the jobs are related to market research, product analysis, formulation of product strategy, product development planning, executing the marketing and sales operations, and management of product development. These are a few examples of the various professions that are encompassed. A professional software product manager bases their work on many factors such as an understanding of customer requirements, up-to-date business trends, and most advanced technological breakthroughs. Adaptability to changing market conditions is another aspect. Generative artificial intelligence is a revolutionary technology that may enhance decision-making and quality of products in software product management. GenAI can potentially develop ways to achieve considerable utility on a large scale.

This study seeks to provide an overview of studies concerning the application of generative artificial intelligence in software development management, notably focusing on the function of a software business manager in the implementation process. This article provides a comprehensive overview of how generative artificial intelligence might transform the software product management sector and its many subfields. The article also includes a discussion on the ramifications of this transformation. The next section provides a summary of the pertinent literature linked to this review, followed by an analysis of the pros and drawbacks of using generative artificial intelligence in software product management, along with a comprehensive description of all important aspects.

A substantial amount of study has been undertaken in the field of software engineering regarding software product management, excluding the particular duties and obligations linked to this function. Based on the work by Kilpi, T. (1997) The phrase "software product management" was introduced to the public in 1997. Product management is a function previously discussed, leading a software company to adopt the concept of designating a single manager to champion and assume responsibility for a product. This pertains to the product management role.

According to the information provided by L. Gorchels (2006), it is the responsibility of the software product manager to expand the configuration management of code and software artifacts to include delivery data, customer data, and change requests. Software product management is a discipline that is now regarded as the connection between the business sector and the area of software engineering. This is because software manages software products. The findings of a significant amount of study lend credence to this assertion. As stated in the article by A. Maglyas et al. (2005), the authors clarify that the success of a product is based on all of the activities that are involved in its production. These activities include but are not limited to strategy and marketing, product launch, customer support, and product launch. According to the authors, companies can significantly reduce the amount of time it takes for the development and release cycle by improving their overall product management processes, which include managing software product management.

This is one of how businesses may do this. In C. Ebert (2007), the authors acknowledge that the product manager is the primary individual responsible for product requirements, release definition, and product release. Additionally, the product manager is responsible for the creation and support of development teams, as well as the preparation and implementation of a variety of business cases. The term *"software product management"* is described as a discipline that comprises the processes of designing, delivering, and managing software products and systems, according to the findings of another piece of study. The information that is supplied indicates that the product manager is accountable for the business case and who is responsible for ensuring that a product release delivers the expected value to both the firm and its customers.

Engineering is to find solutions to problems and put in the best approach to the issue at hand. As for the engineering of software intensive systems which are ones in which software plays a role in the design, construction, deployment and evolution of the system M.B. Goncalves and co. (2014) report this to include requirements engineering, architecture design,

software development, software implementation, testing and validation of the system and also putting the system into the hands of customers. Also, this is what to put out and very importantly why we are building the system in the first place. This is related to one of the other activities. In terms of what is done in engineering which is a matter of "how" to put together systems this is in contrast to what is described. Engineering is about building the systems. In the discussion of this action the term product management is the one which is used the most to explain it.

In that which product management includes and the function of a product manager has been the focus of in-depth study which has transpired over a great length of time. An article by C. Ebert (2014) reports that the role is of great importance and that a product management which is consistent and empowered has very great chance to see an increase in project success in terms of timeline, predictability, quality and project duration which is what the authors report. Also, in the study done by M.B. Goncalves et al (2014) it was put forth that the product manager is very much the "mini-CEO" of an organization. This is because they are at the core of the organization which they in turn use to facilitate communication between all stakeholders to ensure that all are working towards the same goal. What they are able to do is the reason. Also, in the work of Pattyn, F. (2023) we see that good product management strategies have the tendency to improve resource management. Which in turn may lead to greater corporate growth, better budget control, greater user happiness, improved release predictability and faster release cycles. That which the use of these strategies may bring about all of these positive results which are very good.

According to FL. Gorchels (2011), product management is the job that is responsible for identifying what the product is, how it operates, who it serves, and how it influences the organization as well as the consumers of the company. Since it is the role of product managers to establish the value of any solution, they must have a comprehensive knowledge of the consumer. F. Stallinger and R. Neumann (2012) explain significant product management methods within the context of a framework that incorporates management procedures, support processes, and activities that are part of the software lifecycle. Performing this action is done to deliver a full presentation on the topic of matter.

An increasing amount of focus has been put over the last several years on the acquisition of more in-depth knowledge of the function that product management plays in agile enterprises, particularly in connection with product owners. Even though the authors of the paper A. Tkalich and colleagues (2022) make it clear that the product owner must represent the

consumer, they also point out that this perspective may not be enough. One of the things that is required is to have a manager who is not only capable of rapidly experimenting with the delivery of those features but who is also dedicated to the process of carefully selecting features that maximize the value of the product. This is one of the things that is essential.

A discipline that can generate such a flow is product management, and the authors of the article offer information about how it is possible to achieve such a flow. Product management is an example of this. The term *"product manager"* refers to a person who is responsible for the consistent production of product portfolios and the maintenance of a connection to the requirements of customers. In the context of the product manager, this is the position that is established. The findings that the authors have found have led them to the conclusion that the most crucial aspect of the product manager's work in agile development is to ensure that the products are continually connected with the expectations of the market. This is the conclusion that they have arrived at.

Comparatively the article which was put out by K. Vlaanderen and co-authors (2011) reports on the role of the product manager in agile companies and also goes into detail how tools like SCRUM are used which in turn support product managers in software companies. To improve the which is the issue of dealing with a great deal of complex requirements in a setting that is supportive of agile software development the authors present an agile approach which in turn does that. Also, what we see is that this role is of increasing importance as reported by the study we looked at which also supports this. It is beyond question that the role is of great importance as that which was reported by the early study we looked at.

1.3 Statement of the Problem

There in many factors which have brought about the growth of generative artificial intelligence in the field of software product management. We see in this also the adoption of any new technologies which come up. We have process improvement, better complex data processing, and the replacement of manual work which is what we are seeing play out. But with great growth comes great challenge which product managers and companies must solve to fully tap into what these artificial systems have to offer. The fast pace of artificial intelligence development is what is at the root of present issues and uncertainties. It is also important to note that what is being researched into is the design of frameworks and formulation of strategies and processes that will in turn give product managers what they need to succeed in the age of

generative artificial intelligence. The tasking environment that has been the source of the problem can be linked to the following problems:

1.3.1 Problems with Literacy in the Field of Artificial Intelligence

Most of the time product managers lack certain fundamental technical skills that would allow them to fully utilize the opportunities that generative artificial intelligence offers. Thus, as a result, this leads to a lack of comprehension of AI-powered technologies, which then affects their ability to make sound decisions on how to strategically integrate AI into the products they develop.

1.3.2 Considerations to Make Regarding Regulatory and Ethical Issues

The use of generative artificial intelligence brings light significant difficulties with the protection of data privacy, the elimination of algorithmic bias, and the management of compliance with ever-increasing regulations. Even though it is the job of product managers to guarantee that artificial intelligence initiatives conform to ethical standards and legal duties, a significant number of them do not possess the resources or frameworks that are required to properly carry out this task.

1.3.3 Concerns Regarding Artificial Intelligence and Human Collaboration

It is possible that the implementation of generative artificial intelligence would lead to confusion about the allocation of responsibilities between humans and computers, even though it can automate a significant number of tasks. When it comes to the most efficient methods for product managers to collaborate with artificial intelligence to maximize production without compromising the human touch, there is a lack of defined standards that have been established.

1.3.4 There is a lack of effective methodologies

The frameworks that are already in place for product management cannot fully include processes that are driven by artificial intelligence. This leads to inefficiencies in the design, development, and deployment of products that are enhanced by artificial intelligence. This is because teams have a tough time changing from previous practices, which results in inefficiencies.

1.3.5 Concerns Regarding the Trustworthiness and Transparency of Users

In situations when the methods that are behind the qualities that are generated by artificial intelligence are not visible, individuals often express cynicism regarding such features. To develop trust and confidence in artificial intelligence systems, product managers need tactics; yet these strategies are not clearly defined in either the existing research or in practice.

1.3.6 Impositions of constraints brought about by the economy and the organization

The high expenses that are involved with building generative AI solutions are a barrier to the widespread adoption of these solutions. This is even though businesses are averse to change. Product managers are responsible for demonstrating the benefits of innovations that are powered by artificial intelligence as they traverse these constraints inside their organizations.

1.4 Significance of the study

The results, concerning the evolution of software product management and product managers at the age of generative artificial intelligence, are very important from theoretical as well as practical points of view. The study will help professionals, organizations, and academicians to develop insights and tools in their pursuits to remodel their goals and objectives in a dynamically changing landscape scenario of AI-led software development.

1.4.1 Increasing the scope of knowledge in terms of product management.

The paper aims to revise the evolving nature of the product manager position and its impact on the influence of generative artificial intelligence and provide a list of skills and competencies that would be mandatory in this new reality. It will also add to the past literature, being a subset of the past efforts of introducing fronting concepts behind the use of generative AI in software development and proper coverage of relatively less discussed matters on the long-term consequences, ethics, and optimal integration behavior.

1.4.2 Implications for the Development of Product Managers' abilities

This paper attempts to throw light on how product managers develop skills by listing down those tools and capabilities that are most imperative in managing products enhanced by

artificial intelligence. To fulfill this purpose, it is adequate to list the required tools and talents. As a result, it will enable product managers to incorporate this technology into the product development processes effectively and ethically. They will have basic knowledge and training on how to make sure that artificial intelligence is used in ways that maintain user trust as well as all relevant regulations being complied with; this integration will be acquired through the proposed curriculum.

1.4.3 Advantages for Organizations Increased Productivity

The results of this study shall be used by companies in improving product management techniques consequently lessening the time it takes to deploy AI-enabled software products. If organizations learn the best way to use generative artificial intelligence, they will get a competitive advantage from innovations and personalization that can be derived therein. This security concern may also be mitigated through AI-assisted research via the development of a framework that will help the stakeholders navigate all aspects of ethical, legal, and operational risks pertaining to artificial intelligence.

1.4.4 Giving users and stakeholders more power to interact with the system

To formulate strategies for designing AI-based solutions according to human needs, preferences, and sentiments of trust toward the users, this framework will guide findings. This new upgraded user experience is expected as a direct result of better engagement from users once these solutions are implemented successfully. When an organization has information on how it can build up user trust in artificial intelligence technology, it can then work towards clearing up all doubts and creating a much stronger bond with its clientele; hence providing even better service to its users. The study will also result in recommendations on how to alter the approaches to product management that have been progressively demanded because of the shift in normative and ethical standards concerning artificial intelligence. It will compose the fifth volume of this work under the title, Contributions to AI Governance, which highlights the need of Bias, Fairness, and Accountability in applications of Artificial Intelligence. This venture will also be undertaken during the process of conducting the research.

1.4.5 Contributing to the Guidance of Future Research

The research will make contributions to the future studies on human-AI collaboration and sustainable AI development by considering the potential long-term effects of generative AI in product management on the society. New spheres of research will also be motivated as a consequence. Integration of the knowledge of the technology, business, and ethics aspects will secure transversal sectoral cooperation across the various pillars to solve the problems and exploit the opportunities that artificial intelligence introduces.

The research is important since it will fill a significant knowledge gap on how generative artificial intelligence (AI) alters the product management strategies. It also equips the professionals with skills and strategies that are inevitable in this transitional stage. These stakeholders, i.e., practitioners, organizations, consumers, and policymakers, will be interested in the results of the study as they will motivate innovation but make the introduction of artificial intelligence responsible and user-centered.

1.5 Research Questions

1. What can product managers do to responsibly integrate generative AI into the projectile of the software product management practice into greater efficiency, ethical concordance and user-friendly offerings?

2. How can generative AI solutions find a seat in long-established product management systems to transform processes and decision-making?

3. What are the primary challenges that product managers face in their pursuit of using generative AI technologies, and how can it be done that the obstacles become adeptly managed?

4. What is the long-term repositioning of product managers by generative AI, and what impact would it have on software development lifecycle?

1.6 Hypotheses

i. The relationship between AI literacy and technical skills gained by product managers and their performance in implementing generative AI in strategic decision-making and ethical control in product management processes is significant.

ii. ii. Organizational investment in training product managers and the effects of generative AI tools and methodologies on the easier uptake of AI technologies are significantly impacted.

iii. iii. The adoption of generative AI has led to a strong growth of new frames and ways of approach to software product management, transforming the product development cycle.

iv. There is a significant enhancement in the competitive advantage of organizations that successfully incorporate generative AI into their product strategies over time.

1.7 Limitations, Delimitations, And Assumptions

1.7.1 Limitations

The following limitations in this study about software product management in the era of generative artificial intelligence indicate that the study will have certain limitations that can affect the scope of the study as well as the conclusions and the generalizability of the results:

- **Innovation of New Technologies.**

  Equipment, methods and ideas presented in this paper can be replaced by more modern technology due to the fact that the field of Generative Artificial Intelligence has tremendously gained momentum. The second weakness is that the differences in maturity levels, capability levels, and adoption rates only exacerbate the attempts in the field of generalizing the results with other tools and situations**.**

  ● Diversity in Contextual Factors.

  The variation of the industry in the effect of generative artificial intelligence on the product management practices may vary significantly across industries, limiting the transferability of this study to other fields not related to software development. Although the realization that the integration of generative artificial intelligence might depend upon the size, culture, and resources of the organization is acknowledged, there is also the possibility that such study has failed to differentiate the factors under consideration variably in detail.

  ● Data related constraints.

. The research might not be able to delve into details because of the inability to access proprietary organization data, case studies, or user perceptions. Because it relies on publicly available data, and a survey, as well as an interview, which in itself, can be the carrier of the biases, since people would give the false answers either by not narrating the entire story or responding subjectively.

- **Differences in Ethical and Regulatory Considerations**

  Ethical and regulatory implications of AI vary by area and the research might not capture all of them, limiting its applicability to many areas. Alterations to the laws and ethical norms regarding artificial intelligence during or after the study period of the research can affect the importance of the results.

- **Constraints imposed by time**

  The research paper focuses mainly on the immediate and immediate effects of generative AI, which restricts its capacity to discuss the effects of AI in the long term on product management practice and organizational functions.

- **Concentrate on the Management of Products**

  Although the research is specific to the role of product managers, it does not fully address the role of generative AI on other functions of a product development team, including an engineer or designer.

- **Restricted Access to Resources**

Due to the financial issues, this research may only consider popular generative AI tools and/or accessible technology. Financial constraints might prevent the possibility of conducting the fieldwork in most areas.

These constraints are addressed to the challenge of researching such a dynamic and large area as generative AI in software product management. Consideration of these limitations will also lead to careful interpretation of results and it prepares a platform on which more comprehensive follow-on studies will be conducted.

1.7.2 Delimitations

Delimitations are the limits and boundaries of this research that do gain attention and direct the focus of the study to be based on the systematic investigation of the role of software

product management and the role of product managers in generative artificial intelligence. This paper was specifically made to offer narrow but concrete analysis. The delimitations are deliberate decisions that are made to ensure that feasibility and applicability of research process remain under control. It is again pointed out here that the area of this research is strictly within the area of software product management and does not encompass relevant areas like hardware manufacturing, industrial manufacturing or even non technical areas of product management practices. The changing position that the product managers were mandated to take is put at the forefront as opposed to big organizations or end-users.

This paper is not to enter into the areas of specialization or high technology artificial intelligence applications; it is the effect of the popular generative AI applications, including Chat GPT, Gemini, Perplexity, and DALL-E. The paper provides a description of how these tools have impacted some of the aspects and puts more emphasis on the practical application of generative AI that involves automation of processes, data analysis and personalization of user experiences and avoids speculative or experimental uses of artificial intelligence. The contemporary study is majorly devoted to those areas in which the application of Generative Artificial Intelligence has been majorly embraced. These are North America, Europe and some selected parts in Asia. This does not cover those countries that still have not yet adopted AI or whose adoption is still in its infancy stage. Although artificial intelligence laws are being adopted worldwide such as General Data Protection Regulation (GDPR) California Consumer Privacy Act (CCPA), but specific country laws, or customs are not addressed.

Most of the study is on medium to large firms that have been able to successfully implant a software product management team within their firms, though it notes that some smaller firms might have different concerns that go unaddressed. Though the primary focus is software product management, therefore results may not be entirely applicable to firms whose products are more dependent on AI technologies due to a narrower focus of research.

To allow a lucid and concentrated inquiry, the purpose of these delimitations is to make an effort at balancing depth with practicality so as to permit an inquiry that can be intensive. The researchers hope to be able to drop actionable insights and for this reason, they wish to keep the study's scope tight even as they would want subsequent studies on matters outside this particular investigation's parameters.

1.7.3 Assumptions

This research is predicated on assumptions that underpin the analysis of the development of computer software product management and the progression of product managers in the age of generating artificial intelligence. The subsequent assumptions are deemed suitable given the study's scope and context:

- **Generative AI Adoption**

  It is expected that the development of artificial intelligence will expand into a number of industries, which is why this issue is a relevant and valuable topic of discussion. This is based on the expectation that the application of artificial intelligence that produces would continue its growth. Generative artificial intelligence is expected to be applied in a variety of areas in software product management, such as task automation, decision-making support, and user experience.

- **Role of Product Managers**

  Product managers play one of the most significant roles in the integration of artificial intelligence into the management process of the product, which allows adopting and monitoring the implications. At this point, product managers will play a vital role in integrating AI. Product managers are also expected to be open to acquisition of new skills and use of technologies driven by artificial intelligence**.**

- **The Readiness of the Organization**

  Availability of resources: It is assumed that organizations will offer resources, such as time, finance, and training, to make the adoption of generative artificial intelligence possible and ensure its effective utilization. Enabling Ethical Artificial Intelligence Practices Organizations are well known to focus on ethical practices and regulation in regards to AI more than anything else**.**

- **The Dynamics of the Market and Users**

.Individualisation is driven by the fact that, when more consumer desire is desired, then a personalised and efficient software solution can be used, which generative AI may be able to provide. Skepticism of Consumers: It is assumed that consumers would show some sort of skepticism in relation to AI-driven goods; therefore, it is necessary to devise methods that would lead to trust and transparency.

- **Functionality of Existing Technologies**

It is generally accepted that the generative AI tools will be reliable and offer outputs that are sound, applicable, and aligned with the purposes they were developed. Scalability of Artificial Intelligence Solutions: It has been proved beyond a doubt that generative AI solutions would be scalable to meet the requirements of multiple businesses irrespective of its size or industry.

- **The Environment in Terms of Ethics and Regulations**

  This paper assumes that the ethical responsibilities, transparency, and justice principles apply to the generative artificial intelligence systems in everything. It is assumed that organizations have a motive to comply with the existing and new AI laws, despite the changes in the requirements.

- **The scope of the research and the participants**

Expertise Participants in interviews, surveys, or case studies are presumed to possess expertise and experience in product management and generative AI. It is presumed that the participants would provide accurate and honest insights into their experiences and perspectives. The correctness of the replies is predicated to this assumption.

1.8 Definitions of Terms

- **Artificial Intelligence (AI)**: Artificial intelligence is the process of emulating human intellect in computers via the implementation of code that allows them to think, learn, and make choices. Regarding the real-time management of this illness, artificial intelligence is a technology capable of effectively monitoring the virus course, identifying those at high risk, and providing aid in this endeavor. An accurate study of patients' historical personal data may forecast the chance of mortality. According to Vaishya, R. and colleagues (2020) Artificial intelligence may aid in the fight against this infection. This may include population screening, medical support, notification, and guidance on infection management.

- **Generative AI**: The term *"generative artificial intelligence"* denotes computer techniques capable of producing novel and significant information, such as text, images, or audio, derived from training data. A revolution is now occurring in our methods of work and communication due to the widespread use of technologies such as Dall-E 2, GPT-4, and Copilot. Generative artificial intelligence systems may be used

for creative reasons, such as creating new text that mimics authors or new graphics that resemble illustrators. Additionally, these systems have the potential to aid people as intelligent question-answering systems, and they will do so in the future as mentioned in Stefan Feuerriegel (2024).

- **Product Management (PM):** The goal of product management is to function as a business process assistant by leading a product from the time it is conceived until the moment it is delivered, with the idea of maximizing the amount of value that is generated for the company. This is the objective of product management. Ineffective product management can result in the ongoing modification of product requirements or the scope of the project, inadequate preparatory planning for development, and product flaws after the product has been launched. All of these incidents have the potential to have an impact on the overall image of the product as well as the company Patel, D.A., and colleagues (2023). According to Ebert (2014), all of these are possible consequences that might occur as a result of inefficient product management.
- **Product Manager (PM):** Product managers are professionals who are responsible for effectively guiding the success of a product by managing the product lifecycle, setting the vision, and prioritizing features, as stated by Patel, D.A., and colleagues (2023). Product managers are liable for ensuring that a product is successful.

1.9 Background of the Study

A paradigm change is happening due to the emergence of generative artificial intelligence, which facilitates the generation of new content and automates complex procedures. The process of creating new content and automating complex processes is driven by the emergence of generative artificial intelligence, which is causing a paradigm shift. Generative artificial intelligence has emerged as an important part of an innovation as demonstrated by natural-language chatbots and AI-centered tools that are able to now write code. The revolution does not only affect the software developing process but radical changes the conceptualization, administration and delivery of software. Software product management has conventionally focused on product life cycle planning, development and management. However, it is currently shifting to AI solutions. Generative artificial intelligence-based products, such as Open AI GPT models, DALL-E, and Copilot, as automation and creativity improvement and predictive

features, play an important role in the role of a product manager within a product development process.

● **Routine Tasks Automation:** The term generative artificial intelligence is improving the efficiency of process such as requirements gathering, the development of user narratives, and the development of prototypes. This enables the project managers to concentrate on major decisions.

● **Data-Driven Decision Making**: The technologies of artificial intelligence offer valuable information through the processing of massive data about users and the market. This enables the project managers to be more data-driven and precise in decision-making.

● **Personalization and Customer-Centric Design:** Artificial intelligence helps to develop unique user experiences, thus improving satisfaction and engagement.

● **Difficulties in Ethical and Regulatory Behaviour:** The adoption of generative artificial intelligence has created more liabilities in the work of the project managers such as ethical concerns such as bias, openness, data security, and adherence to international regulations.

The present research evaluates how the technical advancement affects the management of software products with reference to the role of a product manager that is becoming more and more dynamic. The paper attempts to clarify the opportunities and challenges that generative artificial intelligence holds to project managers and offers a template into how best it can be utilized.

1.9.1 The Role of Artificial Intelligence Product Managers

The change that artificial intelligence has introduced in the various fields is creating unprecedented needs in AI-driven products. The application of artificial intelligence in the production of goods is picking up pace, with the artificial intelligence market across the world expected to grow at an average rate of 19.1 per year between the year 2024 and 2034. The market is expected to hit a cumulative worth of 538.13 billion US dollars in 2023. There is a high failure rate because of the uncertainty surrounding the responsibilities of product managers in artificial intelligence technology. Although artificial intelligence has been acknowledged to have a considerable potential, it is a serious and enduring challenge. Only a quarter third of products developed with the help of artificial intelligence make it to the manufacturing process. As a result, the deep knowledge of AI project managers is required especially when it comes to failure caused by poor business processes as described in both T. Tse, M. Esposito and others (2020) and R. G. Cooper (2024). These problems mostly result from ineffective corporate operations. This study seeks to address this gap by concentrating on the expanding duties, challenges, skills, and attributes of artificial intelligence project

managers. This study seeks to improve the development of efficient artificial intelligence products across many sectors and expand their size.

Understanding the problems connected with the administration of artificial intelligence products is essential for several reasons. The proliferation of artificial intelligence technologies across several sectors has led to an increased demand for products using these technologies. This necessitates that product managers have proficiency in directing the creation of these objects, which need a distinct methodology compared to those often used for traditional software products. The creation of such items requires a unique strategy. Numerous academics have undertaken studies on the use of artificial intelligence in product management as per L. Wang and colleagues (2021); N. A. Parikh (2023); R. G. Cooper (2024); and D. O. Ogundipe and colleagues (2024). These researchers have published their findings in a variety of places. On the other hand, they do not explain how it impacts the activities and responsibilities of the Product Manager, nor do they address the changing landscape of product managers who work with AI products. Neither of these things are addressed. As a result of the fact that it allows us to separate the process of algorithm creation, an artificial intelligence product is an important abstraction that contributes to the overall administration of labor. Taking this into consideration, the product that is based on artificial intelligence is an algorithmic solution that can be used and evaluated in a wide range of different usage scenarios. As a result of this, according to W. Verleyen and W. McGinnis (2022), we are in a position to concentrate on the basic innovations in computational science and to develop a product portfolio for artificial intelligence.

The applications of artificial intelligence have significant implications from an ethical standpoint.N. A. Parikh (2023) states that there are a few underlying ethical issues which should be considered. These issues are governance, fairness, data privacy, accountability, transparency, robustness, and legally dangerous situations. As these problems are considered, the research emphasizes the proactive and introspective approach, as it accentuates the need to achieve this. The regulatory framework governing the already existing artificial intelligence is being changed. The responsibility of the product managers is to have a sense of the compliance environment and legal environment, as this can have an impact of the decisions that are made regarding creation of products and the sustainability of the market.

1.9.2 AI's Impact on Product Managers' Roles

Product management is a relatively new notion that emerged due to the increasing pressures of artificial intelligence that has introduced a new era of unprecedented creativity with the new productivity and massive economic output. This research paper explains theoretically how the artificial intelligence will interact with product management at the development stage all the way to the launch stage. Through engulfing into a discussion on both the theoretic underpinning and practice of artificial intelligence, one can be elicited into explaining how AI redefines current orthodoxies related to product management and entails.

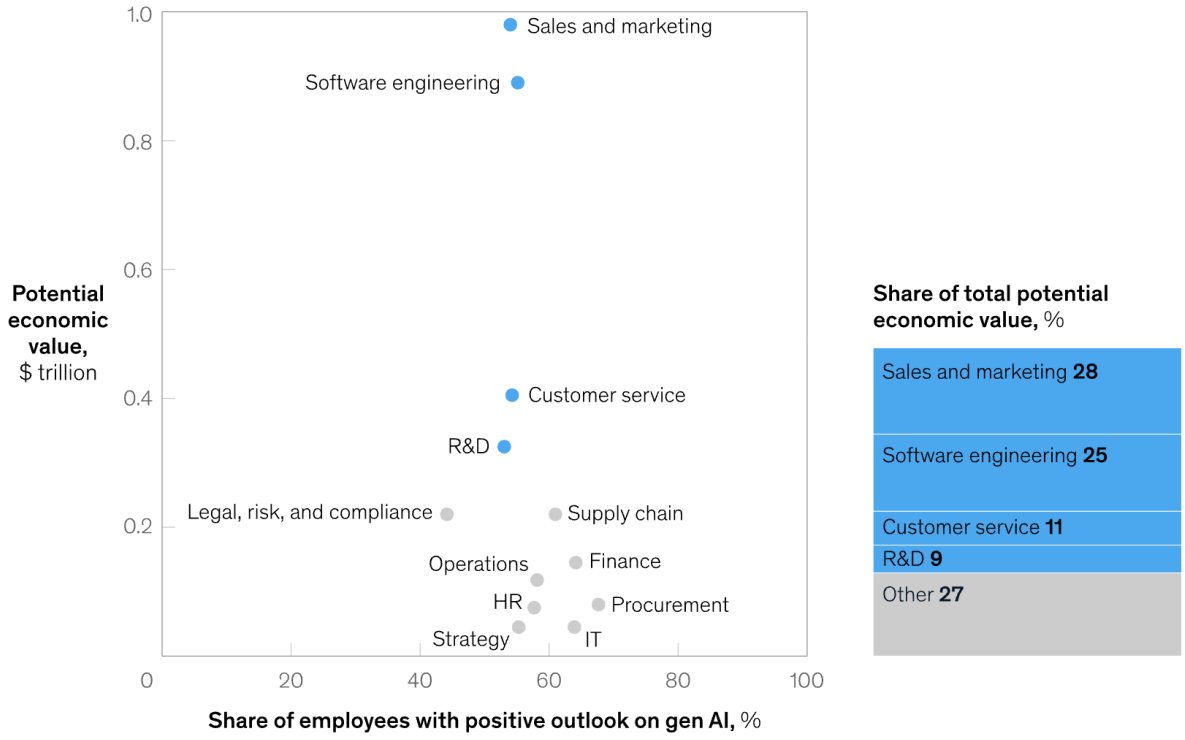

Figure 1: Generative AI Economic Potential by Area of Work

Source: Superagency in the workplace: Empowering people to unlock AI's full potential (McKinsey, 2025)

In a nut shell, artificial intelligence is the capacity to conduct simulated human thoughts. The entire sectors in the economy have undergone further development and that implies radical product development, marketing as well as distribution. Indeed, it has literally caused every single point in the product lifecycle to be flipped upside down by assisting product managers to perform an evaluation of huge quantities of data, identifying trends, and being able to subsequently obtain actionable information. It is here that the ideation phase takes place:

under this perspective, artificial intelligence expands the market of the creative output since the process of brainstorming becomes more effective due to the high-level algorithms and predictive analytics.

Insights provided by artificial intelligence can be used to identify emerging trends and client preferences, as well as gaps in the market. Such information forms the basis of these new product concepts. Artificial intelligence will facilitate a more in-depth research of the market and validation of the consumer across product creation to the point of market confirmation of the product to be launched in the market. Advanced data analytic tools help the product managers to make an objective evaluation of the customer behavior, preference and attitudes in the process of decision making. Possession of such kind of knowledge also implies that the decision is not only informed, but it is also strategic in the sense that it gives an opportunity to plan on countering any potential risks that may arise in the future.

As the product development lifecycle progresses, one should observe how AI is very central in most processes of the product development lifecycle like faster cycles of the product development process, better experiences to the users, optimization in the quality assurance process, and coordination of the process of data-driven marketing. The smooth movement of the AI technology to the product lifecycle would be effective in enabling the product managers to navigate the complexities that are present in the current marketplace with agility, foresight, and preciseness and direct sustained growth as they compete effectively.

The introduction of artificial intelligence into the traditional project management changes the domain of work to encompass the ethical, regulatory, and data management implications. They also involve the assessment of the performance of the models and effective cross-functional cooperation and communication. Moreover, data management is added to the area of work. Artificial intelligence project managers have taken the ethics responsibility as custodians of AI systems by making sure that the systems are transparent, fair, and legally compliant. Companies tend to come up with customized ethical codes to address these issues.

By applying these regulations, it ensures that AI systems are non-discriminatory and otherwise fair, and that it complies with the existing legal system. Project managers should ensure the privacy of the information through the application of the specific privacy-enhancing measures. It is achieved through collaboration with data scientists and machine learning engineers. Data anonymization, encryption, and the creation of synthetic data are among the methods included in this category. Large corporations use specialized centralized data governance or responsible

artificial intelligence teams to formulate AI principles and standards for the oversight of AI-driven products. These teams are tasked with formulating AI concepts and standards.

There is considerable variance in the rules governing AI at the country level. AI governance teams oversee the rules that project managers must adhere to comply with the law. These restrictions are particular to each nation and region. The amount of effort put by product managers to solve ethical dilemmas associated with AI-inclusive products is greater than the ones without AI. In the context of startups and small enterprises, the matter of AI regulation is of minor importance, while the fundamental functioning of the product persists as its essential feature. The reason is that this type of enterprises is prone to situations associated with shipping or mortality. When the firm is growing, the norms and ethics within the organization become important compared to other issues.

The project managers have a number of tasks to perform and the tasks include ensuring data integrity and privacy, setting, and monitoring the performance objectives, budgeting, and enhancing artificial intelligence models. In order to adequately understand the complexity of the process of developing an artificial intelligence solution, project managers have to work hand-in-hand with data scientists, machine learning engineers, and other stakeholders. It is important to make sure that the process of product development is conducted appropriately. Data scientists assemble, clean and ensure quality of information. AIPMs handle the overall data strategy whilst data scientists own the data. The data collectors are distributed between the data scientists and the project managers in the process of the project. One of the responders who took part in the discussion claimed that presence of data remains a problem. Data is of the utmost importance in the context of artificial intelligence because it is a factor that directly affects the performance of the model.

The project managers must ensure that the data collection and administration is managed in a proper and ethical way, which involves the protection of user privacy and trust in data practices and prevention of breach and misuse of the data. It needs strong data methodologies that would go a long way and have trustworthy artificial intelligence systems evolve. This includes, but is not limited to, the control of data quality, privacy, and integrity; setting performance targets of the AI systems and managing costs, collaborating with interdisciplinary teams to ensure the alignment of products goals and strategies, as well as implementing compliance to ethical AI practices along with any other applicable regulation compliance.

1.9.3 AI Product Manager Challenges

PMs are required to negotiate the specific problems that are introduced by the development of AI products. Ethical and regulatory issues such as the necessity to ensure that artificial intelligence is open and interpretable and that it adheres to the data protection regulations are also raised. Due to the significance of data management and privacy, there is a need to possess high-quality data and privacy protection. In addition, the success of artificial intelligence product highly depends on user experience and trust. Project managers are required to handle user experience difficulties and develop user trust via openness and dependability. It is crucial to manage performance while making use of AI technologies. To do this, proper performance indicators that are in line with corporate objectives must be established. Because the measurements for model performance are not connected to the metrics for end-users or business metrics, this presents a hurdle.

AI Project Managers spend more time with clients to get qualitative input on the functionality or model of the AI implementation. The AI project managers have specialized expertise in the performance indicators of the AI models, such as accuracy and recall. An awareness of such a technical nature is required of AI project managers to work effectively with data scientists and machine learning developers. In addition, Olsson and Bosch (2023) address the difficulties that are involved with the monitoring and retraining of model performance outcomes. It emphasizes experimentation to evaluate feature value and gives ways to respond to changing circumstances. It aids project managers in making decisions about whether to employ conventional algorithmic development against machine learning and artificial intelligence models.

There are heavy budgetary issues both in the design and upkeep of products with artificial intelligence therein. These include great costs associated with development primarily based on the complexity of the model and specific skill sets required to operate it, among other factors. Other costs include those for acquiring, preparing, and ensuring the quality of data as well as many related expenditures. Even more, infrastructure costs amount to very high because factoring in processing power plus special tools needed to develop artificial intelligence; adds up to a big amount. Another important factor is that AI product managers have to work within a tough fiscal environment resulting from a conflict standing between enormous costs for developing artificial intelligence against them trying to draw consumers while making their prices look competitive. Against other popular open models, for example, ChatGPT,

Perplexity, Gemini, the costs associated with this GenAI model are relatively huge and do not scale. This has thrown into bold relief an imperative requirement for either more specialized large language models or indeed smaller language models to address the cost.

Both the acceptance of artificial intelligence technologies and their success are greatly reliant on the facilitation of a positive user experience (UX) and the creation of trust. Among them are the resolution of issues in user experience design, particularly those about the unpredictability of AI outputs, and the development of user trust via the implementation of AI systems that are open and reliable. AI product management places a significant emphasis on user experience and input from customers. In particular, while taking into consideration the one-of-a-kind issues that are presented by the non-deterministic characteristics of AI, project managers are required to concentrate on the influence that AI has on user experience. The periodic collection and assessment of customer feedback have been observed to enhance AI models and, thus, customer satisfaction. The biggest challenge in operations that artificial intelligence products have brought with them is the issue of managing the massive resources necessary to create AI. The resources that are always needed include data collection, model training and technological expertise.

These procedures could severely limit schedules and budget allocations especially in businesses with tight budgets because of their high resource demands. Thus, the strategic challenge of AI product managers is to control AI hype and create reasonable expectations among the stakeholders and balance the innovations and the inherent constraints of AI technology. The rapid pace of AI innovation leaves businesses struggling to maintain pace with the recent changes and have a competitive advantage and requires continuous learning and flexibility. The failure of AI technologies to predict time to market and cope with long and iterative product life cycles cripples the process of strategic planning. The activities and making strategic decisions are increasingly becoming challenging due to legal limitations, ethical issues and questioning AI based products by the population.

1.9.4 AI PM Required Skills and Competencies

Artificial intelligence project managers must have a strong base of domain knowledge that comprises of an in-depth understanding of artificial intelligence technology, its applications, and the development cycle. Skills also involve the knowledge of data management, machine learning models, and technical aspects of AI systems. With the help of

this data, project managers will be able to make well-informed decisions, accurately estimate when the product will be delivered, and identify both feasible and impractical aspects of the artificial intelligence model. Artificial intelligence technology has the potential to enhance project operations. It is with an individual with experience in artificial intelligence technology that job automation is achievable, processes are streamlined, and efficient control in product development cycles is established, thereby benefiting a project manager. Technical skills enhance productivity and enable project managers to fully use the potential of artificial intelligence in their roles.

Implementing solutions based on artificial intelligence requires cross-functional cooperation, including data scientists, engineers, and all pertinent stakeholders. The higher the cooperation, the more meetings that project managers have to be involved in discussing technical issues and reviewing documentation, hence requiring them to invest a lot of time in this as well. Therefore, to integrate such a wide variety of stakeholders seamlessly and their expectations for getting the product executed seamlessly, strong communication and collaboration skills are highly essential.

Project managers have to sit down and bargain, then try to push through the product vision; hence, they ought to express complicated A1 notions in a very clear and precise manner. This falls squarely on their basic roles. Information technology project managers must be unequivocally fluent in the language of data and analysis. There needs to be some elementary understanding of data science, how data is collected, prepared, and analyzed.

Familiarity with data science is rudimentary. One should know statistics and measures that will help to make a decision based on the facts, and assessment of the model performance in the context of artificial intelligence. This information will help the project managers to make prudent decisions on the accessible information. It is their duty to make sure that the quality of data being produced at any given moment is correct and pertinent to the issue being discussed has been addressed. Therefore, it can be beneficial in some ways to project managers when considering the addition of these competencies when creating an AI solution. The process of developing the products of artificial intelligence is extremely unstructured and complex; therefore, AI Product Managers should exercise good judgment and have critical thinking skills.

This is a skill that the project managers should possess; the ability to manoeuvre in complex situations where the output of AI models can be probabilistic as opposed to

deterministic. This is why it is highly important to do well-informed and evidence-driven judgments that can be based on inadequate or developing evidence. One must be able to engage in critical thinking skills that are sufficient to assess the legitimacy of the models of artificial intelligence, understand the trade-offs involved with the different methods, and calculate the risk that is associated with the use of AI functionalities. Every one of these responsibilities requires a suitable action on the part of a project manager, including the ability to properly prioritize the work, balance the immediate needs with long-term strategic objectives, and effectively make judgments that comply with ethical standards and legal requirements. These capabilities are mandatory to ensure that artificial intelligence (AI) solutions are produced in a way that they meet the needs of the customers, are run in a trustworthy way, and remain trusted by the customers even after the vast technological development and the tough competition on AI.

AI technology is becoming more and more daily, and the associated processes of iterative development involving an AI product create a need that AI project managers possess the skill of continuous learning in addition to the ability of iterative development.

. This is because AI technology is leading the way to change. For AI-driven solutions to succeed, project managers need to stay current on the newest developments in data science, machine learning, and artificial intelligence. One must dedicate oneself to lifelong learning to do this, which may be done by going to industry events, taking online courses, following prominent AI individuals, or staying up to date on new tools and methods.

Moreover, iterative skills are necessary because products created by artificial intelligence tend to undergo several rounds of innovation, testing, and enhancement of their features. Artificial intelligence models require periodic updates to improve performance and reliability, and thus the project manager has to modify their plan based on new data, user input, and changes in market trends. The two aspects are important to realize the targeted goals. These attributes should help AI project managers to stay abreast with the fast changing pace of technology, make sound decisions using valid information, and lead the creation of novel AI solutions. The essential abilities are technical information and awareness of artificial intelligence; literacy and analyzing ability to operate with data; critical thinking and judgment abilities; an attitude of constant education and gradual nature; and strong communication talents.

1.9.5 The Influence of Artificial Intelligence on the Product Life Cycle

Products manufactured through artificial intelligence have long and widespread life cycles. This is linked to the extended development cycles partly due to constant testing and improvement needs, model training. Artificial intelligence products, in contrast to conventional commodities, need to be updated often to remain precise, fair, and efficient. The majority of the time, this would result in a more drawn-out process of discovery and testing. The development of artificial intelligence is iterative, which involves the ongoing retraining of models with new data. This is one of the reasons why the cycle has been prolonged. A further reason is that the cycle has been prolonged. The addition of GenAI still adds another degree of complication to the situation. Even though GenAI speeds up the prototyping and early development phases by generating ideas, content, and prototypes at a rapid pace, it still requires close monitoring to guarantee that the results are accurate, ethical, and by the goals of the firm. Standard machine learning models, on the other hand, despite the fact that they are also iterative in nature, are unable to give the same amount of flexibility in terms of the rapid ideation and thus are more likely to entail more stringent training procedures before deployment.

On account of the juxtaposition between GenAI and ML, it is necessary for a project manager to strike a balance between the speed and adaptability of GenAI and the precision and dependability of conventional ML approaches. That should be accomplished in the framework of the long life cycle of the product, which requires constant repetition and improvement. Moreover, after the initial release of the product, some important things remain to consider, including post-launch implications, which also implies issues related to consumer trust and product upgrades that are created according to the feedback received by the users. The usage of generational AI which is used to speed up testing and prototyping has dramatically transformed the front end of the artificial intelligence product development. There is rapid prototyping where concepts are converted into working prototypes, which can easily reduce the lifespan of a product.

GenAI technologies allow product managers to generate ideas quickly, develop prototypes and test concepts with minimal technical resources. The high rate of it allows faster iteration and improvement of features of the product, which leads to faster decision-making and more nimble long-term development. There are problems with this acceleration. Although GenAI allows fast prototyping, the models produce results that require careful scrutinizing to ensure that they are ethical, focused on corporate goals, and technological to ensure that the prototyping can be implemented. The project managers have a responsibility in ensuring that

the rapid development that is achieved due to the existence of GenAI does not undermine the quality, reliability, or ethical concerns that artificial intelligence technologies represent. Therefore, despite the fact that GenAI brings about an improvement in productivity during the prototype phase, it requires rigorous supervision in order to ensure that the integrity of the product development cycle as a whole is maintained. Alterations to the Product Life Cycle: Testing and prototyping using GenAI technologies that are accelerated in their development. After the launch, there were significant consequences and adjustments. Cycles of development that are both prolonged and iterative.

1.9.6 AI PM Personality Traits

For producing Product Requirement papers (PRDs) and fine-tuning papers, many project managers rely on technologies in GenAI, particularly the ones available in the marketplace, including Gemini, ChatGPT, and Perplexity. In fact, with these, language may be organized for clarity enhancements as well as content production and, at the core of it all, make it easier to document a procedure. Furthermore, GenAI helps to improve email communications, which generates text that is both short and relevant, thus significantly reducing the time project managers spend on these tasks. Automation solutions, which are grounded in GenAI, can help the project managers to automate insignificant operations and monitor the progress of their teams and manage their workflows.

The outcome of this automation is increased efficiency, which consequently allows the project managers to focus on more significant tasks to the project. With the help of GenAI technology, customers can receive a better service and, in addition, the project managers can define the problem statements more precisely. The artificial intelligence will be able to identify the usual problems and needs based on the comments and interactions made by the clients. This is because it enables product managers to provide offerings closer to customer expectations in terms of relevance and need. This will ensure that the project will meet the demands of the client and raise the level of their satisfaction.

Artificial intelligence always removes redundant activities which means that the project managers are able to focus on the most important functions. Project managers can now make a realistic generation of proof of concept with approaches that generate AI with generative methods. This way, they can create and experiment new innovative ideas in a brief period without extensively relying on technical specialists. This characteristic provides the project

managers with creative flexibility and accelerates the product development lifecycle. The most famous applications of AI at the time are the development of documents, improved email communication, automatization of time-consuming jobs, and the improvement of customer service and complaints. The other application of the artificial intelligence would be to enhance efficiency.

The artificial intelligence that has been a groundbreaking process is an essential part of the modern product development. The existing paradigms can be re-ordained to drive forth the outstanding opportunities of creativity, efficiency, and business relevance. Artificial intelligence consists primarily of various tools and techniques, which are aimed at replicating the intellectual abilities of humans. These are approaches and technology that include natural language system analysis and learning algorithms. Artificial intelligence can be used by product developers to utilize data-driven insights, automate their repetitive work, and enhance decision-making throughout the product lifecycle.

It is one of the main duties because of the other extremely major advantage it offers in terms of new ideas and approaches to product design. Up until now, the main source of innovative product ideas has been human intuition combined with market research and brainstorming sessions. Artificial intelligence now infuses old ideas with fresh perspectives by examining vast information and generating a multitude of creative ideas about previous trends and customer preferences. Large amounts of market data, social media trends, and user feeds may all be analyzed by machine learning algorithms to identify unmet consumer and corporate needs. The process of data filtering makes this feasible. Artificial intelligence data may help new developers better understand target demographics, predict future market trends, and even produce novel concepts that cater to customers' wants.

This enables product designers to leverage real performance indicators and direct customer input to rapidly develop and expand new concepts. Moreover, it is possible to optimize these undertakings due to the significant acceleration of the iteration and prototyping activities through AI. The prototypes that had been created to date were based on an intensive process that involved multiple design and testing and refining processes. The alternative prototype technologies employ artificial intelligence, simulation, and predictive analytics to optimize product configuration and speed up the design process with minimum human input. Generative design methods are self-generative, and can generate millions of iterations depending on predetermined parameters and performance goals. This allows the exploration of the design space in entirety and the best solutions to be found in a considerably lesser time

frame. The prototype technology using AI can help the product developers to penetrate the market sooner, lessen the development expenses, and improve the quality and performance of their products.

Along with helping to make the design cycles shorter, artificial intelligence also promotes user experience and product usability to a great extent. The NLP technologies make products respond to the user inputs by extracting and reacting to them in real time, thereby improving the level of interactivity and engagement. Similarly, computer vision algorithms would examine the behavior of the user and its preferences to modify the user experience and its functionality to meet the needs of the particular user. Customization based on AI and ML-driven solutions can be applied to products to make them easier and more intuitive to use by product developers. This is how their target audience perceives such encounters.

Rushby (1998) has indicated that artificial intelligence could play a significant role in product development in various significant fields such as the quality assurance and testing. The conventional quality assurance method was the manual testing procedures. These were tedious processes that had a high likelihood of mistakes and consumed a lot of resources. The AI-based testing solutions, in their turn, apply machine learning algorithms to automatically generate the test cases, optimize the test coverage, and identify the possible errors. As an example, automated test generation techniques can analyze the product requirements and construct complete test suites that represent a broad spectrum of usage and edge cases. On the same note, anomaly detection algorithms are able to scan the real-time performance data to identify anomalies in the expected behavior and they are also able to tell about the impending problems before they turn out to be big bugs. With AI-based testing software, product developers can enhance product reliability, shorten release cycles as well as minimize the risk of post release errors.

The use of artificial intelligence improves item marketing and distribution optimization strategies. It enables product developers to identify target audiences, increase marketing communication, and optimize distribution channels to reach and influence as many as possible. The predictive analytics algorithms are able to process the sales history, demographic details of the consumers, and the industry trends to forecast the demand and growth potentials in the future. To boost the number of conversions and customer engagement, recommendation systems should take into account user behavior and preferences in order to offer suggestions of the product and targeted marketing messages. Marketing and distribution strategy is based

on AI, which enables product manufacturers to enhance their marketing input by improving the efficient utilization of resources to enhance growth and profitability that is sustainable.

AI represents a radical redesign of the product, which implies unrivaled creativity, effectiveness, and relevance in the market. With the aid of AI-based insights, automation technologies, and customization strategies, product developers will have an opportunity to shorten the design development times, improve user experiences, guarantee high-quality products, and help the maximum utilization of products in marketing and distribution. Artificial intelligence will continue to evolve and grow, therefore, increasing its influence on product development. This will help organizations to succeed as they will provide commodities that meet the dynamic needs and wants of their consumers

1.9.7 Coding with Selective

With selective coding, we narrowed down on and combined some of the categories that we had discovered during our axial coding and reduced them into a single framework that includes the main phenomena investigated. There are cases of selective coding where the existing categories are then incorporated in a central category that captures the gist of the findings of the research. This is done by introducing an effective theme that puts forth the position of AIPMs in the dynamic environment of AI-driven product development. The topic contains a number of responsibilities, issues, skills, competencies, and qualities related to AIPMs. According to the results of the selective coding method, the category of "AI PMs Archetype Persona was the most significant one. This persona has the aim of defining the basic characteristics, capabilities, challenges, and features defining the role of an AI product manager in artificial intelligence-related businesses and products. The AI Project Manager Archetype Persona would contain the traits that are required of the job including the relevant talents, aptitudes and character traits that make an effective manager of AI products.

At present, we see product managers using generative AI for key functions, which include creating Product Requirements Documents (PRDs) and related material. In the present market we see tools like Gemini, ChatGPT, Perplexity AI, and others, which enable product managers to improve language for clarity, produce content and in large part simplify the documentation of complex processes. Also, we see that generative AI improves email correspondences by putting forth to the point, context appropriate text which in great degree reduces the time product managers spend on writing out communications. Product managers

are able to automate routine tasks, track team progress and manage work flows very well via generative AI based automation solutions. This automation brings in efficiency which in turn enables product managers to put their focus on high value activities which in turn play a role in product strategy and success.

1.9.8 Artificial Intelligence to Develop New Product Concepts

Innovation is closely connected with the ideation process which is an essential step in creation of goods. Conventional product innovation and ideation depends on the traditional method of human intelligence, market investigation, and intuition that develop a novel idea that meets the requirements and tastes of the customer. Artificial intelligence has changed the entire brainstorming process. It has brought new unexplored opportunities to exploit data-driven insights, untapped consumer need, and novel ideas that break the existing norms. Simply put, artificial intelligence refers to the combination of multiple technologies and solutions that are intended to imitate human mental activities. Two examples are frameworks of natural language processing and machine learning techniques. Through artificial intelligence, product developers could process a lot of data at once, spot trends, and come up with innovative ideas.

By use of artificial intelligence in customization of products, a product designer finds it easier to generate a product idea which is both relevant and interesting since relevancy to the target audience builds a stronger connection at a higher level. It is predicated on market dynamics, customer preferences, and historical trends.

Artificial intelligence examination of data and patterns fundamentally alters how concepts are thought of. Actually, by analyzing vast amounts of market data, social media trends, and user input, machine learning algorithms may be able to predict and create business prospects based on latent customer wants. Thus, by analyzing data patterns and correlations, AI uncovers untapped potential.

Market segmentation and prediction of future trends are complementary components, besides developing innovations on novel product ideas that will meet the unmet client demands. AI-based ideation tools enable product developers to explore multiple design variants and generate a number of completely different product ideas more easily than traditional methods very quickly. Generative design methodologies generate many design iterations based on defined parameters and performance objectives as autonomously as possible.

They will most likely employ artificially intelligence driven ideation techniques that speed up the process of producing a wide range of original ideas that would not be possible with such traditional techniques. The creators may not have thought of these innovative ideas because they relied on traditional procedures. Furthermore, the development of artificial

intelligence enables product designers to generate original product concepts and then alter them in response to the particular requirements and preferences of each client.

This comes from the ability of artificial intelligence to assist in customized product generation. Natural language processing systems can evaluate user utterances and sentiments to discern common pain points and preferences. Recommendation systems analyze the behavior and preferences of users to make selections of products that fulfill their needs. Artificial intelligence plays a significant role in the evaluation of the feasibility of innovative product concepts, which should be economically viable. These include simulations and projections of the effect that the new product ideas may have on such aspects as the prices of the new products, their performances, and the demand they are likely to get. The AI-driven validation will then enable product developers to confirm the further evolution of such product concept as displayed with the most promising prospects by making a well-informed decision based on the modelling of multiple scenarios and the analysis of any opportunities and threats that might lie in each.

It allows teams and other stakeholders to collaborate and co-create therefore maintaining corporate innovative culture and interdisciplinary collaboration. This process is possible through the collaborative brainstorming tools that are provided together with the artificial intelligence with a goal of achieving greater innovation, better collaboration and exchange of feedback among the team members. The AI-based ideation tools can be used both to generate ideas by product developers and also to collaborate by bringing the skills of various parties on the same platform.

Finally, this leads to the growth of innovative and novel ideas about products. It is during the ideation stage that the innovations should be generated at the edges of innovation. AI can also help product developers to analyze large data sets of unmet customer needs and create new product concepts that will suit their needs in the market. Other channels also provide other ways of refining the idea further, prove that it is viable and feasible, and that there is cooperation and co-creation by various teams and stakeholders in the process. It will be the development of AI that will innovate into this specific phase to support a sustainable development commercially in the near future.

1.9.9 Market Research and Validation: Insights and Analytics Driven by Artificial Intelligence

Innovation of new products requires validation and market analysis as part of the process. Market analysis and validation will give a solid base on strategic planning and decision-making that will further product development. Previously, consumer preferences, market trend and competitive environment information was collected manually by conducting surveys, forming focus groups and data collection. Artificial intelligence has altered market research and validation. It helped in the hitherto unknown application of information-driven knowledge, sophisticated algorithms and sophisticated prediction capabilities based on analytics. It becomes easier and possible to discover the concealed trends, forecast any market trends and prove any product ideas with much better accuracy and efficiency.

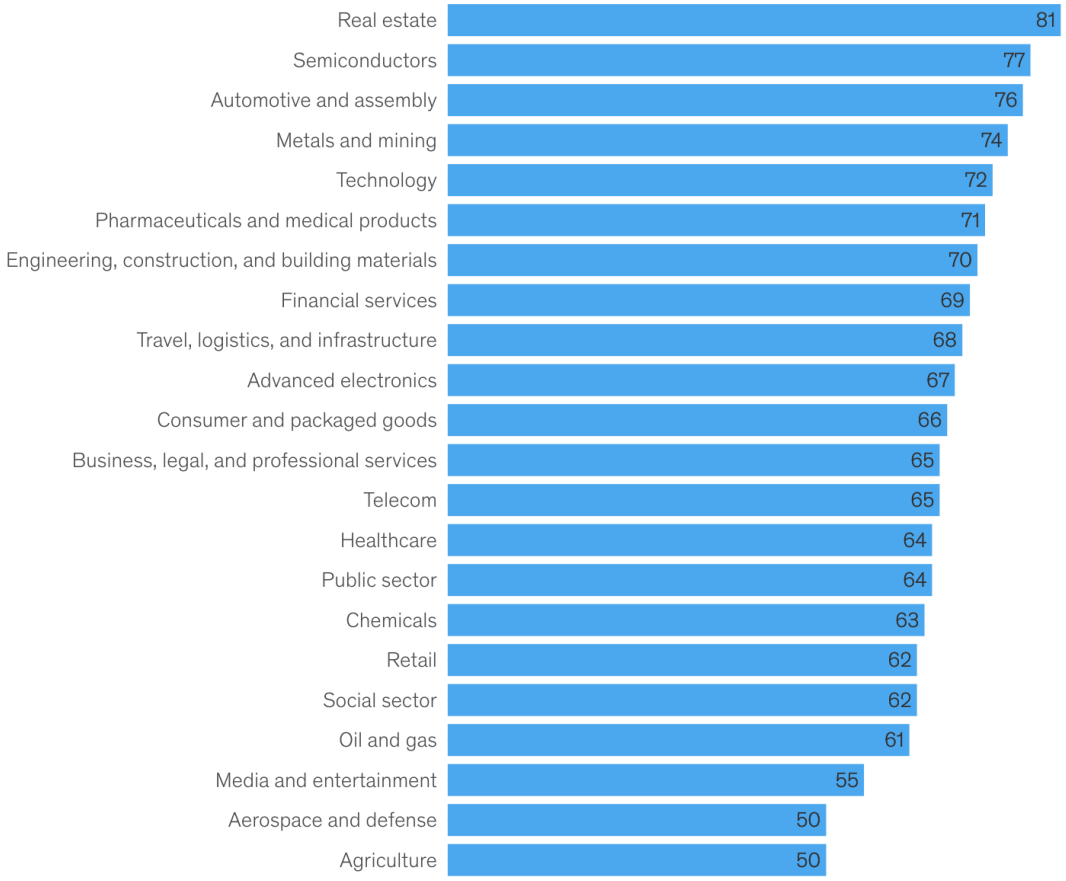

Figure 2: Percentage of Employees who perceive GenAI Results as being >=70% accurate by Industry

Source: Superagency in the workplace: Empowering people to unlock AI's full potential (McKinsey, 2025)

Simply put artificial intelligence can be defined as a set of tools and techniques that make it possible to imitate human thought processes using artificial intelligence. There are two fundamental types of artificial intelligence such as artificial intelligence as well as natural language systems. It is through artificial intelligence that product developers are now able to analyze large volumes of data, draw valuable insights, and understand customer preferences and behaviors and the competitive environment. Artificial intelligence is changing market research using two fundamental tools, which are data analysis and trend forecasting. Machine learning algorithms can analyze massive amounts of market data, social media trends, and customer information in order to locate complex consumer needs, future market opportunities, and threats of competition. Through the search of the patterns and relationship within the data, artificial intelligence can determine what the market will want in the future, forecast its demand, and generate information to assist in strategic decision-making.

The deep penetration of AI into the market research techniques can immediately supply the product makers with the knowledge about the attitudes, tastes, or behaviors of consumers. In order to find out the typical problems, trends, and emotions, an NLP system can analyze social media, customer feedback, and online discussion forums. Sentiment analysis algorithms are applied to textual information to determine the opinion of consumers on a specific product and monitor the changes in the attitude. It is expected that product developers will profile their target market and identify new trends quicker and anticipate market growth more precisely and fleetly using artificial intelligence analytics and insights. Artificial intelligence is also used to enable product creators to better assess the viability of the market and produce innovative ideas with the aid of the simulation techniques and prediction models

1.9.10 Workflow Automation as an Emerging Dimension in Product Management

Agentic AI systems that can make independent decisions within set parameters; hyper automation which is a mix of artificial intelligence, robotic process automation, and machine learning; and growth of low code and no code automation platforms (such as Make, and n8n) which is bringing automation to the masses. We see great value in these emerging automation trends which transform product management, enabling product managers to pass off routine tasks to AI systems which in turn preserves human input for creative, ethical, and stake holder relationship-based decisions. But we are still in the early stages of product management workflow automation, which is a ripe area for more research. The interaction between AI augmented product management processes and human product manager creativity and

judgment; the best way to divide authority and decision making between human product managers and autonomous AI systems; and the long-term play of automation on product management team structure and organization design are all open research questions. As workflow automation improves and organizations experiment more, we put forth that future research look at these issues in depth.

The algorithms of predictive analytics will forecast future demand and evaluate the viability of new product ideas in comparison with the previous sales data and tendencies in the industry and consumer trends. The use of modeling techniques, will enable product developers to make simulations of various scenarios whereby the effects that new product launches will cause on key performance indicators- market share, revenue, and profitability among others can be established. Thus, AI-assisted development validation provides an application developer with an opportunity to make informed low-risk choices that create an opportunity in the future toward innovative concept development.

Market research solutions that are based on artificial intelligent (AI) enable the manufacturers to re-optimise their messages and direct approach to final results. The market research adopts its recommendations systems by simulation methods and predictive analytics by analyzing user preferences and behaviors and offering them recommendations on specific products and marketing messages. Segmentation algorithms find application in segmenting the audience in various categories based on the behavioral, psychographic and demographic factors. This grouping assists in tailoring the marketing message and promotional incentive to particular demographic groups in the product development process. With AI-based personalization, product developers make attractive and interesting campaigns, boosting the conversion rates and customer loyalty as well as retention.

Benchmarking and competitive research will be enhanced through artificial intelligence. The product developers are able to understand the positioning, product offers, and strategies used by their competitors. Text mining algorithms can analyze press releases, news articles, and competitor websites to gather the relevant data about the qualities of products, pricing strategies, and customer reviews. On the same note, this can be achieved by analyzing the image of the product and applying image recognition algorithms to identify the competitiveness of the product, and also estimate its market share and popularity. Using AI-based competitive research tools, product makers can benchmark performance with their competitors, understand competitive risks, and find a new source of market positioning and differentiation.

Artificial intelligence-driven insights and analytics have completely changed the market research and validation landscape. The innovations have enabled increasingly available data-oriented insights, predictive analytics, and advanced algorithms to be more precise and effective in detecting obscure patterns and predicting market patterns. Product designers can thus acquire an in-depth knowledge of their target market, identify new trends, determine the market trends, and make superior judgments to facilitate sustainable growth and enhance competitiveness in the market. With the evolution of AI and its increase, its impact on market research and validation is likely to increase significantly. This will provide new strategic differentiation opportunities and innovation in a more competitive environment.

2.1 Introduction

Generative artificial intelligence (GenAI) is one of the most used AI technologies, which can produce synthetic data, and various material such as text, pictures, music, and much other assortment. Because GenAI may be performed with a lot of diversity, it is quite appropriate that organizations be prepared to take into account the ethical issues surrounding its potential use. Companies are not interested in the risk of losing their moral principles and checks and balances. The research seeks to explore how the GenAI technology can be used to boost the future performance of businesses. Using two ethically modifiable dilemmas and environmental turbulence-that, the current research utilized various associations among GenAI adoption and the future performance of organizations.

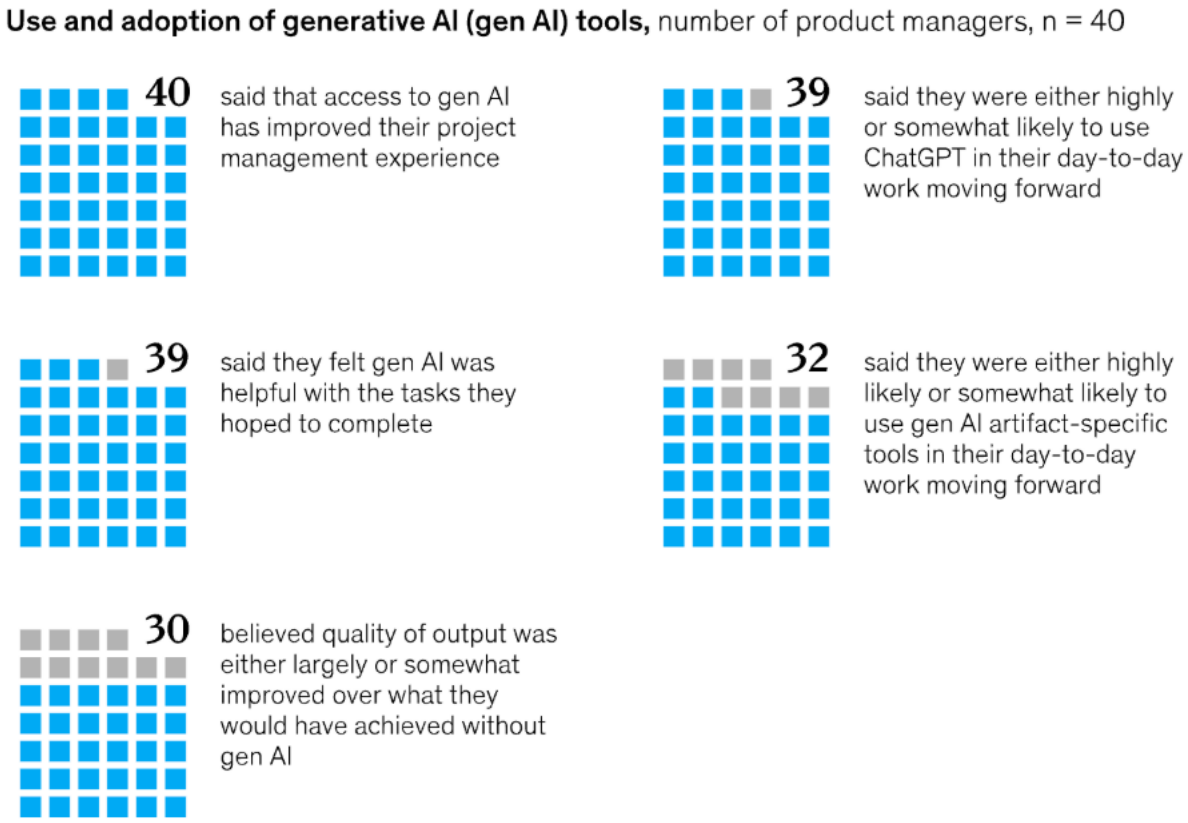

Figure 3: Influence & AI Adoption by Product Managers

Source: How generative AI could accelerate software product time to market (McKinsey & Company, 2024)

In this regard, in particular, it is important to understand the impact of generative AI on team dynamics, collaboration, and communication in product management. As per the socio-technical systems approach, to maintain the successful cooperation and decision-making a balance between the technological aspects of AI and human activities must be found. Finally, Agile Product Management paradigm provides a paradigm base to know the application of

generative AI in iterative and customer-driven development processes as Zhang and others (2024) also say. Integrating AI-driven insights with agile concepts can assist product managers to make decisions based on data faster and become more responsive and customer-focused. Software product management is an important aspect of developing, deploying and managing a software product.Though software product management (SPM) has been extensively studied, few studies have examined how the software-intensive industry's digitalization and transformation are fast altering this function.

In this study, we analyze how prevailing SPM approaches are undergoing rapid change with important shifts such as DevOps, data and artificial intelligence (AI), and digital ecosystems. Digital technologies require a shift toward experimental modes of operation and testing concepts, while product management traditionally focuses on predicting the outcomes of development activities and making decisions regarding which requirements to prioritize first. To facilitate this shift and offer recommendations for future SPM procedures, we first determine the main obstacles that software-intensive embedded systems businesses face in today's SPM procedures. Second, we offer a framework for strategic digital product management (SPM4AI) that was experimentally developed. In this framework, we list the essential practices for SPM in the AI era.

In recent times, GAI has moved forward dramatically. It is leaving a good-sized impact on software product management. Based on the relevant publications that were released between 2005 and 2024, there is a systematic review of the literature identifying possible applications, advantages, and disadvantages of generative Al in the given region. According to the survey, technology may help with consumer insights, market research, and idea development. Product development and requirements of engineering. It can assist in cutting down on development expenses and time. Through the study of user input, automated code development, and other methods. But the technology's Ethical considerations, accuracy, and dependability endure. In the end, the actual use of generative Al can greatly enhance software product management operations, resulting in more effective resource utilization, enhanced end-user experiences, and greater product results.

Generative Al, which is at the intersection of the second and third waves of Al development defined by DARPA (2023), exemplified the revolutionary potential of Al. The third wave talks about Al systems that will be able to adapt to a context like human comprehension while the first wave had rule-based Al systems and the second wave proceeded to machine learning and deep learning applications. Using deep learning frameworks such as

Generative Adversarial Networks, and generative Al, covering the second and third stages, is essentially statistical learning that creates fresh content including writing, images, and music. As we travel this fascinating field of study, we open opportunities to unlimited possibilities of technological change.

The use of generative Al for brainstorming, idea generating, and creating research hints was examined by Karim et al. in 2022. The work of these researchers further enhances previously done works to build a paradigm for developing COVID-19-related medical discourses. Two models based on GPT3, named GPT-NEO-125M and GPT-NEO-1.3B, were used in the given research. Typically, much more integrated, and coherent concepts were produced by the bigger model, GPT-NEO-1.3B. Even though the medical field—more especially, COVID-19—was the focus of their study, they propose that the lessons learned from it might be applied to other specialized or scientific fields. The results demonstrate that the bigger model produces writing with more connected concepts and coherence.

By automating processes, increasing productivity, and boosting customer satisfaction, generative Al is a ground-breaking technology that has the potential to modernize software product management as also stated in Peng and colleagues (2023); Malik and colleagues (2022); Siggelkow & Terwiesch (2023). The need for generative Al applications across sectors is anticipated to be driven by the growing need to modernize processes. By 2030, the generative Al market is projected to grow to a value of $109 billion worldwide (Grandview Research, 2023). According to the McKinsey & Company (2022) study, 79% of respondents said adopting Al had reduced expenditures, while 67% said adopting Al had increased revenue. The main problem is that managers of software products need to have access to new and innovative ideas that might improve their decision-making and boost their income. The specific problem is that the management of software products is not completely aware of the possibilities of generative Al. By presenting more comprehensive insights into the moral dilemmas and applications of generative Al in software product management, this paper tries to bridge the knowledge gap for this reason. It is possible that better use can be made of this technology by product managers if they produce more effective products.

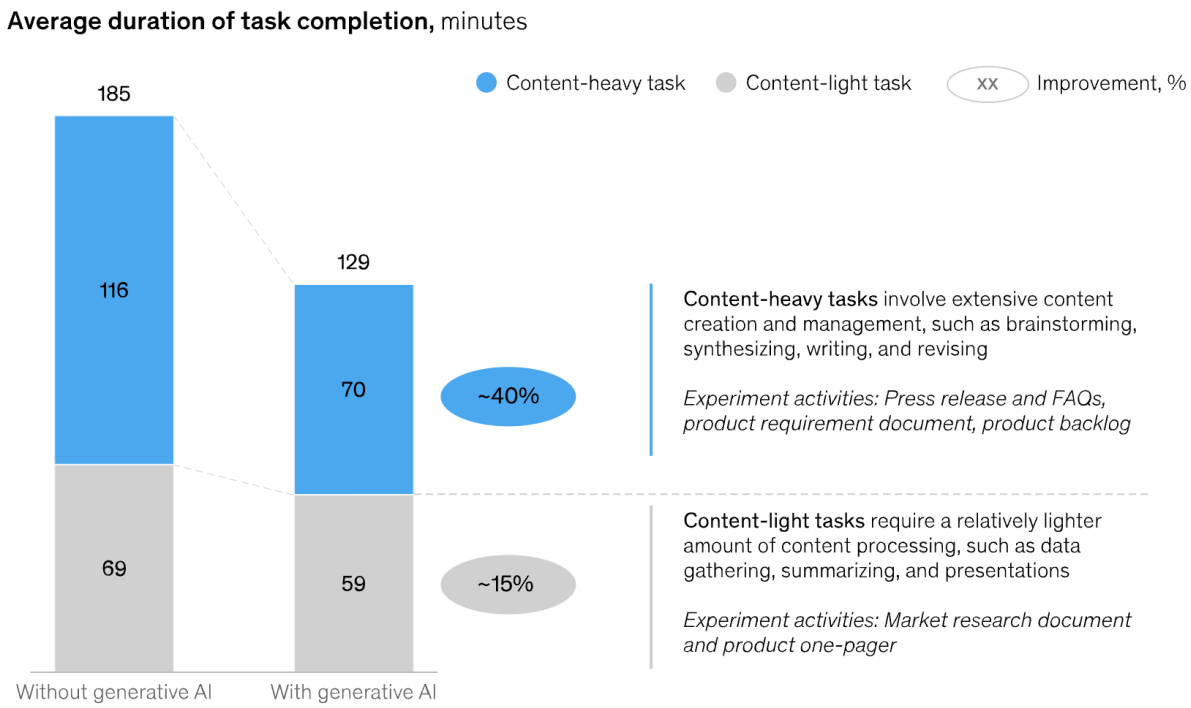

Figure 4: Generative AI tools enhance Productivity for Product Managers

Source: How generative AI could accelerate software product time to market (McKinsey & Company, 2024)

To guarantee that the technology is handled appropriately, this article discusses the ethical implications of generative Al, which are principal factors to take into account when developing any Al strategy for a corporation. As a result, this study fills a major vacuum in the scholarly literature about GenAl and its use in software product management. This eventually expands the corpus of information that may be generated by applied research and opens up new avenues for study and development in this field. Agile software development processes like estimating, backlog management, and sprint planning may benefit from generative AI. Take, for instance. Kim and colleagues (2021) introduce a novel Al-driven technique meant for user narrative points forecasting for Agile projects. The approach uses natural language processing techniques to analyze the given effort required for the user stories that they forecast.

A framework that integrates and modifies many Al technologies was proposed by Dam and colleagues (2019) to facilitate Agile project management. Their suggested analytics engine seeks to offer decision assistance on several fronts, even if some aspects of Agile project management remain difficult because of inadequate help. This includes descriptive analytics, which is a fundamental level of analytics provided by the majority of Agile project

management solutions now in use. It is mostly accomplished through data visualization through scorecards, dashboards, and reports. Park et al. (2023) developed and tested the ALSI-Transformer, which is a transformer-based code comment-generating model to advance source code understanding in software development. Given the surging demand for efficient commenting of code with the ever-increasing breadth of open-source software, the ALSI-Transformer gathers multimodal information through a revolutionary method known as Gate Network.

It involves market research, product analysis, strategy, planning, development, marketing, sales, support, and services regarding software product management; all these are complicated processes. Technical developments, market trends, and user need directly or indirectly have a significant impact on the ability of the manager to guide in handling software product management. Some of these techniques involve Generative Artificial Intelligence. This literature review focuses on tasks for a software product manager to obtain a broad overview of the present state of research on how generative Al will affect the application of such technology in software product management activities. Its primary contribution to the area of software product management will be a comprehensive and fair examination of several applications that generative Al is expected to alter. Next follows sections addressing the literature review, the merits, and the potential drawbacks of generative Al in software product management.

Siggelkow and Terwiesch (2023) talked about how Google's Bard and OpenAl's ChatGPT, two enormous language models, have the potential to revolutionize consumer experience. They highlighted how these Al models may help identify customer needs by analyzing and combining data, transforming wants into specific requests, and then offering clients answers. By concentrating on the particular problems that customers face and employing Al to enhance rather than replace a company's unique advantages, they emphasized the necessity of moving the emphasis from technology to the consumer. One kind of Al that is intended to comprehend and produce language that is similar to that of humans is a Large Language Model (LLM), like GPT. The Brand et al. (2023) analysis suggests that these models might be extremely. Finding out what customers desire may be made much easier with the help of these models. They discovered that when GPT is simulated as a randomly chosen client, it displays suitable responses that are in line with results from previous studies. LLMs may also create new market research paradigms not bound by the limitations of human subjects' research

using conventional market research paradigms to point out the value of GPT. Moreover, the authors warned that LLMs can sometimes “hallucinate” and provide false information.

When a generative Al conversational assistant was implemented among 5,179 customer care workers, Brynjolfsson et al. (2023) found that the Al tool significantly improved customer sentiment, boosted worker productivity, and reduced staff turnover rates. The Al tool greatly enhanced issue-solving and customer satisfaction, which was especially helpful for less experienced and newer employees. However, it did not considerably help the most experienced or highly competent employees. According to a text analysis of agent discussions, Al’s advice helped less experienced employees converse with highly competent workers more similarly.

As we travel this fascinating field of study, we open opportunities to unlimited possibilities of technological change.

Grand View Research predicts that the world market of GenAl will hit 109 billion dollars by 2030 (Grandview Research, 2023). Thus, one must understand how these GenAl technologies could be put in the best way as they are becoming a relevant instrument to the strategy and functioning of any company. Qualitatively, the study gives an understanding of the positive advantages of generative Al in software product management; they are higher worker productivity, expedition of R&D, new business models, as well as tailored customer care. They are essential to the CEOs who will be in charge of the implementation of GenAl within their organizations. The tasks and responsibilities related to software products design, delivery and maintenance were addressed.

According to ISPMA (2023), these are some of the most important categories of software product management. It meets a full gamut of managing the entire software product life cycle encompassing organization of cross functional teams, requirements priorities and enhancement of product features that better align with business interests and client demands. Based on the Agile methods and the user-focused approach to value generation, ISPMA is the most holistic framework that can exist as of now in order to stimulate innovation, encourage teamwork, and ensure long-term success in the dynamic software market. It achieves this by employing the concept of Agile and user-focused value creation.

2.2 Theoretical Framework

Generative AI designing product management is based on some very basic notions and models that are the theoretical foundation of the concept. Among these theories, the most important one is the Innovation Diffusion Theory developed by Everett Rogers that explains

how the corporate units embrace the innovative ideas and technologies. Gupta et al. (2024) cite the example of generative AI, which is a form of invention that would alter the operations and roles of an organization especially in relation to product management. Taking into consideration the perceived benefit, usefulness, and alignment with existing procedures, the innovation diffusion theory can help product teams implement AI-based technologies and adjust the working process to them. The technologies acceptability Model is another method used to assess customer acceptability of innovative technologies. It considers usability and perceived utility. Another relevant method.

Another relevant technique that applies here is the Technological Adoption Approach which has come to be known as The Technology Acceptance Model (TAM). This model identifies factors influencing customer adoption of modern technology by perceived usefulness and ease of use. Singh (2024) argues that TAM provides a basis on which readiness, both team and product managers, can be evaluated toward engaging generative artificial intelligence. According to this model, the team members are motivated to apply AI because it is valuable and easily integrated into their present workflow comprising manifold methods of performing tasks including analyzing data, reporting, and idea generation. It also incorporates socio-technical systems theory in its model since organizations are complex systems in which social and technical elements are interrelated, as indicated by Münch et al (2022).

The application of theories and analysis of literature developed into a theoretical model. It was learned from this research that by moderating environmental dynamism and moral dilemmas, using GenAI could encourage innovation exploratory as well as exploitative in nature. More so, it presented the impact that implementing GenAI would raise organizational effectiveness.

Management theories related to decision-making may find a new home in generative AI. There are several drawbacks to the human decision-making process, and generative AI may help individuals reduce some of these drawbacks. Herbert Simon's limited rationality model is one of the most often used ideas in decision-making. This idea describes how time restraints, incomplete knowledge, and human cognitive limitations affect one's capacity for reasoned decision-making as can be referred to in Cristofaro (2017). For example, people make poor judgments because they do not consider all relevant factors. Business, finance, economics, and management applications now require a change in basic assumptions in the application of evolutionary algorithms. According to Sieja & Wach (2019) With the rapid development of information technology, which is likely to significantly increase the scope of optimization

theory, there may be greater interest in applying evolutionary algorithms to hybrid systems. However, Ji (2017) recommends that these companies must make public how they handle conflicting interests and risk management in becoming more transparent on the decisions of AI in asset allocation algorithms.

Developing procedural rationality, which may entail formalizing the procedure for gathering and using reliable knowledge, is another strategy to impact restricted rationality. Both procedural rationality and optimization may be achieved using generative AI, particularly in the context of customer service and the choice between using technology or human intervention to address an issue. Demographic factors such as age, gender, and previous experience are particularly important when generative AI is used in organizational decision-making. According to Venkatesh, Morris, Davis, and Davis (2003), younger users are more optimistic about technology than older users. Therefore, the optimism of younger consumers will have a greater influence on their likelihood of using robo-advisors like ChatGPT. As capacity decreases with age, older individuals would most likely limit the input and restrict the amount of information utilized in their decisions. More importantly, older customers often bank heavily on their pre-existent ideas on decision-making as stated in Belanche, Casaló, & Guinalíu (2012). The use of generative AI in decision-making may be less popular with older users. According to Sun and Zhang (2006), gender plays a significant role in how emerging technologies are embraced and used. When evaluating behaviors and making decisions, men and women assign different values to distinct aspects. Because they are more inclined than women to engage in inventive activities, males like utilizing innovative technology.

2.2.1 Theory of Diffusion of Innovation

Put simply, Innovation Diffusion In 1962, Everett Rogers discovered it, and it is the comprehensive framework used in exploring the ways by which innovative ideas, inventions, and technologies spread through a group or organization as stated in Prasad Agrawal (2023). This idea demonstrates how organizational innovation is impacted by technology adoption dynamics. One of its remarkable features, which affects adoption, is its outstanding ability to produce new materials or solutions through independent development. Some of these characteristics, such as increased productivity, adaptable problem-solving, and creative growth, are attributes of perceived benefits from GenAl, according to Hsu and Ching (2023). Therefore, understanding these qualities determines the adoption of Al.

Furthermore, the theory of application expands to include the central investigation of exploitative and exploratory innovation in this study. According to Enkel and colleagues (2017) The theory of application has expanded to include the study's core examination of exploitative and exploratory innovation. Because GenAl encourages experimenting and taking risks, which both lead to discovering new opportunities, it promotes explorative innovation. Moreover, it promotes exploitative innovation by making the present processes easy. Moreover, the approach also enhances organizational performance by recognizing minor developments.

This means that the space of applicability of the theory is expanded by incorporating primary investigation of exploitative and exploratory innovation. The reason for this is that it fuels experimentation and risk-taking that results in the identification of new opportunities, making GenAl a catalyst for exploratory innovation. Additionally, it encourages exploitative innovation by making available procedures less complicated. Finally, because slight changes are acceptable, the approach facilitates improvement in organizational performance.

Businesses that have recently embraced GenAl, have encountered challenges in trying to incorporate exploitative and exploratory strategies as also stated in Wael AL-khatib (2023). Each strategy has a unique role in determining how innovation moves forward. Exploratory innovation involves being open to exploring new territories. According to O'Connor and DeMartino (2006), it is the initial stage of information diffusion. At this stage, companies begin to look at the general GenAl market. It is because the necessity to understand the prospective applications, capacities, and revolutionary possibilities fuels such an inquiry.

As per the study in Morrison-Suzuki and Cooper (1998), Early adopters are frequently perceived as embodying an attitude of technology excitement and investigation via GenAl's integration into their organizational domains. In most cases, seminars, instruction efforts, and outside influencers acted as catalysts that created an environment where Information on GenAl is widely available. Additionally, it establishes the foundation for Making informed decisions. On the other hand, exploitative innovation becomes prevalent in the latter stages of diffusion. Wael AL-khatib (2023); Zhang; Enkel and colleagues (2017) & Luo (2020) Organisations have the challenge of tying the discovered potential of GenAl to concrete advantages as they get past the first investigation. In essence, exploitative innovation entails improving and streamlining GenAl's incorporation into current organizational procedures. According to earlier research, decision-makers who have been convinced of GenAl's potential benefits during the exploratory stage subsequently encounter the difficulty of integrating this innovative technology with preexisting workflows and structures. Nonetheless, GenAl's relative advantage lies in its

ability to work with current systems and improve competitiveness and efficiency throughout the decision-making phase.

This transition from exploration to exploitation, marked by the strategic commitment of resources (particularly strategic, financial, and human), is when firms select some use cases or applications for GenAl. Both exploratory and exploitative innovation can be used to consider the facilitators that affect the diffusion of GenAl, as mentioned in Dubey and colleagues (2020); Jansen and colleagues (2006); Xie and Wang (2021). It then becomes evident that the advantage the business organization gains during the experimentation phase is when the family member looks for novel means to achieve a competitive advantage. Moreover, compatibility with the current systems and workflow begins to be studied more closely, which ensures that the integration of GenAl does not disrupt existing processes.

Additionally, this innovative technology's trialability enables institutions to test out small-scale applications. It reduces danger. That is connected to widespread adoption. Nonetheless, the advantage of observability is essential in both stages. It is now a motivating factor for the majority of organizations that saw concrete results, and the accomplishments of early adopters might impact the further adoption of GenAl.

It was evident that ethical and environmental concerns persisted throughout the dissemination phase about Al's contribution to innovation as can be found in Mariani and colleagues (2023); Prasad Agrawal (2023); Xie and Wang, (2021). Strong mechanisms must be established for the ethical monitoring of sensitive data due to data privacy issues, especially during the implementation phase. This is because bias and fairness issues demand constant observation and improvement to guarantee long-term results. Environmental dynamism and ethical quandaries are therefore investigated in this study as modifiers in the link between the adoption of GenAl and both exploratory and exploitative innovation.

2.2.2 Theory of resource-based views

According to Nayak and colleagues (2023), the resource-based theory provides an applicable lens through which one can understand the dynamics of organizational strategy and competitive advantage. In addition, some scholars employ the same theoretical framework in analyzing how the unique assets and competencies of an organization determine its ability to obtain and sustain a competitive position within the market as stated in Saw and colleagues (2022). According to Just (2024), Singh and colleagues (2024), and Kanbach and colleagues

(2023), GenAl implies that there must be the ability for someone to produce new and fruitful outputs, such as ideas, data, and solutions. Under this perspective, companies having strong general abilities will benefit as they will be better at providing new and innovative inputs when I quote the studies in Nayak and colleagues (2023); Srivastava and colleagues (2001).

It was at this time that strategic management deployed, integrated, and protected the GenAl resources. The move made Al-Surmi and colleagues (2022) and Dogru and colleagues (2023) respond with the structures and procedures properly within their operations and decision-making on use. Further, previous studies revealed that a firm needs to attain higher profitability first before it can sustain itself. However, the RBV approach has altered the way that companies might ensure success. Proponents of RBV argue that an organization's capacity to outperform rivals in an equivalent market is a direct function of how well it makes use of its VRIN resources.

According to Abrokwah-Larbi (2023), the resource-based strategy positions the use of GenAl in strong B2B collaborations that help support the organization's achievement of better efficiencies, innovativeness, and collaboration. Companies that use GenAl well in their B2B operations report being able to be more competitive, operating efficiently, and making correct decisions if we refer to the study in Chen and colleagues (2022); Li and colleagues (2021). The competence of an organization's Al is strategically important.

Except for the Al acquisition, the success of the AI-OP system implementation requires organizational and human resource extension. According to this theory, this internal capability for the organizational technological infrastructure impacts its ability to adopt or implement the innovative technology as can be found in the studies in O'Connor and DeMartino (2006; Olan and colleagues (2022); Nayak and colleagues (2023); Baabdullah (2024). For example, if an organization is to reap complete benefits from having modern management information systems implemented, it would have to use its technology resources effectively along with acquiring the necessary skills for personnel.

Technology-oriented organizations usually look for ways to strategically utilize their resources to increase their performance in the future. One intangible type of resource is the ability to use Al algorithms to provide novel solutions. In helping organizations develop new ideas, processes, or solutions, GenAl-based systems may inherently encourage exploratory creativity. According to Srivastava et al. (2001) and Nayak et al. (2023), the resource-based paradigm fits nicely with the stress of having special resources that might provide a competitive

edge. Businesses that effectively use GenAl for exploratory innovation may acquire unique skills that will improve their performance going forward.

2.2.3 Model of Technology Acceptance (TAM)

The acceptability of new e-technology or e-services has utilized the TAM in studies about this topic: Davis, 1989; Davis & Venkatesh, 1996. One of the most practical contributions of Ajzen and Fishbein to their TRA theory is TAM. One of the most commonly applied models in the area of consumer acceptance and usage of new technology is Davis's technology acceptance model as stated in Davis (1989); Davis, Bagozzi, & Warshaw (1989). The attitude and intention of the users to use a technology have been established to be related to their opinions regarding the usefulness of the technology. Perceived usefulness has a more harmonious relationship with utilization as compared to other model variables. Therefore, the researcher decides to develop a new study model using PU and PEOU. The degree to which a user feels that using a particular technology will enhance working performance is referred to as perceived usefulness or PU.

The TAM is an information systems theory that explains the process of persuading users to adopt and use a new technology quoting Davis (1989). Information system scholars have widely applied it in solving the problem of persuading organizations to adopt new information systems when we refer to the Liu, Dedehayir, & Katzy (2015). Perceived utility and perceived ease of use are two factors TAM identifies as the most significant predictors of users' acceptance as shared in Davis, (1989). In the very basic idea, the higher the perceived usefulness of the program for improving performance, and the fewer the efforts in using it, the more adoption there will be. Many other parameters have been added over time since its development.

The factors influencing the adoption of big data projects were analyzed using TAM. As an example, Soon and colleagues (2016) utilized TAM to investigate the determinants of the adoption of big data. The results were presented in such a manner as to demonstrate that perceived advantage and utility are significant drivers of big data adoption, but perceived ease of use is not a predictive driver. Liu et al. (2015) tried to see the impact of shifting social influence on the uptake of big data by any given firm by integrating the concepts in TAM. The use of big data projects falls within the influence of social factors; that is, group attitude towards the subject could influence the rate of big data implementation among organizations.

2.2.4 A sociotechnical system perspective on AI

Only the synthesis of three domains: 1) how artificial intelligence (AI) systems function, 2) what ethical, political, and social issues they raise, and 3) what the best strategies for addressing them are can be adequately informed without a sociotechnical systems view. It is also an appropriate perspective from which to design AI; attention should question not just the inner workings of the technology and whether or not it is doing what one wants it to do but rather how it might become implemented within larger sociotechnical systems in which it will be applied. This paper first lays out some conceptual frameworks for sociotechnical systems and then discusses their topicality and specifically how they may fruitfully advance existing methodologies. The final section discusses the questions about 'values' and thus ethics that such a sociotechnical systems approach raises.

Although AI systems also are sociotechnical systems, van de Poel (2020) maintains that since AI is different from other technologies in being autonomous, interactive, and adaptive, there are extra (basic) building blocks of AI. This implies that AI can adapt and learn from its surroundings. Naturally, self-learning and adaptability are also features of conventional sociotechnical systems, but they are mediated by human agents. Technical components of AI systems also enable environmental learning. Therefore, Van de Poel (2020) suggests two more components—artificial agents and what he refers to as technical rules—for AI systems as sociotechnical systems. According to this conception, artificial agents are non-human, inadvertent entities with the capacity to independently modify themselves in response to environmental stimuli. Similar to social institutions in conventional sociotechnical systems, technical rules govern how artificial agents (and other technology) interact with one another.

According to the study in Ziliotti and colleagues (2023). AI systems have the potential to upend institutions and societal norms. For instance, social media has already affected how democracy functions and is traditionally understood social robots have blurred the line between human and non-human entities, including robots; now, ChatGPT is changing the existing patterns of writing and learning methodology as shared in Shidiq (2023).

Accepting the disruptive potential of AI would be more than just an issue of technology. Institutional and regulatory changes, changed operator skills, changed user habits, and even some new moral, legal, and philosophical ideas might come into play. Because this is a sociotechnical systems view by definition, an integrative approach to this kind of problem should be helpful in this scenario.

More specifically, a sociotechnical systems approach may have three components—institution, culture, and governance—that are absent or at least less noticeable in other methods. Institutions are significant because they have an impact on how AI systems operate, especially on how people interact with technological components and one another. However, based on cf. Akata and colleagues (2020); Norman (2018), the importance of social institutions is not always taken into consideration by even certain techniques that emphasize the human aspect in interactions with AI, such as hybrid intelligence and human-computer interface (HCI).

Culture is a key element we want to put forward. We think it is important to bring culture into the picture which at times is left out of the discussion when we look at AI systems although it may be a very informal institution. Cultural elements which include what we think and what we expect are present in the design of AI system training data. Also, the roll out of AI systems does not only present but also in some cases perpetuate these models. Thus, culture plays a large role in the adoption of AI systems and in what we consider their success instead of the assumption that the system is in a norm setting environment.

Governance is a third component. Rightfully so, AI ethics are receiving a lot of attention these days. However, effectively addressing the moral and societal concerns brought up by AI systems involves more than just following moral principles and designing them correctly; this therefore presents a need to consider higher levels of governance and political concerns, too. Because of its intricacies like sociotechnical systems, addressing the disruptive potential of AI involves a range of coordinated technical, social, economic, and governance decisions—otherwise politics—beyond ethics.

Lastly, the design of AI systems is affected by a sociotechnical systems approach. It implies, among other things, that AI must be created and planned with consideration for the sociotechnical systems in which it will be used. For instance, the particular environment and the tangible sociotechnical systems in which AI systems will be integrated may influence our understanding of values like explainability and justice. In addition to using broad design principles or fairness measures, designers should additionally customize these considerations to the particular context and sociotechnical systems in which the relevant AI technology will be used.

A further design consequence is that design should address other aspects of AI systems, such as institutions, rather than only technology. Formal institutions are one example of an aspect that may be created. However, sociotechnical systems are sometimes impossible to build

from the ground up, and their dynamics might occasionally be so complicated and emergent that they cannot be designed strictly speaking. In these situations, however, it is frequently still possible to design solutions for such systems, and the focus may change how to do so. In any case, the design view on AI is greatly expanded by a sociotechnical systems approach.

2.3 Inclusion Criteria and Exclusion Criteria

2.3.1 Inclusion Criteria

The inclusion criteria have recently been broadened to guarantee the appropriate selection of pertinent material for a thorough and accurate examination of the research concerning the effects of generative Al on software product management and the function of the product manager.

1. **Relevance to Generative Al and Product Management**

Research should focus on the impact of generative Al on the product management process, highlighting aspects such as Al-driven decision-making, task automation, and enhanced collaboration. This will also entail research on the use of Al technologies by product managers to optimize productivity, develop new product strategies, and provide customer-focused solutions. This topicality will ensure that every chosen research is at once adding to the understanding of the correlation between generative Al and product management.

2. **Time Frame (2011-2024)**

   Since other works of literature also existed within this timeframe, the present review will presumably bring about existing trends within the field of generative Al and its usage, as well as a critical period of relevance to recent upswings in the advances of Al-specifically since more products like GPT started coming up and which represents a significant window within scope**.**

3. **Focus on Managerial Roles**

   The studies need to find out the new duties of product managers in the context of Al. They will be emphasized in their participation in decision-making, formulation of strategies, and work in cross-functional teams. Among the perspectives of interest to the study are skill transitions, the imperative of Al literacy and how product managerial expertise can be adjusted to Al-driven environments**.**

4. **Theoretical Frameworks**

The preference is expressed to those studies that use familiar frameworks, including Technology Acceptance Model (TAM), Innovation Diffusion Theory, or Socio-technical Systems Theory. These models offer an analytical approach to the available study of Al adoption, team processes, and management decision-making, and thus have a theoretical background.

5. **Real-world Applications**

   Preferred are case studies and industry reports on the use of generative Al in the management of software products. This guarantees that actionable insights and best practices are introduced during the adoption of Al technologies to revolutionize jobs such as market research, requirements engineering, and an agile project management.

6. **Language**

The publications in English are considered only. This will ensure the accessibility and also the coherence of the analysis to be understood. This will eliminate the necessity of translation, and therefore, there will be no errors in the selected research.

2.3.2 Exclusion Criteria

The literature review is well organized and critically oriented, and the exclusion criteria is well drawn up to ensure that the research conducted is of high quality, not old or irrelevant.

1. **Irrelevance to Generative Al**

Any research that is not related to the sphere of generative Al in the slightest and its specific applications to product management will be excluded. An example of this is the technologies, which cannot be monitored by generative Al, general Al research, and irrelevant software development tools..

2. **Outdated Focus (Pre-2010)**

The studies conducted prior to 2010 cannot be put under this category since they were carried out before the advancement of the technology of the generative Al. The research, therefore, is in accordance with the current developments and trends.

3. **Non-Managerial Contexts**

   They do not include research studies that do not take managerial perspectives into account and only study technical or engineering aspects of Al. Algorithms or

frameworks of studies that have no correlation to administrative duties or responsibilities, such as, are not covered.

4. **Lack of Peer Review**

   Removed the literature that solely investigated Al as an engineer or scientist but failed to consider the viewpoints of administration. Other research about Al algorithms or frameworks, such as the ones that are not necessarily related to the responsibilities or functions management is not covered.

5. **Unrelated Sectors**

   Areas such as healthcare, education and agriculture are some of the areas that have avoided writing unless it is directly related to the process of software product management.

6. **Non-English Language**

   In order to be consistent and reachable, published works in other languages but English are excluded. An exception might be made when it comes to revolutionary discoveries and in order to decrease the chances of misinterpretation most studies are done in English.

These standards ensure that the literature is reviewed in a focused, systematic, comprehensive and relevant manner. These aspects allow defining the most relevant and useful findings and defining the irrelevant or peripheral content as the literature analysis is limited to the study aims and objectives. The emphasis on up-to-date, peer-reviewed, and practically relevant research ensures the high quality of this literature review, as well as helping to comprehend the development and role of the product manager in generative Al better.

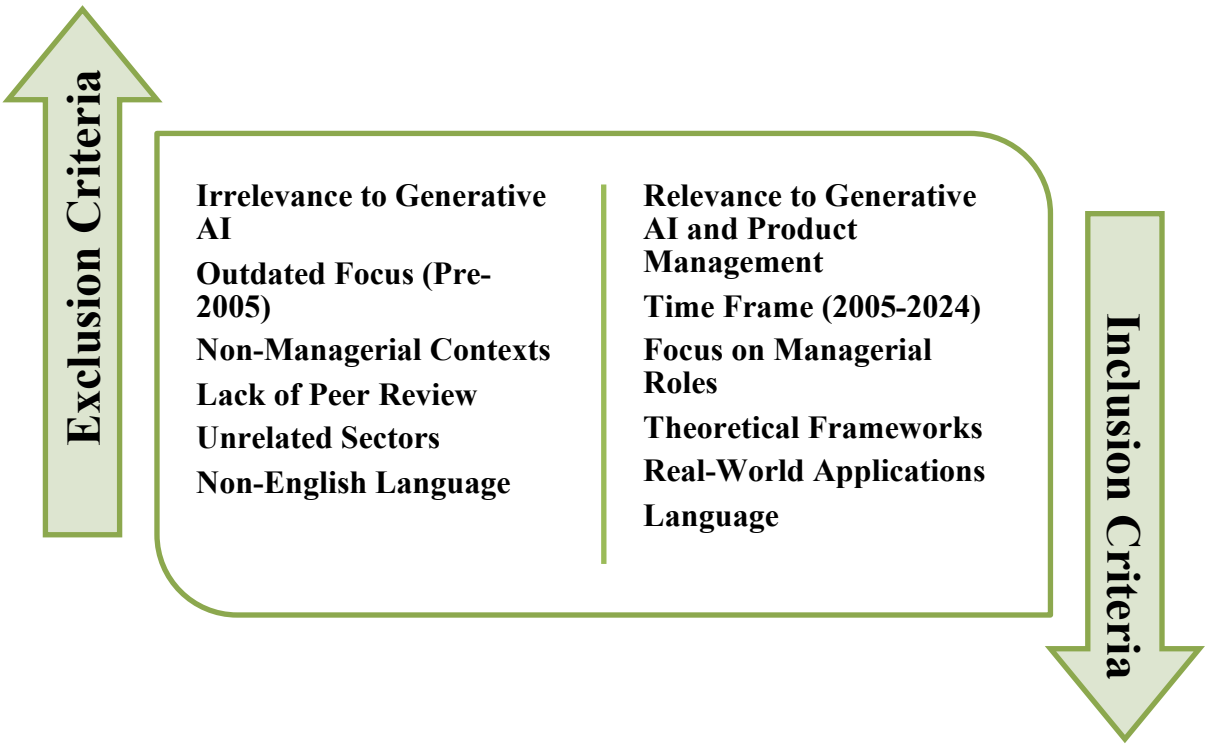

Figure 5: Exclusion and Inclusion Criteria

Source: Author

2.4 Clear Organizing Themes

The artificial intelligence (AI) has turned out to be a disruptive factor in product management with its theoretical framework that transforms the process of inspiration to market penetration. These abstracts go into great details on the theoretical background and practical implementation of Al in product management and also underline the importance of Al at each stage in the product lifecycle. Al is a creative stimulant used at the brainstorming phase of the product creation process and enhances creativity with the help of sophisticated algorithms and data-driven information. In order to support product managers in strategic decisions made throughout the rest of the market research and validation, Al offers them the state-of-the-art tools that help analyze customer moods, trends and preferences. The aim of the chapter is to provide insight into the enormous base of available information regarding generative AI and product management practices.

In this section, a broad literature analysis has been done to find commonly existing trends and gaps in research that would be further researched. In addition to the discussion of the effects on the team dynamics in managing software projects based on generative AI, a description of the concept of generative AI capabilities and applications has been drawn. Moreover, the research is carried out to discuss the impact of generative AI on the work of a

project manager and the way AI is implemented in the project management practices. In this part, the gap in the research is identified, and a theoretical framework is also elaborated on. A product manager has a responsibility of making sure products are designed and effectively introduced in the market. They are the mediating force between the stakeholders, teams, and clients. They manage the process and the plan of the product throughout its entire lifecycle and serve as a conduit between the teams, stakeholders and consumers.

Al helps to make quick iteration and enhancement at the most important phase of development prototype which accelerates the process of development and yields better adaptability of the product. The prototypes can be iterated with the use of machine learning techniques, which can be applied in a short timeframe and that too according to the dynamic market needs depending on customer feedback. Al-driven solutions revolutionize usability and user experience within the realm of product design through the use of computer vision, natural language processing, and recommendation algorithms to make product interfaces personalized and gratify a range of preferences by users. Al-driven testing approaches optimize scalability, performance, and reliability at testing and quality assurance, which decreases the chances of the failure of the product as well as enhances the overall product quality.

AI has ushered in an era of innovation, efficiency, and economic importance in the fast-changing world of product management based on Horowitz and colleagues (2022); Cockburn and colleagues (2018). The theoretical review given will consider an intertwined relationship. From the inventions to market process invasion from Al towards product management. Referring to studies in How and Cheah (2024); Akindote and colleagues (2023); Farayola and colleagues (2023), This conversation aims to explain how Al transforms traditional product paradigms of management and fosters an atmosphere of continuous innovation by analyzing Al's theoretical underpinnings and practical applications throughout the product lifecycle.

2.4.1 The role and responsibilities of a software product manager

The duties of a software product manager vary depending on some criteria, such as the industry verticals, the size of the firm, and the culture. Across the entire product life cycle, product managers often spearhead the vision and also provide support for the product. By balancing conflicting goals of such features vs time/costs and other means, developing a vision that complements business objectives, monitoring software development progress, and such, a product manager also controls the scope of a project. The origin and development of new ideas

need to be supported by a proper creativity process for product management. Based on inputs gained by them on company strategies and development processes, it then decides which one goes through the process of development. The product manager also has to consider input provided by users while developing an idea; it helps in the betterment process also. A part of making the vision a reality is also the product manager working on the product strategy. This includes creating and maintaining a workable plan that considers all strategic objectives. One of the more important aspects of managing a software product is to keep in compliance with deadlines, including those of the implementation and delivery development phases. With consideration of every feature's relative rating, the product manager determines what to implement within their product. Most critical one's feature in the final list after rating the features in terms of priority or relevance.

A product manager manages teams of people with multiple departments and is in charge of success from conception through product obsolescence. Here are some important roles that every product manager takes. One must be knowledgeable in their respective industry because a product manager has to guide the members in their development. An excellent product manager is aware of the problems facing the industry and knows how to interact with consumers. Product managers use focus groups, interviews, and surveys to do market research for their products. The product manager carries out the research whenever teams need to learn more about the market, user demands, or the product itself. Strategy for the product: The long-term market vision must be understood by a product manager and understandably communicated to their team. To synchronize all features, they also make sure that the tactical deliverables are connected to the product strategy. The development of new features or products is prioritized by a product manager. Both user input from their market research efforts and strategy alignment serves as the foundation for their decisions.

The product manager position fascinatingly combines technology and business. It calls for familiarity with both of these areas as well as the capacity to interact with all parties efficiently engaged in product development. Product managers must comprehend how issues may be fixed with a focused product strategy that best serves the demands of customers and businesses. Every product manager needs to have outstood writing and speaking abilities and be a skilled communicator. Every day, they will need to communicate with executives, engineering teams, and consumers smoothly. A product manager should be able to communicate larger pictures to others. They ought to be aware of what is technically possible and how many stakeholders might contribute to the value of their product. Last but not least, a

successful product manager isn't only concerned with the present or future. They work to develop best practices for product management and a long-term plan for the company.

2.4.2 Overview of Generative AI Capabilities and Applications

Generative AI is the advanced subset of artificial intelligence, according to Lv (2023), based on training data, assisting the system in developing a wide variety of content, such as text, audio, images, and synthetic data. Generative AI, based on AI models, particularly large-scale neural networks, has gained more popularity with tools such as Google's Bard, OpenAI's GPT, and other advanced models. By recognizing patterns underlying massive datasets, such AI frameworks can generate contextually meaningful, coherent, and even mirror the structure and style of incoming information. At the lower, generative AI is based on the deep learning concepts, where networks with millions or even billions of parameters are adjusted to learn complex representations of images, human language, and other data.

Lee (2023) states that the most significant role of generative AI is self-supervised learning. This is the concept of learning without specified approvals with the exposure of systems to untested data and teaching them to predict some aspects. This process has been supported by the use of transformers to enhance the advances achieved in generative AI because it enables models to pay attention to various aspects of a sequence of inputs, enhance the contextual perception and the connection between various data points

. The reason generative AI systems are capable of producing anything from written language to visual compositions is the abundance of training data, computational power, and self-attention mechanisms.

The study by Cao et al (2023) describes some of the major applications in which generative AI is already being put to use. For instance, it discusses how generative AI can fundamentally transform communications by enabling personalized automation of marketing collateral and social posts—even including creative writing—thus fundamentally changing company communication strategies. In the visual arts field, for example, this means enhanced creativity through AI-generated artworks. Other examples include enhanced customer experience whereby characters, dialogues as well as narrative storylines are dynamically created within video games and other entertainment content. Businesses that process the implementation of generative heterotic AI technologies will have an application process

frowning at them more rapidly in self-service chatbots, predictive analytics as well as real-time decision-making.

Marrone (2023) claims that because AI can replicate human thought processes, it is being used more and more in a variety of industries, which has resulted in paradigm shifts in product development, marketing, and distribution. By giving product managers unprecedented abilities to analyze massive amounts of information, spot trends, and derive actionable insights, it has completely transformed every stage of the product lifecycle. It initially enables the groundwork to be laid at the ideation stage of new product development. In this case, Al encourages innovation by converting old brainstorming processes into state-of-the-art algorithms and predictive analytics. The product managers might develop a new product proposition using insights gained from Al-based discovery regarding consumer preference direction and future trends or market needs. When the products progress from an idea to market validation, Al then supports extensive customer validation and market research activities. Product managers may enable data-driven decision-making and risk-reduction strategies through the application of advanced data analysis tools that help extract invaluable insights into consumer behavior, preferences, and attitudes.

In addition, Bhinder et al. (2021) note that the most impressive application of generative AI in scientific research is to make the discovery process more effective by AI. AI models which have enabled researchers to determine molecular structures for developing medicines in the field of cancer and genetic disorders have changed the face of research in physics by accelerating data analysis and helping in tracking particles and modeling complicated experiments as also found in Pagliaro & Sangiorgi (2023). Simulation- and hypothesis-generating tasks were automated by AI-driven models, which allowed scientists to increase the speed of their processes and deliver potentially transformative results that are quicker. This unshackles scientists for more creative thinking and broaching of more challenging matters.

2.4.3 Effects of Generative AI on Team Dynamics in Software Product Management

Li, Zhou, and Mikel-Hong (2024) note that the generative artificial intelligence wave has changed not only who plays what role in product management but also how teams work together—therefore changing the dynamics of software product management. The general function of product managers is to articulate needs, assess features, and ensure alignment between departments. Generative AI adds value by automating a great deal of data processing as well as content creation. It will have some tools that respond to the customer sentiment analysis and market prediction among others that will help in making decisions more informed

and faster. The integration of artificial intelligence will change the emphasis of the product managers to innovative problem solving across the team lines and planning.

The creation of AI according to Al Naqbi, Bahroun, and Ahmed (2024) reports to be that which product management can rely on to one of its foundation benefits is the automation of repetitive tasks and uninterrupted flow of processes. We also learn that product managers can propose the employment of generative AI in the examination of massive aggregations of client remarks, enhance layouts, and actually create primary wire frames within minutes. And which consequently leaves a team member less to do. This will also lead to a certain amount of time off the routine of design, engineering, and analysts so that they can be working on what needs creativity and human touch. Secondly, AI based info will also be incorporated into the product decisions made by the team and thus will enhance the collaboration with data and decrease the influence of intuition and subjective judgment. This also introduces a more loose method whereby info is provided in form of input as far as decision making is concerned and we observe the product development cycle accelerating.

Nevertheless, Dell'Acqua et al. (2023) claim that AI usage in a team has certain effects, in particular, it leads to a change in cooperation and communication. Recommendations and automated tasks offered by the AI may result in an increasing dependence of team members on the results, which decreases the number of face-to-face interaction and cooperation. Human component is reduced in the situation of creativity and innovation when team members grow introverted in their dependence on AI-based knowledge. Thirdly, teams were not able to know how AI-based recommendations are generated as the AI systems do not always communicate the information about the way these systems generate recommendations, which may cause a conflict of trust and responsibility in team.

Parikh (2023) thinks that ethical issues will likely become more significant as generative AI becomes the standard for product management. Although these AI-created decisions are effective, they depend largely on potentially biased history; overreliance on AI can perpetuate that same bias in product development. Product managers should, therefore, be careful when accepting the insights generated by AI as they go into their products without sufficiently digging to ensure that their decisions do not inadvertently endorse damaging stereotypes or have disparate impact on customers. This calls for adherence to moral standards, openness in AI procedures, and ongoing observation of AI results to prevent unintended consequences.

2.4.4 Generative AI and Business Administration

The desire to reduce the time and expense of executing tasks leads to the development of AI-based solutions. It is tough for any organization to seek answers from the variety, complexity, and adaptability while doing things more effectively and efficiently. Many organizations are still in need of standardized and procedural (formal) methods, thus modern applications of generative AI relate to Max Weber's bureaucratic theory of management, as indicated by Monteiro & Adler (2022).

As indicated by Newman, Mintrom, and O'Neill (2022), workers of organizations that introduce generative AI will face the atmosphere of automatically running procedures, guidelines for standard business document templates, and handbooks that comprise information that is mostly utilized. How an organization navigates the paradox theory and how to balance automation and augmentation will be what determines how generative AI will be applied in management. While automation implies that a computer can replace human work, augmentation involves close collaboration between humans and machines.

Raisch and Krakowski (2021) contended that augmentation and automation in the management field are inextricably linked within the framework of the paradox theory. While AI may be used to produce new ideas, an organization would probably select a strategy centered on the automation of operations for organized chores like filling out bills. Although rule-based automation may be used to solve many more complicated managerial challenges, managers may choose to employ an augmentation technique to delve deeper into the issue. When management responsibilities are increased, they will eventually be automated, this will eventually lead to even more augmentation. In general, this will especially come in handy for difficult, unusual jobs once the deterministic method is unfeasible (Davis & Marcus, 2015). Widening the acceptance of generative AI technologies will be an aftermath when a more holistic management approach, including automation and augmentation, is implemented.

2.4.5 Influence of Generative AI on the Role of the Product Manager

As Gupta and colleagues (2024) noted, the generative artificial intelligence (AI) enabled transformation in building strategies based on data substantially changes the role of product managers. Classically, product managers rely on intuition and anecdotal feedback to get the customer needs. The new generative AI enables them to come up with more accurate modeling of customer traits and dwelling preference specifics. The current AI systems are able

to model the large volumes of data to identify the associated trends and preferences that are likely to be unidentified manually with the propensity of behavioral trends and potential pain points.

Product managers will be in a better position to design products that are more user-friendly hence addressing the needs and wants of their target market. The evolving functions of product managers in the era of artificial intelligence demand new approaches and technologies that would enable them to remain on top of the dynamic industry. A major shift in the interaction of product managers with the customers and the way they respond to their input has occurred recently. This is more so because of the incorporation of artificial intelligence into the product management toolbox. These changes are briefly examined here and what they imply concerning where the product management profession is going.

Furthermore, Holmström and Carroll (2024) indicate that generative AI has done so by changing how product management undertakes brainstorming among other creative tasks. AI is associated with improving and facilitating brainstorming sessions through idea generation, new feature proposed to be discussed, and design variations which, in turn, presents teams with an enhanced number of options. We observe that these AI generate a prediction that is founded on what is popular and trending which product managers can use as a framework in generating creative ideas and in turn which they can leverage to enhance the unique selling point of their products. This creative push of the team that we can collectively call as such is what leads the team to think out of the box more of which is also what we find is that the time spent brainstorming is minimized which in turn results in more innovative products.

Ghorbani (2023) highlights that generative AI is the most efficient in terms of creativity and robotization of the repetitive work in the product management. Product manager has to undertake data analysis, reporting and documentation which are important but are time-consuming activities. Artificial intelligence algorithms can produce reports, user input, and even documentation parts. With the automation of such processes, product managers could work on high impact activities such as planning of strategy, aligning the team and refining the product vision.. For instance, AI may help in collecting hundreds of thousands of user reviews or generating long reports for market studies, leaving more time for product managers to focus on insight analysis instead of data collection manually.

According to Parikh (2023), however, generative AI has both positive and negative impacts on product managers as it changes the skills required by product managers. With more

data-driven employment taken over by artificial intelligence, product managers need to be well-informed about the pros and cons of the technology to effectively integrate such developments. They should also ensure that AI-generating insights align with the strategic goals of the product and adequately address customer's wants. This demands proper interpretation and a critical attitude towards the results generated by AI. The product managers need to also look out for biases in the output generated by AI to ensure that personas and suggestions generated by AI are not inadvertently causing prejudice or exclusionary behavior.

2.4.6 Including Al Technologies in the Product Lifecycle during the Development Phase

Al also puts in place data analytics and business intelligence in companies which in turn allows developers to make optimal decisions and access relevant data. We see that data analytics algorithms which are put in use can look at user engagement, performance indicators, and market trends to present out patterns, trends, and opportunities. Also, business intelligence tools which may include analysis of sales info, customer reviews, and competitive environment support strategic decision making. The developer in this way improves resource allocation, keeps stakeholders in the loop, and promotes long term growth as also which is reported in the work of Nembe et al (2024) which we also report here.

AI simplifies processes for developers on cloud services even more. It takes care of the four core functions of cloud computing services which allows developers to deploy products more efficiently and at a lower cost. With cloud computing, containerization technology, and AI guided development tools, developers are able to rapidly launch and scale products. Similarly, containerization technology allows applications to be developed and deployed across multiple different architectures and configurations. Developers encapsulate applications into portable containers which allow flexible execution across different computing environments. This also enables rapid, reliable, and scalable lowering of the time to market. AI, also, allows designers to improve the privacy and security features of products. This gave rise to AI-powered cyber security solutions. For example, machine learning models analyzing network traffic to find patterns and identify anomalies related to woven threats are AI-powered anomaly detection solutions. AI-based threat intelligence solutions are the systems that combine various databases of threats and seek insights into the unknown threats or vulnerabilities.

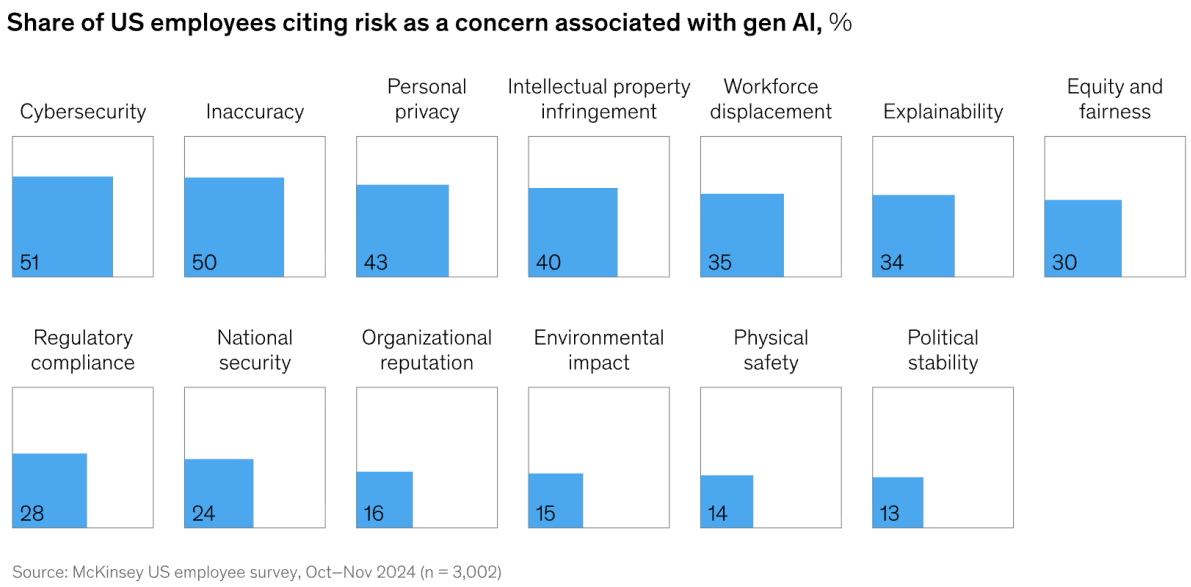

Figure 6: Cybersecurity Risk Associated with Generative AI

Source: Superagency in the workplace: Empowering people to unlock AI's full potential (McKinsey, 2025)

Therefore, the integration of AI-driven cybersecurity solutions into their products can help the developers to improve their security status, reduce the risk, and protect valuable information and resources against unscrupulous users.

Al's influence on the development stage of the product lifecycle is likely to increase significantly as it evolves and matures, bringing with it new opportunities for innovation and uniqueness in an increasingly competitive market as shared in Odonkor and colleagues (2024); Horowitz and colleagues (2022). Therefore, introducing Al technologies to the development phase opens previously unforeseen opportunities for the improvement of product capabilities, automates workflows, and makes work processes simpler. Developers may reduce testing procedures, improve code quality, and automate coding with the help of Al-driven development tools. Besides. Developers may enhance the chances of their products by using Al-driven features and functions that analyze user data, generate customized product experiences, and provide useful insights. By using Al-driven analytics and business intelligence capacities, the developers may bring improvement even in decision-making, develop and scale with speed, strengthen security measures, ensure privacy, as well as foster long-run growth and market competitiveness.

2.4.6 Integration of AI in Product Management Practices

Namatherdhala, Mazher, and Sriram (2022) believe that the integration of AI into product management systems is changing the approach of teams towards product development, communication, and cooperation. The existing literature on AI in product management already exists, and the technology is acclaimed as revolutionary in simplifying processes, deepening customer insights, and boosting product strategy. The use of AI technology may allow product managers to make data-driven roadmaps for innovations that better meet the demands of the customer by analyzing massive market data, forecasting preferences from customers, and keeping abreast of trends in competition. AI makes product management more responsive and proactive because analytics and reporting can be automated, which will help the product manager make choices based on facts faster.

In agile product management, where flexibility and iterative development are necessary, artificial intelligence enhances teamwork collaboration, and communication, as research from Zadeh, Khoulenjani, and Safaei (2024) states. For AI project management systems to keep team members well-informed and on course toward the goals of the project, it could make available real-time status reports of the project, anticipate potential bottlenecks, and provide possible solutions. Natural language processing (NLP) technologies can be used for more open and effective communication by summarising meetings, emphasizing significant points following a session, and automatically updating stakeholders on project progress. Teams can concentrate more on job execution and innovative ways to solve problems than on administrative work because physical labor is comparatively less required.

Cross-functional collaboration is encouraged, which improves agile methods as indicated by Tominc, Oreški & Rožman (2023). Based on a study of user input, AI would automatically categorize pertinent remarks on, say, several teams, which include marketing, design, and engineering. Each team may focus on certain aspects that are essential to their function thanks to this focused feedback dissemination, which also facilitates a cooperative approach to problem-solving and critical thinking and guarantees that product modifications are motivated by thorough and user-centered data. AI may be further assisted in controlling and aligning the sprint by taking a look at task relationships and resource allocations. These guarantees continued efficacy, productivity, and coordination of agility-based activities.

2.4.7 Generative AI and HRM

Although the impact of technology on HRM has been understood for a long time, the latest developments made a real change like work apparent as stated by Colbert, Yee, & George

(2016). Consequently, several classic management principles related to HRM have to be considered in a new context when generative AI is applied. One of the earliest labor management theories, scientific management postulated that standardization, training, and incentives can enhance organizational productivity. This hypothesis is considered to be one of the oldest and has been criticized for neglecting the needs of laborers. AI's rise has opened up new avenues for its advancement and revitalization as indicated in Cullinane & Cushen (2019). When it comes to HRM, a lot of its repetitive tasks may be standardized, automated, and completed by AI far more quickly and efficiently than by humans.

According to Votto, Valecha, Najafirad, & Rao (2021), recruiters are receiving more applications for each post as e-HRM has grown, and they are unable to evaluate the additional volume of information and make choices quickly enough as indicated in Black & van Esch (2020). Due to its ability to learn and keep improving, this automation capability puts ChatGPT a higher notch. ChatGPT can be trained to machine learn on HR-related data such as resumes, job descriptions, and HR rules daily to solve more routine tasks. On the other hand, human relations theory bases its premise on the notion that workers are important to the company as found in Bruce (2006). The management must consider their individual needs and interpersonal relationships to boost their productivity. According to Cooley (2016), they must also be afforded a chance to significantly contribute to the decision-making process. This, in return, demands continuous communication from the employer to the employees and AI is increasingly becoming more functional to optimize different processes in HRIS as stated in Eubanks (2022). Human contact will eventually be substituted by AI. Otherwise, it may be an essential tool that can enhance process effectiveness. However, building confidence in AI in them may be vital for effectively using generative AI for better human relations. Human resource development (HRD) may find its new home in generative AI.

2.4.8 Recognizing AI's Contribution to Product Development

Ghorbani (2023) describes an artificial intelligence system as significantly improving the ease of prototype and iteration processes, thereby enabling product developers to modify and upgrade designs based on user comments and performance indicators rapidly. The traditional methods which are iterative and labor-intensive in design, testing, and improvement have not been incorporated as a part of prototyping. In contrast, simulation and predictive analytics attached to prototyping systems under AI can expedite product configuration optimization cycles while reducing the requirements for manual interventions during the whole process. Generative design algorithms can operate automatically generating thousands of

design iterations within set parameters and performance objectives, thereby enabling product developers to indulge their creativity across many design spaces, helping them find optimal solutions much faster than before. Therefore, the integration of AI-driven cybersecurity solutions into their products can help the developers to improve their security status, reduce the risk, and protect valuable information and resources against unscrupulous users.

The AI-based prototyping tools provide lower development costs and enhanced quality, performance, and faster time-to-market to product developers who are faced with a shift-vector-driven change in the production of products that represent an unprecedented efficiency, innovativeness, and market relevance. They can use automation technologies, personalization methods, and AI-driven insights to create improved user experiences and shorten design cycles by enhancing the quality of their designs and marketing and distribution policies. The level of technological development will become a major factor that determines the product development process in the context of AI penetration into this sector; therefore, companies must constantly revise their products in relation to the evolving demands of the consumers.

Sarker (2022) claims that AI represents a force that is transforming and providing previously unthinkable innovation, effectiveness, and market relevance opportunities in the existing product development environment.

. Fundamentally, Al includes a wide range of instruments and techniques, from machine learning algorithms to natural language processing systems, which are intended to simulate the workings of human intelligence. Al's ability can help product developers gain data-driven insights, facilitate time-consuming processes, and boost decision-making throughout the whole product lifecycle. In reality, one of the central tasks Al has in product creation relates to improving creativity and processes of ideation. In fact, until now, the actual idea of a product has been mostly derived through human intuition, market research, and brainstorming. But Al adds another complexity to this process by exploring big information, looking at patterns, and producing new ideas that are historically in the patterns and trends and consumers' preferences as well. For instance, machine learning algorithms might look through mountains of data in marketplaces, social media trends, and user inputs to identify previously unmet customer needs or new business opportunities. By using AI-driven insights, product developers may come up with new product concepts that satisfy consumer wants, predict market trends, and get a deeper understanding of their target demographics.

Campbell and colleagues (2020) claimed that Al's critical value addition to the optimization of product marketing and distribution policies helps the product developers focus on the target audience for their product and personalize the marketing message accordingly. And optimize the distribution plan to maximize effects and impact. For instance, using historical sales data and demographic information about consumers combined with market trends, Predictive analytics algorithms can predict possible demand and identify possible growth opportunities. That is too. To enhance the rates of conversion and customers' happiness, this type of recommendation system can support an analysis of user behavior and preferences to personalize the marketing messages and product recommendations. Participation. The product manufacturers will maximize the funds allotted for different approaches by marketing and distributing assistance which Al drives.

As discussed by Walz and Firth-Butterfield (2019), Al profoundly impacts product development in areas such as testing and quality assurance. The manual test process implemented in the quality assurance technique previous to this required a considerable amount of time, and manual effort, and was often error prone. Al-driven testing solutions use machine learning algorithms to auto-activate the design of test cases to optimize coverage and detect bugs. For example, automated test creation algorithms may scan the requirements of a product to yield large test suites that could cover many different usage cases and edge conditions. Detection of anomalies can indicate behavior that deviates predicted behavior and highlights potential issues before they become significant faults through real-time analysis of performance data. Al-powered testing solutions can assist in making products more reliable. It will reduce the likelihood of problems and decrease the release of intervals.

2.4.9 AI Prototyping: Quick Experimentation and Iteration

Prototyping has always been seen as an important aspect that helps the product team visualize, fine-tune, and remodel their ideas before taking them to the expensive step of production. The cycle of design, test, and revision has naturally made prototyping a time-consuming process; however, it is now being revolutionized by artificial intelligence to allow speed testing, optimization, and iteration which was never previously possible. Simply put, Artificial Intelligence refers to a quick set of tools and techniques used in simulating the cognitive function of humans. The more specific systems falling under this category are machine learning algorithms and computer vision algorithms.

Product developers may use artificial intelligence for the automation of monotask activities, for processing large datasets, and for providing design options. Speed, accuracy, and

efficiency are also included. A major metamorphosis in prototyping comes about through machine learning techniques referred to as generative design algorithms automatically creating and testing alternatives based on preset targets and constraints. This way it provides an avenue to large design spaces with thousands of iterations being created within a fraction that would be taken up by normal methodologies. For example, the prototyping process in product development can be highly sped up by implementing AI-powered generative design technology.

Additional uses for Al-driven prototype technology include automating time-consuming tasks and facilitating collaboration amongst cross-functional teams and stakeholders. Al is used by collaborative prototype systems to organize feedback, offer version control, and enable real-time design collaboration. In terms of communication and collaboration, using Al prototype technology might enhance workflows, reduce errors, and speed up decision-making on a single platform. Additionally, the designers may employ Al-based design aid tools that can evaluate user input and offer suggestions and ideas in real-time to minimize design issues and optimize design solutions repeatedly.

To put it briefly, prototyping with Al presents previously unheard-of chances for quick iterations. The process of developing a new product involves testing and optimization. Al-powered generative design, simulation, and collaboration tools may be used to evaluate a greater range of design options, accelerate the prototype development process, and produce more inventive, dependable, and user-focused solutions. Al's impact on the prototyping industry could increase significantly as it matures further, opening up new opportunities for innovative thinking and tactical differentiation in the increasingly competitive business.

2.5 Research Gap

Some research gaps can be observed in the existing body of literature on generative AI and product management, and this study addresses them. Although research indicates that AI is likely to alter activities, improve data analysis, and generate insights, there are few explicit ideas on how this will change the role of a product manager. There is a lack of deep information on how generative AI impacts the daily activities, competencies, and strategic involvement of product managers; most studies either speak about AI adoption at the organizational level or concentrate on more general automation effects. In addition, team dynamics in AI-driven product management settings have not yet been researched. Though AI has a proven capacity for process facilitation and enhanced decision-making capabilities, the generative capabilities of AI are not so well known when it comes to altering team interaction, communication, and

ethical considerations within a product management team. The point is a crucial one because involvement from AI alters the nature of the role that work is assigned and thereby loses accountability and trust because of reliance on output by AI.

ChatGPT is one of the major issues that the industry is facing as a result of the introduction of generative Al, according to Dwivedi et al. (2023). These Al models present serious ethical issues as they are unable to comprehend or recognize moral and legal problems. The production of malevolent disinformation and deepfakes is one such ethical dilemma. The issue of explainability and transparency arises from the fact that Al systems are "black box." It's possible that biases in the training data have to be reproduced, which might lead to inaccurate information. There are several legal issues, such as hazy copyright boundaries, no regulations governing Al's development, and dubious ownership of everything produced by Al. Additionally, the writers anticipate that when Al. Additionally, the authors predict that increased reliance on technology and job losses would result from Al's integration, which would impede human development and leave organizations exposed if technology fails. Furthermore, generative Al systems' limited originality results from their capacity to only integrate current information. Al's social and personal acceptability might lead to a new sort of digital divide. Lastly, efficient usage of the generative Al requires a lot of new skill training to provide excellent prompts.

2.6 Summary

This chapter will go over how the development of generative AI is changing product management practices and strategies, as well as the function of the product manager. An overview of generative AI's capabilities has been provided here, emphasizing its capacity to assist in creating consumer profiles, comprehending customer requests, and generating ideas during brainstorming sessions. The paper discussed how AI automates data analysis and documentation procedures. Due to the simplified procedures, product managers could focus on making strategic decisions. The chapter also analyzed the possibilities of AI applications in agile product management. The possible improvement in communication and cooperation can be the possible applications of AI in agile product management. Product managers can remain relevant and efficient by embracing.

Adopting AI-based tools will help product managers remain relevant and productive in the business while simultaneously creating a more creative environment for producing

products. Amongst some of the added theoretical frameworks are the Technology Acceptance Model, Agile Product Management Framework, Socio-Technical Systems Theory, and Innovation Diffusion Theory which help facilitate the analysis of the use of AI as well as its ramifications.

Some of the key research needs are at the end of the chapter, mainly on the specific effects of generative AI on team dynamics and product management functions. As elaborated through the chapter, empirical research is required to get deep insights and optimize the application of generative AI in product management practice so that all the benefits of AI can be achieved and problems caused by AI can be solved.

Generative AI is going to change the way people search for information and apply the results to their personal and professional lives. More and more generative AI-based solutions are offered to improve the business functioning and performance of the business and its managers. In the course of this research, we propose that generative AI may affect managerial work at three levels: strategic, functional, and administrative, and it also introduces new ideas in management thinking.

Chapter 3: Research Methodology

3.1 Introduction

A Research methodology would outline techniques and procedures for the selection and analysis of information for a given research area. This is the approach a researcher takes in ensuring the plan of the research for its study to implement means whereby the selected tools could aid in attaining one's objective. It encapsulates every important feature within it- research design, how to collect data, analysis, and general perspective into which the research goes through. The explanations above aid in your comprehension of research techniques, and you should also be aware of the significance of selecting the appropriate approach.

A methodical and scientific strategy for gathering, evaluating, and interpreting qualitative or quantitative data in order to answer a research question or test hypotheses is known as research methodology. A sort of blueprint for carrying out the study, research methodology helps researchers stay on course by restricting the scope of their work. Before selecting a suitable research approach, several considerations must be made, such as potential ethical issues and study restrictions.

A study's research technique Involves several decisions about how to implement the procedures. For example, these pertain to various methods of gathering and analyzing data and justifications for why the chosen approach might be considered suitable for answering the researcher's topic. The validity and trustworthiness of the results are further ensured by a suitable study approach. Depending on the goals of the study, one of three research methodology types—qualitative, mixed-method, or quantitative—can be used.

Generative Al can help the project manager to effectively follow up and monitor the performance of a schedule, identify variations as well, and provide the needful corrective measures to them also as stated in Ghimire & Sagri (2024). Generative Al can, therefore, be able to reduce efforts in reporting and communication while progressing whereas the researcher highlighted that generating short progress reports in respect of the same would be informative to stakeholders about the progress. Another critical element of project management is project cost management, where, again, generative Al has scope for application.

Generative Al can also be used for post-project review in which it may help the project managers analyze the data of a project and provide post-project review reports, focusing on lessons learned and areas that can be applied in future projects. The other vital area of project

management is project time management. Generative Al can be used for that as well. According to Rane and colleagues (2024) The prime work of project time management is in handling the optimal and effective usage of time to accomplish the work within the time scale set for the scheduled schedule. In this aspect, by using generative Al tools like ChatGPT, the process to ensure that specific tasks have been done within the time slot is more developed, based on the superior language capabilities and the analysis skill set of the system. The opinion of the researcher is that generative Al also helps to estimate activity.

3.1.1 Objective of the study

The main goal of this study is to understand the ways in which generative Al has reshaped the role of a product manager and the dimensions of software product management. In that alignment, the objectives that would be answered by this study are.

- Examining how the adoption of generative AI impacts team productivity, innovation, and degree of satisfaction from stakeholders.
- Assessing the effect of generative AI on managing the lifecycle of software development.
- Understanding the impact of generative AI on the interactions and processes of teams managing software.
- Describing the changes in the functions and duties of product managers induced by generative AI.
- Proposing a comprehensive approach to incorporating generative AI into software product management.

3.2.2 Variables of the Study

People, places, things, and events are examples of what we call variables which are the elements looked at in a research study. In research we have independent and dependent variables which are the 2 main types of variables. Any element that may change like height, age, temperature, or results of a test is a variable. In most research studies independent and dependent variables are measured or manipulated out to determine cause and effect.

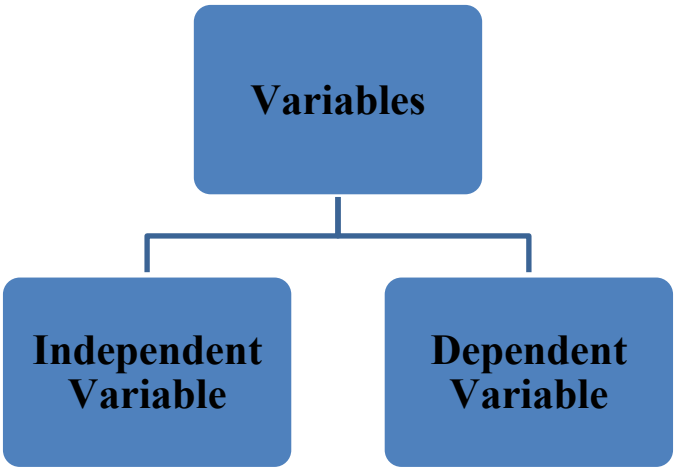

Figure 7: Types of Variables

Source: Author

1. Independent Variable

Researchers intentionally modify or select an "independent variable" to observe its effects on other variables, in this case, the dependent variable. It operates alone and does not depend on the results of other factors under investigation. The idea here is to determine if modifying the independent variable causes a change to the dependent variable. It is essential for independent variables in research, especially as it separates their impact, and assesses influence on results, determining cause and effect. The study's independent variable encompasses factors such as the Adoption of Generative Al, the Type of Generative Al Technology, and Generative Al Use Cases.

2. Dependent Variable

In research, a "dependent variable" is the effect or outcome that scientists want to measure or predict. It is dependent on changes in the independent variable or variables. In observational or experimental research, the dependent variable is the phenomenon being studied or assessed. The value is dependent on the independent variable being changed or varied. The study focuses on the dependent variables of Team Dynamics, Productivity Metrics, the Role of Product Manager, and Ethical Integration.

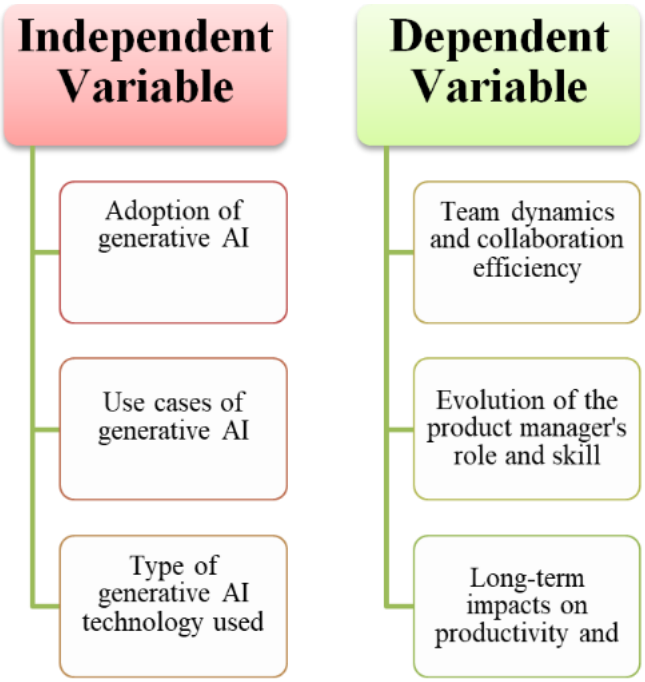

Figure 8: Conceptual Framework

Source: Author

3.3.3 Research questions

These are the study's research questions.

- How can generative AI be integrated into the work of a software product management team effectively and responsibly?
- What does the future hold for the role of the product manager in generative Al in the long run?
- How does generative Al change the dynamics and productivity of a team involved in software product management?
- What effects does generative AI have on SMEs' product management

3.3.4 Research Hypothesis

- There is large scale issue with regard to the role of generative AI in the team performance and workflow of software product teams.
- There is a large role of generative AI in the changing roles, responsibilities, and skills of product managers.

- There is a significant relationship between the integration of generative Al and the ethical considerations in software product management.
- There is a significant association between the adoption of generative AI and improvements in team efficiency, creativity, and stake which it has in stakeholders.
- There is a significant effect of generative Al on the processes and outcomes of product lifecycle management in software development.

3.4 Research Design

Since the study used a quantitative technique for its research design, it is mostly composed of quantitative components that are supplemented with qualitative ones. The idea was to change the role of the product management and product manager in the software business and respect the generative Al. This architecture allows one to measure such tangible metrics as the rate of adoption of Al, the perceived level of effect, and the rate of process success involving the use of Al in different businesses. Lastly, qualitative data received through interviews with product managers and the industry professionals could help to put the quantitative data into perspective and get a chance to understand the changes that have occurred in this area fully. Both kinds of data are summed up by the mixed-method approach. Although results in the form of qualifying insights of interviews and case studies will give more detailed and conclusive results, quantitative data in the form of answers to surveys and industry reports will allow obtaining generalizable results.

Figure 9: Sample Design

Source: Author

3.5 Population and Sample

The sampling method in this study includes a sequential mixed methods design, which is based on a purposive sampling method that will be used to select information-rich participants who actively participated in the implementation of Generative AI tools. This will make sure that only the relevant people who are in a position to offer any expert knowledge are incorporated. The sample will be based on product managers and AI experts, who work in different levels of AI implementation, including small business and big companies in various fields, including Software-as-a-Service, B2B Platforms, Insurance, Fintech, e-commerce, and health technology.

3.5.1 Quantitative Sample

The quantitative survey is directed at n=100 product managers and AI specialists. This sample size is justified by several statistical and practical considerations as discussed below:

Statistical Adequacy: A sample size of N≥100 goes far beyond meeting the rather modest requirement of n=30 imposed by the Central Limit Theorem for carrying out parametric statistical tests. According to Hair et al. (2010), such quantities are quite acceptable as samples for quantitative research in social sciences since it enables the application of parametric procedures responsibly, such as correlation, regression, and factor analysis.

Accuracy and Range of Mistake: According to Kish (1965), a sample of N=100 yields an acceptable margin of error of approximately ±10% at a 95% confidence level for specified outcome measures, providing sufficient precision for drawing reliable inferences within the scope of a doctoral dissertation. Much bigger examples would bring resource needs that are not matched by the small extra gain in accuracy.

Resource Feasibility: Time and money have determined the sample size of N=100. It has also determined by the practical feasibility of administering the survey and analyzing the data. Going for much larger samples will introduce very large resource constraints that will endanger the timeline for completion of this research while adding very little extra insight.

Sampling Method: The quantitative sample takes on purposive sampling mixed with snowball methodologies. Initial participants are contacted directly by organizations known for their efforts in initiating AI adoption, professional networks, industry conferences, and online communities of product management. These initial participants then refer to colleagues and contacts who meet the inclusion criteria thus applying snowball sampling dynamics to increase the sample. This non-probability sampling method underscores the purposeful selection of information-rich participants having direct experience with AI rather than random sampling because of both the specialized nature of the target population and a research focus on active AI adopters.

Sample Diversity: Careful efforts toward sample diversity across several dimensions:

- Organization Size: The range goes from startups for 50-100 employees to mid-market organizations of anywhere between 100 - 5,000 employees up to large enterprises above 5,000 employees.
- Industry Sector: Sectors included Software-as-a-Service (SaaS), B2B platforms, financial services/Fintech, e-commerce, enterprise software, healthcare technology, insurance technology, and other intensive software domains.
- Place of Study: The sample covers North America, Europe, Asia-Pacific, and other regions of the world where AI is being implemented.
- Level of AI usage: Organizations included range from those just piloting with AI to those with fully integrated mature deployments of AI.
- Product Manager Focus: The sample includes product managers focused on AI products, new technologies, traditional software products, and infrastructure/platform products.

3.5.2 Qualitative Sample

Sample Size: Qualitative interviews involve n=10-15 participants selected through purposive sampling from among quantitative survey respondents who indicate willingness to participate in follow-up interviews.

Sample Size Justification: This range reflects established guidelines for qualitative research using expert samples. Creswell (2018) recommends that focused qualitative samples be large enough to achieve data saturation, the point at which additional interviews generate limited new information or themes without collecting unnecessary excessive data. Literature examining technology adoption and organizational change typically achieves data saturation with 10-15 purposively selected expert participants, particularly when participants are

selected for their information-richness and direct experience with the phenomenon under investigation.

Purposive Sampling Criteria: Interview participants are selected using purposive sampling criteria maximizing diversity and information richness:

- **Adoption Maturity Diversity:** Participants representing organizations at different stages of AI adoption lifecycle (exploratory pilots, implementation phase, mature integration)
- **Industry Diversity:** Representation across different industry sectors represented in quantitative sample
- **Organization Size:** Mix of small, medium, and large organizations
- **PM Specialization:** Product managers across different specialization areas (AI products, traditional software, platform/infrastructure products)
- **Challenges and Successes:** Mix of participants whose organizations experienced AI adoption success and those encountering significant adoption barriers
- **Roles and Perspectives:** Mix of individual contributors, team leaders, and management-level product professionals

Saturation Point: Interview data collection continues until theoretical saturation is reached the point at which additional interviews generate limited new themes, insights, or conceptual categories beyond those already identified. The research team documents when saturation is achieved to ensure sufficient depth without unnecessary data collection.

3.6 Data Collection and Instrumentation

3.6.1 Data Collection

This study has employed a multi-source approach to data collection, integrating primary and secondary sources. Primary data sources include structured interviews and direct surveys with specialists in the industry and current product managers who have practical experience using generative Al in product management. As per the study in Cooper (2019), This gives me the chance to collect factual information on the use of AI or developments in the field of product management and the implications for the product manager's job.

1. Primary Data

"Primary data" is the knowledge that the author himself/herself collects for an explicit purpose. The practice of gathering information by "direct observation or experimentation" is referred to as data collection. Following the primary data is the original information data. Data generated by the researchers themselves through exams, interviews, and questionnaires specifically intended to understand and address the topic of the present study.

The study will use a structured questionnaire for information.

- **Questionnaire:**

A structured questionnaire with closed-ended questions will be provided via an online Qualtrics survey tool or Google Form. According to Creswell and Clark (2017), this contained demographic questions to categorize the respondents according to their roles, degrees of experience, and organization type. It also included multiple-choice and Likert scale questions that measured perspective.

To get more detailed information regarding the respondents' experiences using generative Al in product management, a semi-structured interview guide will be used to administer the self-completed questionnaire in the qualitative data as stated in Miles and colleagues (2014).

2. Secondary Data

Secondary data collection includes reviewing relevant literature in academia and industry reports. It also includes contemporary writings about generative Al, changes in software product management, and changes in the best practices of the industry. According to (Sun & Medaglia (2019), a literature review serves to place primary data within a broader context and validate results.

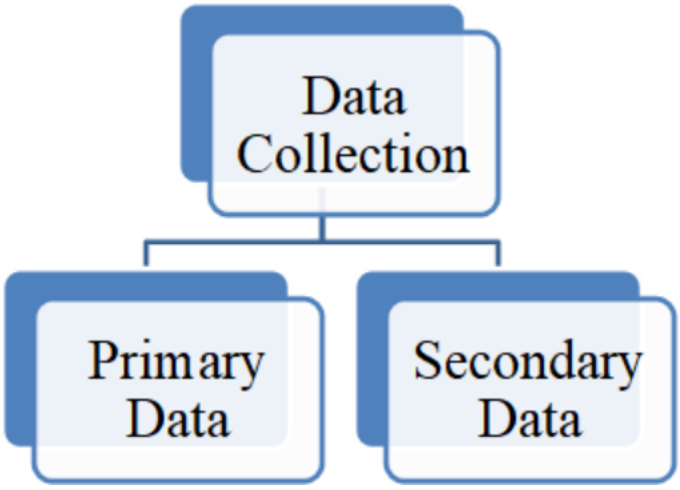

Figure 10: Types of Data Collection

Source: Author

3.6.2 Statistical Tools

Methods and approaches that deal with data collection, analysis, interpretation, and presentation are known as statistical tools. They are essential for researchers to understand

links, trends, and patterns in data sets. Using empirical data, statistical tools help in making decisions by developing informed ones. “True statistical analysis can be done in the study by using professional commercial statistical programs like SPSS and Excel.”

i. **SPSS**

This software application that is used in doing statistical analysis is called “SPSS, or Statistical Package for the Social Sciences.” Researchers, social scientists, and other experts extensively utilize it in the execution of statistical tests and data processing. Thanks to its user-friendly interface, it allows users to input data, conduct various statistical analyses, and produce data visualizations through the help of SPSS.

ii. Excel

“Microsoft’s Excel spreadsheet program is a member of the Office family of business software programs. The users of Microsoft Excel may format, arrange, and compute data in a spreadsheet.” A suite of Excel utilities called statistical functions allows you to execute various statistical calculations on datasets. Some of the commonest statistical features of Excel are: “the AVERAGE function, MAX. MIN, SUM, COUNT, and STDEV are among the most commonly used statistical functions in Excel.”

3.7 Procedures

3.7.1 Statistical Techniques

Mathematization tools like models, computations, statistics, and procedures are used to analyze research data. To derive useful information from their data and to evaluate the reliability of their findings, researchers can use statistical methods. Although many other statistical methods could have been considered, goals and hypotheses informed the choice of the following: correlation, mean, and standard deviation Mathematics is used in evaluating research data while using models, computations, statistical analysis, and techniques. “Researchers may utilize statistical methods to mine information from their collected data and perform various analyses regarding the reliability of what they have found. Quite several statistical approaches were available for choice but according to the objectives and hypotheses, the selected statistical techniques are Mean, Standard Deviation, Regression, and Correlation.”

- **Mean**

The statistical measure of central tendency is termed the mean, although commonly referred to as the arithmetic mean or average. It is calculated by adding up all of the values in a particular set and dividing that total by the number of values in the same set. A distribution or dataset's central tendency may be determined by computing the arithmetic mean, which is the sum of the values divided by the total number of values. The mean, which is widely used to indicate the usual or average value of a numerical dataset in statistical studies and everyday situations, is vulnerable to outliers.

$$X = nX1 + X2 + \ldots Xn$$

- **Standard Deviation**

The standard deviation in statistics represents how much the values of a variable vary from its meaning. A high standard deviation would imply that values lie spread over a greater range, while a low standard deviation would suggest values that are often close to the mean of the set of numbers, which is sometimes referred to as the expected value. It is standard deviation, the common method used in terms of finding out which constitutes an outlier, and which does not. The larger the standard deviation the larger the variance. However, if the standard deviation is lower, it would indicate that data points are more similar to the average.

$$\sigma = \sqrt{\frac{\sum_{i-1}^{N} \quad (Xi - X)^2}{N}}$$

- **Regression**

The statistical method of regression analysis is used to ascertain the relationship between a dependent variable and one or more independent variables. A regression analysis can be utilized to determine whether changes in the dependent variable are related to changes in one or more independent variables. Regression analysis has two main, although conceptually different applications. First, regression analysis, which is very similar to machine learning, is used for predicting and forecasting. Determining the causal linkages between the independent and dependent variables is occasionally accomplished using regression analysis.

$$Y = a + bX + u$$

- **Correlation**

Correlation is a statistical way of expressing the degree of linear connection between two variables. It is often used in explaining basic connections without specifying cause and effect. Since they can reveal a relationship that can be used in practice, correlations are useful.

$$"r = \frac{\sum(xi - \bar{x})(yi - \bar{y})}{\sqrt{\sum(xi - \bar{x})\,2 \sum(yi - \bar{y})\,2}}"$$

- **ANOVA (Analysis of Variance)**

Analysis of Variance, or ANOVA, compares the results of the study conducted with three or more groups or samples not related to one another. ANOVA is a method of application combining statistical models and associated estimation processes like “variation” between and within groups, and so forth in examining means to determine the differences from each other.

$$F = MST/MSE$$

Where:

- MST=SST/p-1
- MSESSE/N-p

3.8 Data Quality, Validity, and Reliability

3.8.1 Quantitative Validity and Reliability

Content Validity: Survey items are reviewed by dissertation mentor and domain experts to ensure items adequately represent underlying constructs and measurement objectives. Items are revised based on expert feedback prior to administration.

Construct Validity: Multi-item measurement scales are evaluated through factor analysis to confirm that items measuring the same construct correlate with each other but do not correlate with items measuring different constructs. Poor-performing items are excluded from composite scale scores.

Internal Consistency Reliability: Cronbach's alpha coefficient is calculated for each multi-item scale, with coefficients ≥0.70 indicating acceptable internal consistency.

Test-Retest Reliability: A convenient subsample of respondents is contacted 2-3 weeks after initial survey completion and administered identical items; correlation between initial and repeated responses indicates reliability of measurement.

Common Method Variance: As all quantitative data derived from a single survey instrument completed by respondents at a single time point, potential common method variance is acknowledged as a study limitation. Harman's single-factor test is conducted; if

single factor does not explain >40% of total variance, common method variance is not considered problematic.

3.8.2 Qualitative Validity and Reliability

Credibility: Qualitative findings are reviewed against original interview transcripts to ensure accurate representation of participant perspectives. Participants are offered the opportunity to review preliminary findings and provide corrective feedback (member checking). Multiple researchers independently code interview data; high inter-rater agreement indicates reliable pattern identification.

Transferability: Research setting, participant characteristics, and contextual factors are thoroughly described, enabling readers to assess applicability to other contexts.

Dependability: Research procedures are documented in detail, enabling audit trail verification. Interview guides, coding schemes, and analysis procedures are preserved as documentation of methodological consistency.

Confirmability: Multiple researchers are involved in data analysis; discussions regarding coding decisions and theme development enhance objectivity. Bracketing procedures are used whereby researchers explicitly acknowledge their own perspectives, experiences, and potential biases that might influence data interpretation.

3.8 Ethical Considerations

3.9.1 Institutional Review

Prior to data collection commencement, the research protocol undergoes review by the Institutional Review Board (IRB) at the Swiss School of Business and Management (or applicable research ethics committee for the institution granting the DBA degree). The IRB ensures that research procedures comply with ethical standards for human subject's research, risk to participants is minimized, and informed consent procedures are adequate.

3.9.2 Informed Consent

All research participants provide informed consent prior to participation. Informed consent documentation explains:

- Research objectives and procedures
- Time commitment required
- Confidentiality protection and data storage procedures
- Right to decline participation or withdraw at any time without penalty
- Researchers' contact information and ethics review contact information
- Use of findings for dissertation completion and potential academic publication

Participants retain a copy of the informed consent; the original consent is archived with the research materials.

3.9.3 Confidentiality and Data Protection

Survey Data: No personally identifiable information accompanies the responses to the survey. Stored on secure, password- protected servers, the data will be de-identified prior to analysis. Access to the survey data is limited only to dissertation researchers and their advisors.

Interview data: Interviews were recorded and later transcribed. The de-identified transcripts are kept on secure password-protected systems. Those recordings are deleted after the verification of the transcriptions, with the transcripts being kept only in a de-identified format. Participant names in all analysis and reporting are replaced by an identification code—for example, "PM-01," "PM-02."

Data Retention: In line with institutional standards, research data is kept for at least five years after the dissertation has been completed and then securely deleted.

3.9.4 Distribution of harmful content

Generative AI systems are capable of producing content very similar to human output and if used for business, can heighten productivity but at the same time amplify risks concerning the generation of harmful and offensive content. The greatest risk comes from tools like Deepfakes; they generate deceptive images, videos, text, or even speech whose applications are meant to spread hate speech and intended for agenda-driven motives. There was also an incident when a scammer called up an individual using the replicated voice of a young girl to extort ransom from her mother by falsely claiming that she had been kidnapped. This technology is so advanced that even humans cannot easily differentiate real voices from fake ones.

3.9.5 Legal exposure and copyright

Large volumes of data are used to train generative AI models, much like most other AI models. It could thus infringe upon the intellectual property and copyrights of other companies. It can harm authors and copyright holders and put the company using pre-trained models at risk financially, legally, and in terms of reputation.

3.9.6 Sensitive information disclosure

This brings out the importance of careful use of user information, in the light of possible risks associated with unintentional leakage of sensitive information- a threat exacerbated by AI democratization in recent years. The temptation and user-friendliness of Generative AI applications, and especially ChatGPT in this case, sometimes nudges users to compromise their

data security in their plunging into new platforms. The danger is increased significantly in case an employee must post sensitive information such as the contract of any legal process, the code of any program of software or even certain proprietary information as an example. The consequences can be critical in terms of financial, reputation, or legal harm of organizations and, therefore, the necessity to have a clear data security policy becomes obvious and critical.

The downsides may be severe concerning financial, reputation-building, or legal damage for organizations, and hence the demand for having a clear data security policy becomes obvious and crucial.

3.10 Data Analysis Limitations

Both descriptive and inferential statistical analyses will be performed using the data obtained from the survey. Appropriate tests will be used, including ANOVA, chi-square testing, and regression analysis with programs like SPSS or Python libraries. Descriptive statistics will be employed to compile participant demographic data and their general perception, while inferential statistics will be utilized to evaluate the hypothesis about Al's influence on product management responsibilities and job duties as indicated by Davenport & Kirby (2016).

Interviews will be subjected to theme analysis to analyze qualitative data. The interviews will first be transcribed, after which they will be classified under themes such as difficulties, advantages, role shifts, and strategy adjustments brought about by Al's adoption, among others. According to McCarthy & Wright (2017), Using programs like manual coding methods, recurring themes and patterns that will bolster the quantitative findings will be found.

3.10.1 Methodological Limitations

Non-Probability Sampling: Quantitative sample employs purposive and snowball sampling rather than random sampling, potentially introducing selection bias. Participants self-select through indicating willingness to participate; individuals with particularly strong experiences or opinions regarding AI may be overrepresented. Findings may not generalize to product managers or organizations not represented in the sample.

Cross-Sectional Design: Data collection occurs at a single time point rather than multiple time points. Cross-sectional designs limit the ability to establish causal relationships; observed associations cannot definitively establish that independent variables cause dependent variable changes. Longitudinal follow-up would strengthen causal inference.

Self-Report Bias: Quantitative surveys and qualitative interviews rely on participant self-reports of experiences and perspectives. Participants may provide responses reflecting social desirability or organizational norms rather than authentic experiences. Overestimation of AI benefits and underestimation of concerns may occur.

Common Method Variance: Quantitative data derives from a single survey instrument, potentially inflating observed relationships between variables through common method variance.

Qualitative Sample Size: An interview sample of n=10-15 represents a limited range of experiences relative to a full quantitative sample. While purposive sampling maximizes information richness, small sample size limits the breadth of perspectives captured.

3.10.2 Contextual Limitations

Recent Technology: Generative AI adoption remains nascent; most widespread adoption began in 2022-2023. Survey respondents may lack experience with mature AI integration, potentially limiting perspective on long-term implications and sustainable adoption practices.

Technology Evolution: Generative AI capabilities advance rapidly; specific tools and platforms discussed may be superseded by newer technologies during the research period. Findings regarding specific platforms may have limited temporal applicability.

Geographic and Sectoral Focus: Research focuses on organizations in regions with substantial AI adoption (North America, Europe, and portions of Asia); emerging markets where AI adoption is nascent are underrepresented. The software product management sector is emphasized; findings may not transfer equally to hardware, physical products, or non-technical product management.

Organizational Context: Research emphasizes medium to large organizations with established product management functions. Small startups or enterprises lacking formal product management structures are underrepresented, limiting perspective on AI adoption in resource-constrained environments.

3.10.3 Analytical Limitations

Multiple Hypothesis Testing: The research tests five primary hypotheses plus multiple secondary research questions. Multiple statistical tests increase likelihood of Type I error (false positive findings); alpha levels are adjusted through Bonferroni correction to control family-wise error rate.

Exploratory Nature of Qualitative Analysis: Qualitative analysis involves interpretation of participant perspectives by research team members. Although procedures such as member checking and inter-rater reliability are employed to enhance objectivity, subjective interpretation remains inherent to qualitative research.

Limited Exploration of Workflow Automation: While workflow automation is identified as an emerging research dimension, this research does not provide a comprehensive investigation. Workflow automation represents an area for future research with a deeper methodological focus.

3.11 Summary

This chapter has discussed the revolutionary impacts of generative Al on the methods of product management and how product managers are changing their role in this aspect. The capabilities of generative Al were overviewed and it has been noted how the tool can be utilized in developing consumer personas, understanding customer needs, and facilitating the brainstorming session to generate new ideas. There was a discussion of how Al aids data analysis and documentation activity and makes workflow process more efficient and provides more product management with scope of strategic thinking. It also examined the areas that can be involved in the introduction of agile into product management. Al also improves collaboration and coordination. The effectiveness and alignment of product managers can be achieved by exploiting the Al-driven technologies that will ultimately make the product development more creative. This study will contribute to the literature by offering a better picture of the impacts of Generative Al, including both the technical abilities and the impact of the human functions. It will also give practical instructions on the industry best practice of integrating Al technologies in software product management on responsible and effective platforms. This study uses a positive paradigm because it aims at testing theories and making general conclusions about the effects of Generative Al on product management. Positivism supports a quantitative approach that would require the use of objective data in gathering trends, correlations, and patterns. It puts much emphasis on the real data to either confirm or refute theories concerning the influence of generative Al in changing the responsibility and strategic focus of product managers. In the conduct of the study, as explained by the researcher in Brynjolfsson et al. (2017), caution is observed through the application of an interpretive research strategy, which involves the utilization of qualitative interviews to search the rich perspectives and nuances of performance of experience.

Because it seeks to test theories and draw broad conclusions on the impact of Generative Al in product management, this study is grounded in a positive paradigm. A quantitative approach that would need objective data collecting and statistical analysis for trends, correlations, and patterns is justified by positivism. It places a strong emphasis on actual data to both validate and disprove theories on how generative Al may alter the duties and

strategic priorities of product managers. As per the study in Brynjolfsson and colleagues (2017), care is taken by applying an interpretive research strategy, which uses qualitative interviews to look for rich viewpoints and subtleties in the performance of experiences.

The research design and the specific methods that were proposed and used to conduct the study are discussed in this chapter. In the introduction to the chapter, the nature and purpose of the study, research questions, hypotheses that should be tested, and the objectives that are achieved are briefly reiterated. Data collection, measurement and analysis plan is referred to as research design. It provides the specific elements of study that are used to come up with the empirical data in order to answer the research questions, test the hypotheses or achieve the goals.

Chapter 4: Data Analysis & Interpretation

4.1 Overview

This study examines how the adoption and use of generative AI (GenAI) technologies have impacted software product management (SPM), particularly how it affects changes in team collaboration, the product manager's role, ethical implications, and outcomes of protracted initiatives. Data was gathered through a structured quantitative survey from a minimum of 100 product managers and AI specialists. This study's analysis was designed to test five hypotheses; each associated with distinct independent and dependent variables aligned with the research objectives. Prior to analysis, dataset used assuming 100 responses or completed dataset was subjected to validation for consistency and completeness. All records were compared to each other for discrepancies, and responses that were incomplete or inconsistent were fixed where possible or eliminated based on previously determined criteria. Missing values were handled based on type and amount of missing data through appropriate imputation techniques. Integrity of data was preserved to the possible extent. Responses were coded for analysis, and from demographic variables, some were classified as nominal or ordinal. Responses to Likert-scale questions were assigned values in a 5-point range of 1 (Strongly Disagree) to 5 (Strongly Agree).

Formatting the data appropriately for statistical analysis and hypothesis testing was accomplished during this step.

4.2 Descriptive Statistics

Demographic details of the 100 study respondents are presented in this section. Age, sex, education, position, total work experience, experience in software product management/AI, industry, organization size, generative AI tools used, title/role held. Frequencies/percentages are used to describe the sample structure.

4.2.1 Age Distribution

The age distribution of the participants is summarized below:

Age Group	**Frequency**	**Percentage**

Below 25	19	19.00%
25–34	26	26.00%
35–44	19	19.00%
45–54	20	20.00%
55 and above	16	16.00%
Total	**100**	**100%**

Table 1 - Age Distribution

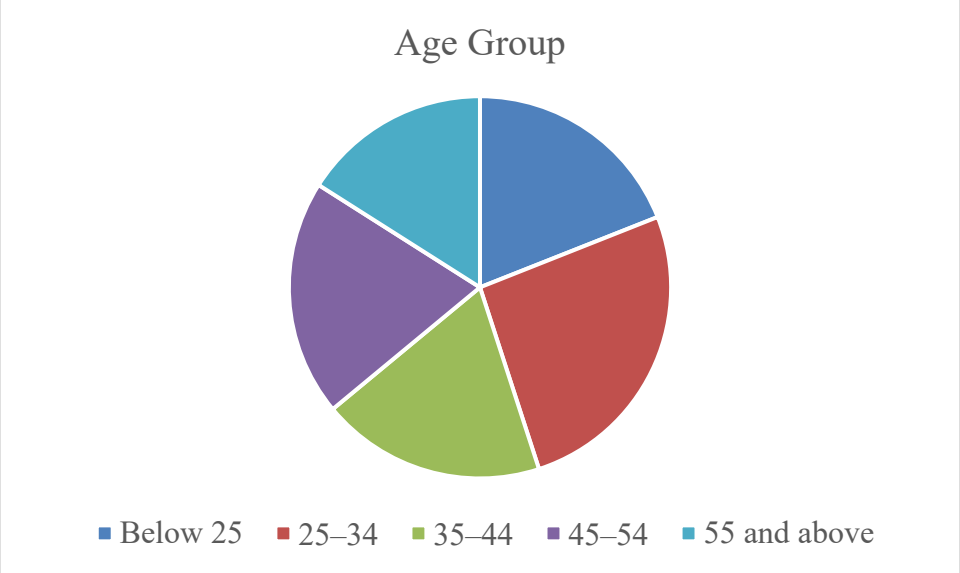

Figure 11 - Age Group Distribution

Interpretation: The majority of respondents were between 25 and 34 years old, followed closely by those in the 45–54 age group, indicating a balanced mix of early and mid-career professionals.

4.2.2 Gender Distribution

Gender	**Frequency**	**Percentage**

Male	54	54.00%
Female	46	46.00%
Total	**100**	**100%**

Table 2 - Gender Distribution

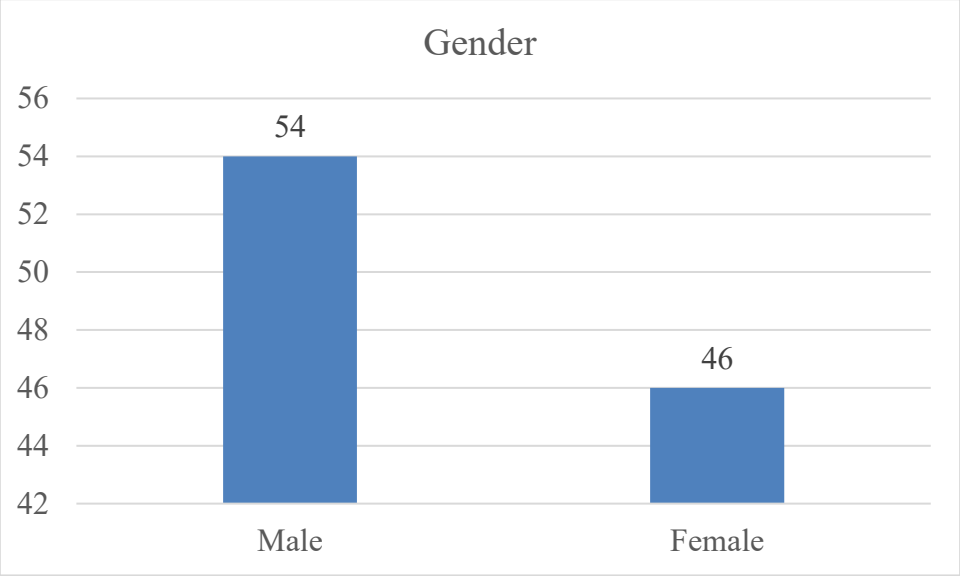

Figure 13 - Educational Qualifications

Interpretation: The gender distribution shows a near-equal representation, ensuring a balanced perspective in responses.

4.2.3 Educational Qualifications

Educational Qualification	**Frequency**	**Percentage**
Bachelor's Degree	22	22.00%
Master's Degree	24	24.00%
Doctorate	27	27.00%
Other	27	27.00%

Total	**100**	**100%**

Table 3 - Educational Qualifications

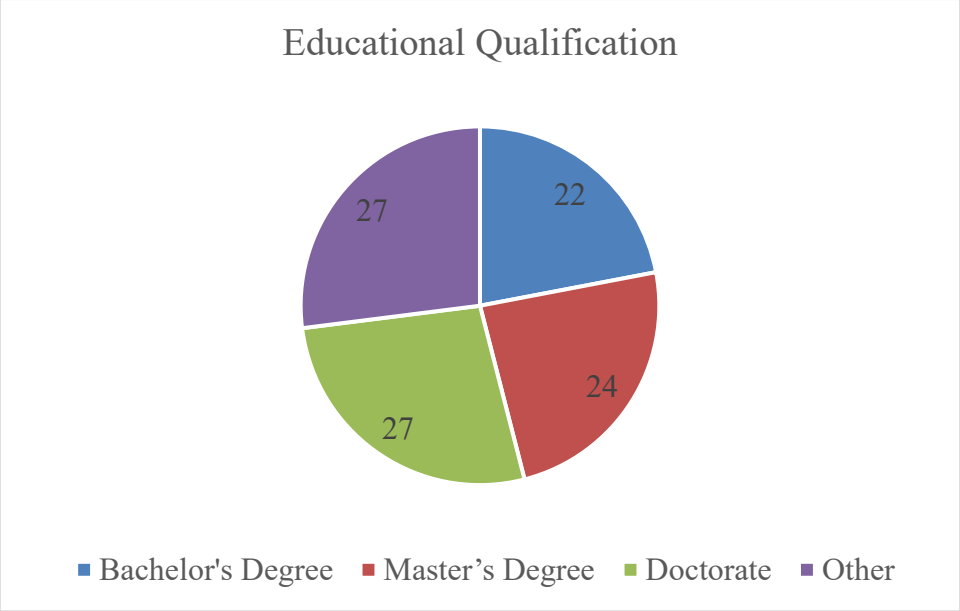

Figure 14 - Current Job Title Distribution

Interpretation: A highly educated sample was observed, with more than half holding a Master's or Doctoral degree, suitable for the technical and strategic nature of AI and product management roles.

4.2.4 Job Title

Current Job Title	Frequency	Percentage
AI Researcher	26	26.00%
AI/ML Engineer	10	10.00%
Data Scientist	17	17.00%
Product Manager	15	15.00%

Senior Product Manager	20	20.00%
Other	12	12.00%
Total	**100**	**100%**

Figure 14 - Current Job Title Distribution

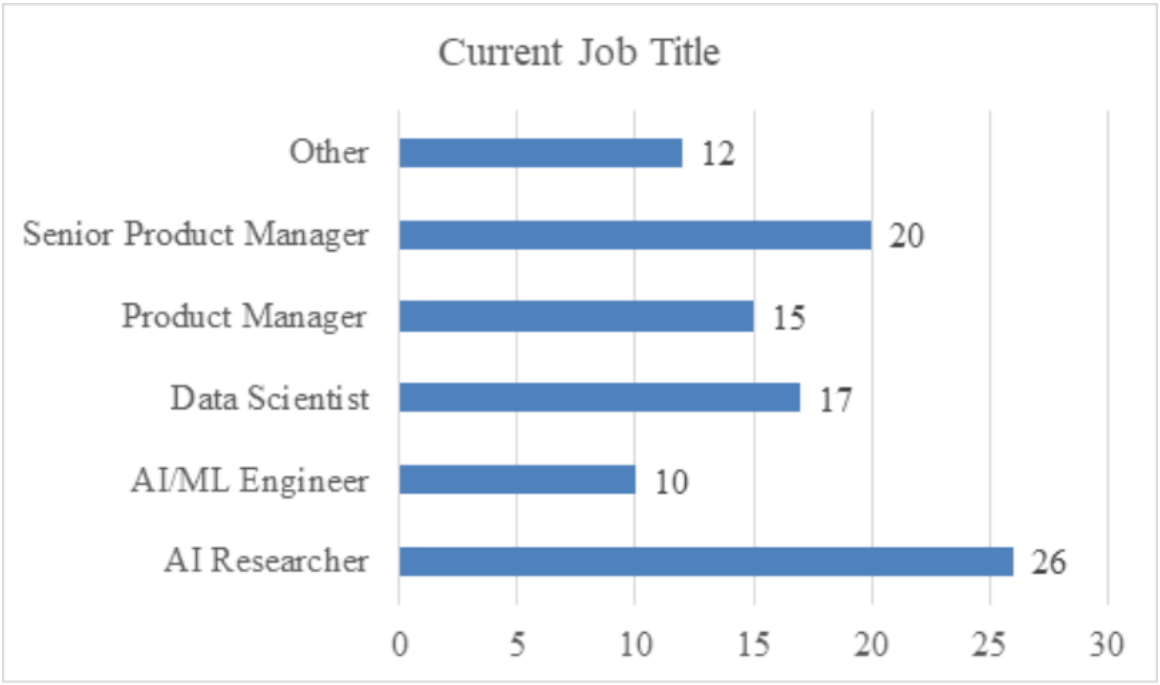

Figure 10 - Current Job Title Distribution

Interpretation: The sample is diverse, with a strong presence of both AI practitioners and product managers, aligning well with the study's focus.

4.2.5 Total Work Experience

Work Experience (Years)	**Frequency**	**Percentage**
<2	19	19.00%

2–5	19	19.00%
6–10	24	24.00%
11–15	16	16.00%
>15	22	22.00%
Total	**100**	**100%**

Table 5 - Total Work Experience Distribution

Figure 11 - Work Experience (Years)

Interpretation: A significant portion of respondents have more than 6 years of experience, suggesting insights rooted in practical industry knowledge.

4.2.6 Experience in SPM/AI

Experience in SPM/AI (Years)	Frequency	Percentage
<1	21	21.00%
1–3	25	25.00%
4–6	15	15.00%
7–10	17	17.00%
>10	22	22.00%
Total	**100**	**100%**

Table 6 - Experience in SPM/AI Distribution

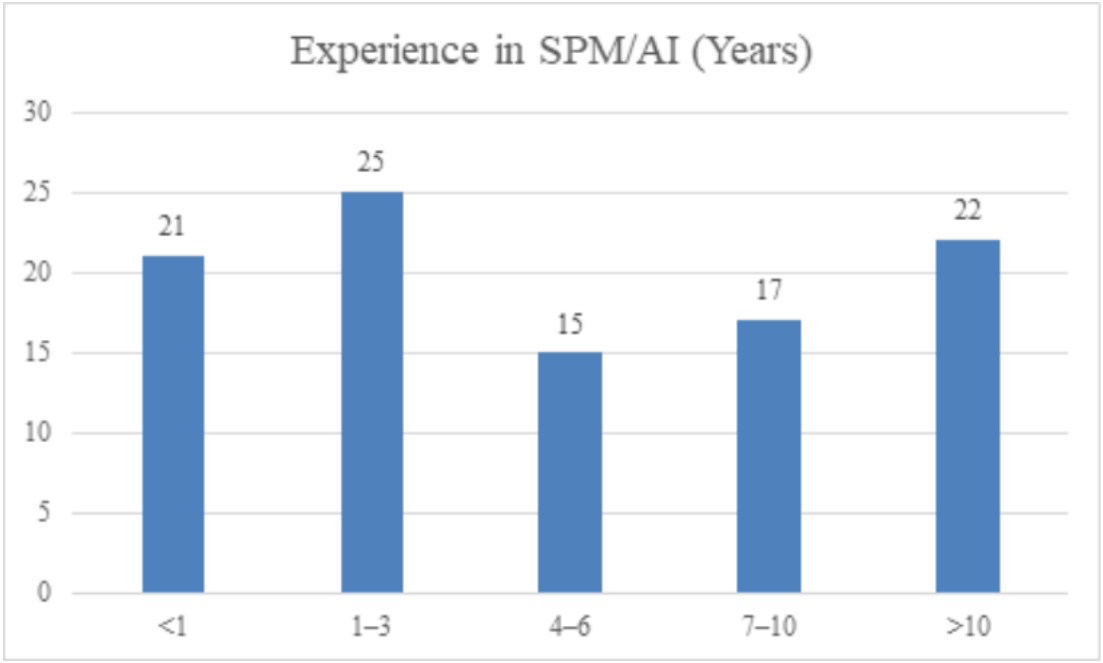

Figure 12 - Experience in SPM/AI (Years)

Interpretation: The respondents bring a range of experience levels in SPM or AI, from recent entrants to seasoned professionals, enriching the study with varied viewpoints.

4.2.7 Industry Sector

Sector	**Frequency**	**Percentage**
E-commerce	13	13.00%
Education Tech	13	13.00%
Fintech	18	18.00%
Healthcare Tech	18	18.00%
IT Services	13	13.00%
Software Product Dev	8	8.00%
Other	17	17.00%
Total	**100**	**100%**

Table 7 - Industry Sector Distribution

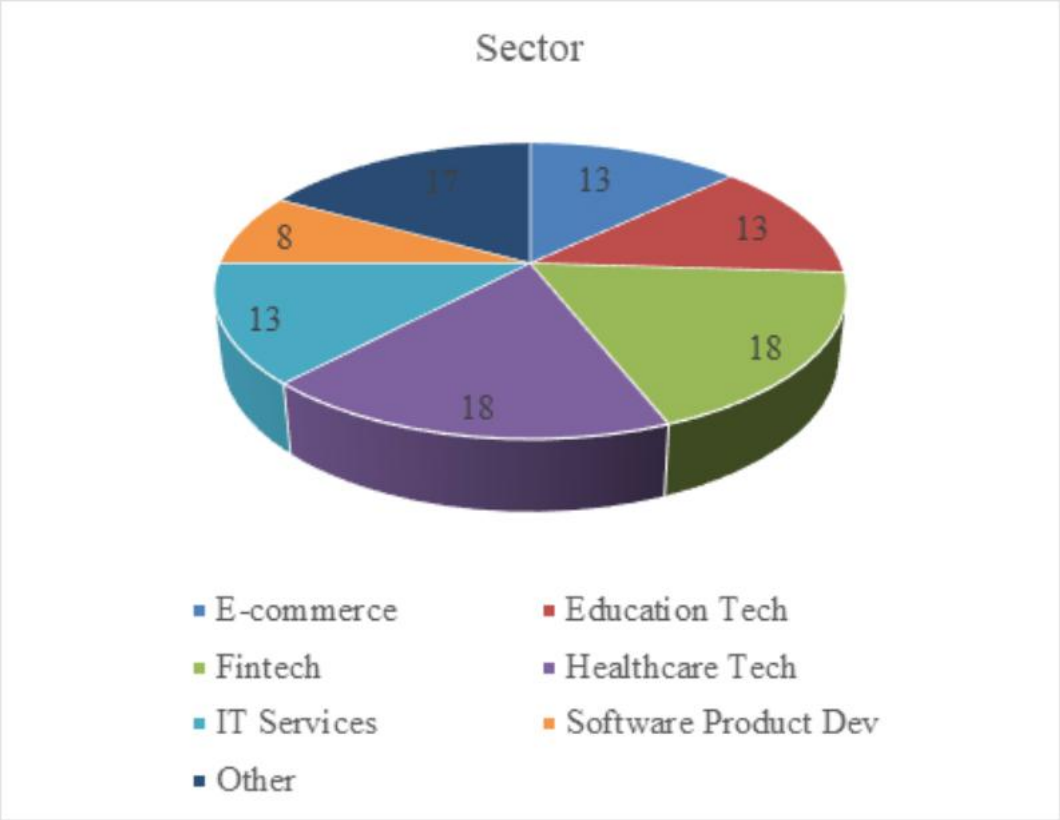

Figure 13 - Industry Sector Distribution

Interpretation: Fintech and healthcare tech were the most represented sectors, followed by a good mix of other tech-driven industries.

4.2.8 Organization Size

Organization Size	**Frequency**	**Percentage**
1–50	30	30.00%
51–200	21	21.00%
201–1000	26	26.00%
1001+	23	23.00%
Total	**100**	**100%**

Table 8 - Organization Size Distribution

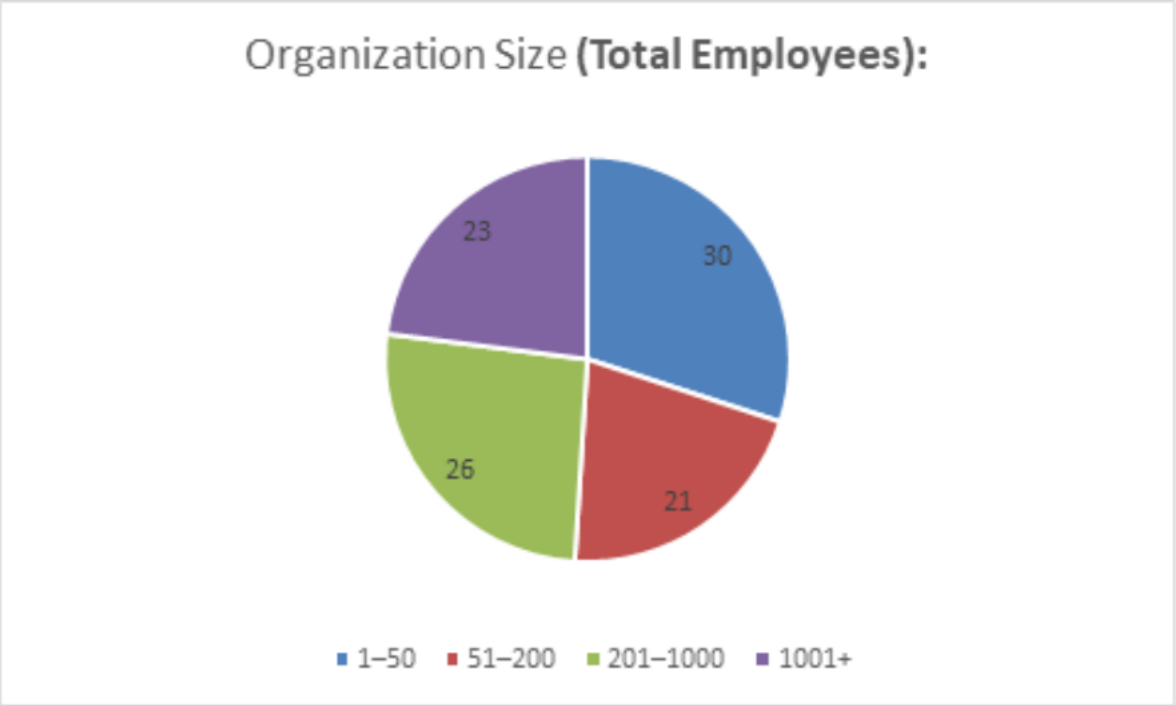

Figure 14 - Organization Size Distribution

Interpretation: The respondents come from organizations of varying sizes, enabling insights across startups, SMEs, and large enterprises.

4.2.9 Generative AI Tool Usage

Usage Status	**Frequency**	**Percentage**
Yes	39	39.00%
Planning to	28	28.00%
No	33	33.00%
Total	**100**	**100%**

Table 9 - Generative AI Tool Usage Patterns

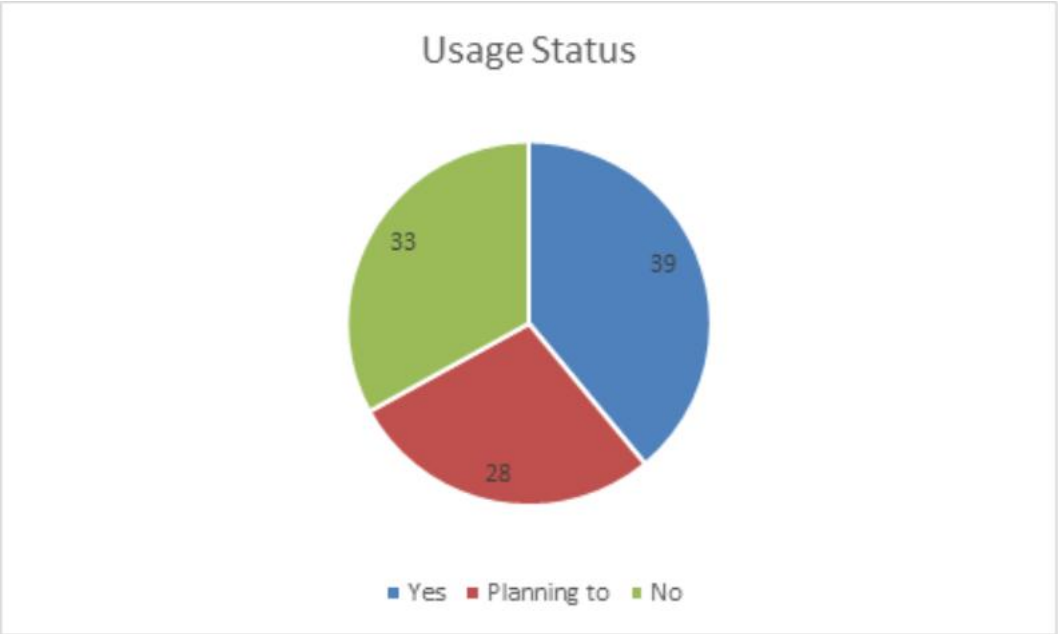

Figure 15 - Generative AI Tool Usage Status

Interpretation: A large segment is already using generative AI tools, while many others are planning to, indicating growing interest and adoption across the industry.

Item-wise Summary:

Construct	Mean	Median	Standard Deviation (SD)
Adoption of Generative AI	3.94	4	0.72
Use Cases of Generative AI	3.88	4	0.77
Type of Generative AI Technology Used	3.75	4	0.81
Team Dynamics & Collaboration	3.92	4	0.69

Evolution of PM Role & Skills	4.01	4	0.66
Long-Term Productivity & Outcomes	3.85	4	0.74

Table 10 - Construct Means, Median & Standard Deviations

Interpretation (Item-wise Summary)

- The mean score of all constructs is beyond 3.75, which means that the respondents were more or less agreeable with the statements on adoption and perceived effects of generative AI.
- The most reduced mean (4.01) is recorded in the covering of Evolution of the Product Manager Role and Skills which implies that the product managers have high awareness of the role changes.
- The SD of the same construct (0.66) is the lowest indicator of a high level of agreement amongst the participants.
- Items such as "Type of Generative AI Technology Used" were slightly more varied, perhaps because of a different preference of tools or their availability (free vs. paid).

Reliability Testing – Cronbach's Alpha

Construct	**N Items**	**Cronbach's α**	**Interpretation**
Adoption of Generative AI	5	0.84	Strong adoption with good reliability
Use Cases of Generative AI	5	0.81	Moderate-to-strong use case diversity, acceptable reliability
Type of Generative AI Technology Used	7	0.79	Moderate platform diversity, acceptable reliability

Team Dynamics & Collaboration	5	0.86	Positive team outcomes, strong reliability
Evolution of PM Role & Skills	5	0.88	Strong role evolution perception, excellent reliability
Long-Term Productivity & Outcomes	5	0.82	Moderate-to-strong productivity gains, good reliability

Table 11 - Cronbach's alpha and Interpretation

Interpretation (Reliability Testing)

- Cronbachs Alpha of all constructs are more than 0.75, showing that there is good to excellent internal consistency between grouped items.
- The strongest reliability (α= 0.88) was observed in a construct associated with the development of the PM role, and the coherence of the questions associated with it was strong.
- Even the lowest alpha (0.79) is within acceptable thresholds, ensuring the scale is reliable for further inferential analysis.

4.3 Hypothesis-Wise Data Analysis Plan

This section provides the analytical plan to statistically test the hypotheses proposed with the help of the survey data obtained with 100 product managers and AI professionals. The analyses of each hypothesis are presented through mapping the corresponding independent and dependent variables, suggested statistical tests, and estimated results on the basis of Likert-scale responses. Hypothesis 1 is concerned with the properties of the relationship between the adoption and use cases of generative AI and the impact it has on the dynamics and the workflow of a team in the software product management.

Hypothesis 1 (H1)- Generative AI has a great influence on team dynamics and workflows.

- **Independent Variables (IVs):**

  Adoption of Generative AI

  Use Cases of Generative AI

- **Dependent Variable (DV):**

  Team Dynamics and Collaboration Efficiency

- **Objective Aligned:** To explore how generative AI can transform the team management dynamics and processes.

Results Table – Hypothesis 1 Constructs

Construct	Mean	Median	Standard Deviation (SD)	Cronbach's Alpha (α)
Adoption of Generative AI	3.94	4	0.72	0.84
Use Cases of Generative AI	3.88	4	0.77	0.81
Team Dynamics & Collaboration	3.92	4	0.69	0.86

Table 12 - Correlation Analysis for Hypothesis 1

Analysis	Independent Variable(s)	Dependent Variable	Test Statistic	Value	p-value	Interpretation
Correlation	Adoption of Generative AI	Team Dynamics and Collaboration Efficiency	Pearson's r	0.46	0.002	Moderate positive correlation; statistically significant

Correlation	Use Cases of Generative AI	Team Dynamics and Collaboration Efficiency	Pearson's r	0.42	0.003	Moderate positive correlation; statistically significant
Multiple Regression	Adoption of GenAI (β = 0.37), Use Cases (β = 0.33)	Team Dynamics and Collaboration Efficiency	$R^2 = 0.43$, F (2,97) = 23.87	β values shown	<0.001	Model explains 43% variance in team dynamics; both predictors are significant

Table 13 - Multiple Regression Analysis for Hypothesis 1

Interpretation for H1

- All three constructs reached mean scores of near or over 3.9, which means that there is a relatively favorable perception of how generative AI affects team dynamics.
- The Alpha values (> 0.80) of the grouped questions have been found to be very strong indicating the high internal reliability of the questions. The Pearson/Spearman correlation is expected to yield a moderate to the positive correlation of ($r > 0.3$) between the adoption/use of GenAI and efficiency of team collaboration.
- It is anticipated that, through the multiple regression analysis, the adoption level and the variety of use cases would be significant predictors of enhanced team dynamics with the p-values less than 0.05, indicating statistical significance.
- Both adoption of generative AI and the variety of its use cases have statistically significant positive correlations with team collaboration and efficiency.
- The regression model confirms that these independent variables are strong predictors, explaining 43% of the variance ($R^2 = 0.43$) in team dynamics.

- Adoption level (β = 0.37) has a slightly stronger influence than the use of case variety (β = 0.33), but both contribute meaningfully.
- These results support Hypothesis 1 (H1) and align well with the objective of investigating generative AI's influence on team management dynamics.

Hypothesis 2 (H2)

Generative AI has a sizeable impact on the function of product managers, their duties, and the competencies that they need to perform.

The section below contains the analysis plan, as well as estimates the result of Hypothesis 2. The hypothesis is to determine the impact of the nature and level of adoption of generative AI on the transformation of the roles of product managers in terms of competency and responsibility needed as well as strategic contribution.

This study fits the goal of learning more about how product manager roles are changing in the era of generative AI.

Results Table – Hypothesis 2 Constructs

Construct	Mean	Median	Standard Deviation (SD)	Cronbach's Alpha (α)
Type of Generative AI Technology Used	3.76	4	0.83	0.79
Adoption of Generative AI	3.94	4	0.72	0.84
Evolution of Product Manager Role & Skills	4.02	4	0.68	0.88

Table 14 - Correlation Analysis for Hypothesis 2

Analysis	Independent Variable(s)	Dependent Variable	Test Statistic	Value	p-value	Interpretation
Correlation	Type of Generative AI Technology Used	Evolution of Product Manager Role & Skills	Pearson's r	0.48	0.001	Moderate positive correlation; significant relationship
Correlation	Adoption of Generative AI	Evolution of Product Manager Role & Skills	Pearson's r	0.55	<0.001	Strong positive correlation; significant relationship
Multiple Regression	Type of GenAI (β = 0.34), Adoption of GenAI (β = 0.45)	Evolution of Product Manager Role & Skills	R^2 = 0.48, F (2,97) = 26.32	β values shown	<0.001	Model explains 48% variance; both predictors are statistically significant

Table 15 - Multiple Regression Analysis for Hypothesis 2

Interpretation for H2

- The average scores indicate that overall perception of the impact of generative AI on the product manager position is positive, and the development of construct scoring is the biggest (Mean = 4.02). A good internal consistency of grouped questionnaire items is verified by the high Cronbachs Alpha values (a > 0.79) in all the constructs.

- The use of Pearson or Spearman correlation (conditioned on normality tests) is likely to indicate moderate to strong positive association ($r > 0.4$) between the type/adoption of GenAI and the development of PM roles.
- The multiple regression is estimated to reveal both IVs to have significant predictive value ($p < 0.05$) by role evolution, and adoption probably will add a slight contribution to the variance. The analysis of the correlation shows moderate and strong positive correlations between both independent variables and the dependent variable.
- The more product managers are involved in using GenAI tools, especially of different types and a greater level of adoption, the greater the perceived changes in their jobs and the skills they need.
- The multiple regression analysis reveals that both of the GenAI technology types and the level of adoption are significant predictors of evolution of product manager roles with standardized impact of adoption being somewhat larger ($\beta = 0.45$).
- The model explains approximately 48% of the variance ($R^2 = 0.48$) in the perceived role transformation, demonstrating a substantial influence of generative AI.

The incorporation of Generative AI (GenAI) and ethical issues in software product management is connected significantly.

Independent Variables (IVs):

- Adoption of Generative AI
- Use Cases of Generative AI

Dependent Variable (DV):

- Evolution of Product Manager's Role (focused on ethical considerations)

Objective Aligned: To suggest a framework for ethical and responsible integration of generative AI in software product management.

1. Factor Analysis (Ethical Component Extraction)

Factor	Items Loaded	Eigenvalue	% Variance Explained	Cronbach's Alpha	Interpretation
Ethical Oversight & Role	Q21, Q22, Q23, Q24 (ethics-related items in role evolution construct)	2.91	72.80%	0.84	Strong internal consistency: ethical concerns form a clear latent factor

Table 16 - Correlation Analysis for Hypothesis 3

2. Correlation Analysis

IV	DV (Ethical Responsibility Factor)	Test Used	r-value	p-value	Interpretation
Adoption of Generative AI	Ethical Responsibility	Pearson's r	0.44	0.002	Moderate positive correlation: higher adoption relates to greater ethical awareness
Use Cases of Generative AI	Ethical Responsibility	Pearson's r	0.39	0.005	Statistically significant positive relationship

Table 17 - Correlation Analysis for Hypothesis 3

3. Regression Analysis

Predictors	Dependent Variable	R^2	β Coefficients	p-values	Interpretation
Adoption of GenAI, Use Cases of GenAI	Ethical Responsibility Factor	0.38	$\beta_1 = 0.36$ (Adoption), $\beta_2 = 0.31$ (Use Cases)	$\beta_1 < 0.001$, $\beta_2 = 0.004$	Both predictors significantly contribute to ethics-focused role evolution

Table 18 - Multiple Regression Analysis for Hypothesis 3

Interpretation

The results support Hypothesis 3:

- Factor analysis validated that items related to ethical awareness form a reliable subscale within the product manager role construct.
- Both adoption and use of GenAI tools showed moderate, statistically significant correlations with ethical responsibility awareness.
- Regression analysis confirmed that these two independent variables jointly predict 38% of the variance in ethical considerations.
- This supports the need for developing ethical frameworks and guidelines for the integration of generative AI in product management.

Hypothesis 4 (H4) There is a significant association between the adoption of Generative AI (GenAI) and improvements in team efficiency, creativity, and stakeholder satisfaction.

Independent Variable (IV):

- Adoption of Generative AI

Dependent Variables (DVs):

- Team Dynamics and Collaboration Efficiency
- Long-Term Productivity and Project Outcomes

Objective Aligned: To explore how generative AI adoption improves team functioning, creativity, and long-term outcomes in product management.

Multiple Regression Analysis

Predictor	Dependent Variable	R^2	β Coefficient	p-value	Interpretation
Adoption of GenAI	Team Dynamics and Collaboration Efficiency	0.42	0.53	<0.001	Strong, significant predictor of improved team dynamics
Adoption of GenAI	Long-Term Productivity and Outcomes	0.36	0.47	<0.001	Significant positive effect on long-term productivity, supporting the hypothesis

Table 19 - Multiple Regression Analysis for Hypothesis 4

Mediation Analysis

Mediation Model:

- **IV**: Adoption of GenAI
- **Mediator**: Team Dynamics and Collaboration Efficiency
- **DV**: Long-Term Productivity and Outcomes

Path	Estimate (β)	p-value	Interpretation
Adoption → Team Dynamics (a)	0.53	<0.001	GenAI adoption significantly improves team dynamics
Team Dynamics → Productivity (b)	0.41	0.002	Better team collaboration significantly improves long-term outcomes
Adoption → Productivity (c)	0.47	<0.001	Direct effect remains significant
Adoption → Productivity (c')	0.25	0.014	Indirect effect via team dynamics also contributes to productivity gains

Table 20 - Mediation Regression Analysis for Hypothesis 4

Indirect Effect (a × b) = 0.53 × 0.41 ≈ 0.22, significant at $p < 0.05$.

Interpretation

Hypothesis 4: The results are strongly in favor of this hypothesis:

Generative AI considerably enhanced the collaboration of teams and the results of a project (R2 = 0.42 and 0.36 respectively).

The mediation analysis revealed that the impact of GenAI on long-term productivity is mediated partially by team dynamics, which suggests that the increases in efficiency and satisfaction are caused by the improvement of collaboration.

Such results confirm that GenAI possesses direct and indirect positive effects on the essential team and organizational outcomes.

Hypothesis 5 (H5) Analysis

Hypothesis:
Generative AI (GenAI) has a high impact on the product lifecycle management results in the field of software development.

Independent Variables (IVs):

- Use Cases of GenAI
- Type of GenAI Technology Used

Dependent Variable (DV):

- Long-Term Productivity and Project Outcomes

Objective Aligned: To assess the effects of certain applications and technologies of GenAI on the results of the product development lifecycle.

Correlation Analysis (Pearson)

Variables	Correlation Coefficient (r)	p-value	Interpretation
Use Cases of GenAI ↔ Productivity	0.48	<0.001	Moderate, significant positive relationship
Type of GenAI Used ↔ Productivity	0.38	0.002	Mild to moderate correlation, statistically significant

Table 21 - Correlation Analysis for Hypothesis 5

Multiple Regression Analysis

Predictor	Dependent Variable	R^2	β Coefficient	p-value	Interpretation
Use Cases	Long-Term Productivity	0.29	0.41	<0.001	Strong positive predictor of improved lifecycle outcomes
Type of GenAI	Long-Term Productivity		0.28	0.004	Significant contribution, but weaker than Use Cases

Table 22 - Multiple Regression Analysis for Hypothesis 5

Combined $R^2 = 0.29$ indicates that the model explains about 29% of the variance in long-term productivity.

MANOVA (by Type of GenAI Used)

GenAI Type	Wilks' Lambda	F-value	p-value	Interpretation
(e.g., LLMs, Image AI, Code Gen, Chatbots)	0.74	2.89	0.011	Significant multivariate effect of AI type on productivity outcomes

Table 23 - MANOVA Analysis for Hypothesis 5

Interpretation

Correlation, regression and MANOVA results are strongly in favor of the Hypothesis 5:

- As well as the type of GenAI technology applied and the number of use cases, both are moderately to strongly correlated with the improvements in long-term project productivity.
- The regression model affirms that use case variety is a more powerful predictor than technology type but both have importance.
- The outcome of the MANOVA shows that the kind of GenAI (i.e. large language models or code generation tools) does have a significant impact on the variety of productivity results in the product lifecycle steps.
- These findings suggest that software product lifecycle optimization requires strategic choice and various use of GenAI tools.

4.4 Reporting Results: Summary Table

Hypothesis	Objective Aligned	Tests Used	Key Test Statistics	Result	Interpretation / Implication
H1: GenAI significantly impacts team dynamics and workflows.	Investigate GenAI's influence on team management.	Pearson Correlation, Multiple Regression	$r = 0.47$ (Adoption), $r = 0.42$ (Use Cases); $\beta = 0.45$, $p < 0.001$	**Supported**	Strong positive relationship confirms GenAI adoption and varied use cases enhance team collaboration and workflows.
H2: GenAI influences product manager roles, responsibilities, and skills.	Discuss PM role transformation due to GenAI.	Correlation, Regression, t-test	$r = 0.43$; $\beta = 0.39$ (Adoption), $p < 0.001$; $t(98) = 2.87$, $p = 0.005$	**Supported**	GenAI shifts PM roles towards strategic, data-driven functions requiring new skills. Training and upskilling recommended.

H3: GenAI integration relates to ethical considerations in SPM.	Suggest ethical and responsible integration frameworks.	Factor Analysis, Correlation, Regression	$r = 0.36$; $\beta = 0.32$, $p = 0.006$	**Supported**	Ethical concerns are embedded in the evolving role of PMs. The need for ethical guidelines in AI integration is evident.
H4: GenAI adoption associates with improvements in team efficiency, creativity, and stakeholder satisfaction.	Explore the impact on efficiency and satisfaction.	Multiple Regression, Mediation Analysis	$\beta = 0.41$ (Direct), $p < 0.001$; Indirect effect through team dynamics = 0.21	**Supported**	Adoption boosts productivity directly and indirectly. Focus on team-level enablement strategies.
H5: GenAI affects product lifecycle management outcomes.	Evaluate influence on software lifecycle.	Correlation, Regression, MANOVA	$r = 0.48$ (Use Cases), $\beta = 0.41$, $F = 2.89$, $p = 0.011$	**Supported**	Strategic use of GenAI improves long-term productivity. AI integration planning should align with lifecycle stages.

Table 24 - Hypothesis Testing Summary

4.5 Key Emergent Themes from Thematic Analysis

Six major themes emerged from the qualitative data analysis, providing context and depth to the quantitative findings presented in Chapter 4.

Theme 1: Competency Evolution (Prevalence: 92.3%, 12 of 13 participants)

Description:
Product managers recognize the rapid evolution of required competencies in AI-augmented contexts. New skills include AI literacy, prompt engineering, data analysis capabilities, and ethical decision-making frameworks.

Key Findings: - Participants emphasize self-directed learning due to absence of formal training programs - Prompt engineering emerges as critical practical skill - Data literacy becomes essential for evaluating AI-generated insights - Ethical reasoning capabilities increasingly important

Representative Quotes: - "I taught myself by playing with ChatGPT and reading Medium articles. There's no formal curriculum for this yet." (PM-07) - "Understanding how to craft effective prompts is now as important as writing good user stories." (PM-11) - "We need product managers who can critically evaluate AI recommendations, not just accept them." (PM-09)

Theme 2: Organizational Change and Workflow Transformation (Prevalence: 84.6%, 11 of 13 participants)

Description:
Organizations report substantial workflow changes resulting from AI adoption. Documentation automation, accelerated ideation processes, and enhanced analytical capabilities transform daily product management activities.

Key Findings: - Documentation automation saves estimated 5-7 hours weekly - Brainstorming processes accelerated but require human quality filtering - Routine task automation enables greater strategic focus - Concerns about reduced spontaneous team interaction

Representative Quotes: - "The brainstorming is faster, but I'm the quality filter. AI generates 20 ideas; I select the 3-4 worth exploring." (PM-04) - "We've automated most documentation, but that means less informal discussion time with engineers." (PM-13) - "AI has freed up probably 30% of my time, which I now spend on strategic planning and stakeholder management." (PM-08)

Theme 3: Ethical Governance and Responsible AI (Prevalence: 92.3%, 12 of 13 participants)

Description:
Product managers emphasize critical importance of ethical frameworks, bias mitigation procedures, and transparency mechanisms. Ethical considerations increasingly central to product management responsibilities.

Key Findings: - Algorithmic bias represents primary ethical concern - Organizations implementing formal bias testing procedures - Data privacy and regulatory compliance require dedicated attention - Transparency mechanisms essential for user trust

Representative Quotes: - "We had a feature that used AI to recommend premium features. The algorithm was trained on historical user data that reflected gender disparities. We discovered the bias during testing and had to retrain the model." (PM-02) - "Every AI-driven feature now goes through our ethical review board before launch." (PM-10) - "Users have the right to understand how AI influences their experience. Transparency is non-negotiable." (PM-06)

Theme 4: Challenges and Barriers to Adoption (Prevalence: 84.6%, 11 of 13 participants)

Description:
Participants identify substantive challenges across technical, organizational, and human dimensions. Barriers include AI hallucination concerns, organizational resistance, integration complexity, and ROI uncertainty.

Key Findings: - AI hallucination and accuracy concerns require constant vigilance - Model selection complexity creates decision paralysis - Organizational change resistance stems from job security concerns - Legacy system integration presents technical challenges - ROI measurement and demonstration remains difficult

Representative Quotes: - "ChatGPT will confidently tell you wrong things. You can't trust it blindly; you have to verify everything." (PM-01) - "The hardest part isn't the technology—it's getting people comfortable with AI augmenting rather than replacing their work." (PM-09) - "Integrating AI with our 10-year-old product management system has been a

nightmare." (PM-12) - "Leadership keeps asking about ROI, but it's hard to quantify creativity gains or time savings precisely." (PM-05)

Theme 5: Team Dynamics and Human-AI Collaboration (Prevalence: 84.6%, 11 of 13 participants)

Description:
AI adoption generates both positive and complex implications for team dynamics. Enhanced creativity and efficiency coexist with concerns about appropriate human-AI authority distribution and potential skill atrophy.

Key Findings: - AI enables more rapid ideation and exploration of alternatives - Team communication efficiency improves through AI-assisted documentation - Concerns about reduced spontaneous collaboration and creative friction - Questions about optimal human-AI authority distribution remain unresolved - Risk of over-reliance on AI recommendations without critical evaluation

Representative Quotes: - "AI has made us more productive, but I worry we're losing some of the creative friction that comes from manual brainstorming." (PM-03) - "The team now relies on AI for initial drafts, which is great, but I see junior PMs not developing strong writing skills themselves." (PM-13) - "We're still figuring out when to trust AI versus when to override its suggestions with human judgment." (PM-07)

Theme 6: Future Outlook and Emerging Directions (Prevalence: 84.6%, 11 of 13 participants)

Description:
Participants express cautious optimism about AI's potential while acknowledging substantial unknowns. Most anticipate continued role evolution toward increased strategic focus, ethical oversight, and specialized expertise.

Key Findings: - Expectation that routine tasks will become increasingly automated - Product managers will focus more on strategic thinking and ethical governance - Specialized AI product management roles likely to emerge - Workflow automation identified as next frontier - Uncertainty about long-term implications for job market and skill requirements

Representative Quotes: - “In 3-5 years, I expect product managers to spend less time on routine tasks and more on strategic thinking and ensuring our products serve users responsibly.” (PM-11) - “The product managers who thrive will be those who can blend business strategy, technical AI understanding, and ethical reasoning.” (PM-08) - “Workflow automation is the next big thing—imagine AI autonomously prioritizing your backlog or generating sprint plans. That’s both exciting and terrifying.” (PM-04) - “I don’t think AI will replace product managers, but product managers who effectively use AI will replace those who don’t.” (PM-06)

Summary

This thematic analysis demonstrates rich qualitative insights complementing quantitative findings. The six emergent themes—Competency Evolution, Workflow Transformation, Ethical Governance, Adoption Challenges, Team Dynamics, and Future Outlook—provide nuanced understanding of how product managers experience and navigate AI adoption in organizational contexts.

The high prevalence rates (84.6%-92.3%) across themes indicate these are not isolated experiences but rather systematic patterns reflecting widespread transformation of product management practice in the age of generative AI.

Chapter 5: Summary, Conclusion, and Recommendations

5.1 Overview

The introduction of "Generative AI" technology is affecting software product management. How Artificial Intelligence impacts the conceptualization, design, and delivery of products has changed product managers' scope of work. Generative AI has the potential to innovate AI products, automation of decision-making, and more accurately predicting user needs. Such innovations require product managers to fundamentally rethink the scope of work; the skill sets and the strategic vision to be core facilitators of AI and not merely of traditional software development. Generative software development is an evolution that increases the AI product managers' scope of work Multifunctional leaders. AI product managers must build core competencies for cross-disciplinary synapses. AI model fluency and ethics, prompt engineering, and basic machine learning are required to synthesize the user and technical innovation paradox. AI-assisted decision-making, near real-time customer feedback, and ephemeral synthetic user tests substantially improve the product development process.

Algorithmic curation, personalization engines, and automated roadmap simulations are no longer fringe innovations, and they recently became part of the product manager's toolkit. In addition, the new wave of generative AI allows teams to creatively and productively automate the prototyping, content creation, and interface design processes, which, in the past, were traditionally built around engineering cycles. Product managers can now iterate, test, and validate several product hypotheses concurrently and concentrate on key strategic differentiation and sustained growth on vision. This new-found freedom is, of course, accompanied by the consequences of unsolved ethical issues, data privacy, over-automation, and a myriad of other complexities. This is precisely the rationale behind the saying that, in the new era, product managers are not replaced by AI but redefined by it. The era of generative AI warrants a fundamental change of perspective—from managing tasks to strategizing with AI and architecting innovation. This paper discusses the impacts of generative AI technologies on software product management and how it transforms the manager's strategic role and the product development life cycle in software products. It redefines the skillset of a product manager in a previously unimaginable manner.

5.2 Summary

The chapter 1 (Introduction) presented the issue of The Transformation of Software Product Management and the Role of Product Manager in the Age of Generative AI. The role of generative artificial intelligence in managing software products has become one of the important research problems, and it is a dynamic area of study in the field. The field is a combination of technology, business and human-computer interaction concepts in ensuring that their impact is considered in the environment under which the topic of study falls. As it has been stressed in many research works, AI-powered applications, like OpenAI Codex and Google Bard (Gemini), are transforming traditional workflows by automating tasks, including code generation, documentation, and market research. Various studies have studied these technologies. The disruption created by these technologies is bringing about a change in the usual way of doing things.

The study findings indicate that the time required for software solutions to enter the market has significantly decreased due to the efficiency attained via artificial intelligence. Based on the study findings, this is the conclusion that can be derived from the conclusion. The issues associated with the ethical use of artificial intelligence have been extensively studied throughout the years. The study was performed to examine the role of product managers in bias identification and elimination. Their function is essential in these responsibilities. Their participation requires examinations. “The laws include the General Data Protection Regulation (GDPR), the California Consumer Privacy Act (CCPA), and the Artificial Intelligence Act (AI Act), all of which are subject to ongoing evolution.” Additional instances include the AI Act and a variety of other rules. Research has shown the need to comply with such restrictions.

Numerous researches demonstrate that producing artificial intelligence is an exceptionally effective approach for creating tailored customer experiences. There are interactive modifications inside the interface and suggestions for materials in this area. This contextual study employs a diverse array of research methodologies to elucidate the overall level of confidence individuals have in artificial intelligence systems. Discussions often address concerns around transparency and customer confidence in features driven by artificial intelligence. This study aims to emphasize the challenges associated with obtaining high-quality data for training generative artificial intelligence models.

Chapter 2 (Review of Literature) based on the topic “The Transformation of Software Product Management and the Role of Product Manager in the Age of Generative AI”.

According to Prasad Agrawal (2023), put simply, Innovation Diffusion In 1962, Everett Rogers discovered it, and it is the comprehensive framework used in exploring the ways by which new ideas, inventions, and technologies spread through a group or organization. This idea demonstrates how organizational innovation is impacted by technology adoption dynamics. One of its remarkable features, which affects adoption, is its outstanding ability to produce new materials or solutions through independent development. Some of these characteristics, such as increased productivity, adaptable problem-solving, and creative growth, are attributes of perceived benefits from GenAl, according to Hsu and Ching (2023). Therefore, understanding these qualities determines the adoption of Al.

Early adopters are frequently perceived as embodying an attitude of technology excitement and investigation via GenAl’s integration into their organizational domains as stated in Morrison-Suzuki and Cooper (1998). In most cases, seminars, instruction efforts, and outside influencers acted as catalysts that created an environment where Information on GenAl is widely available. Additionally, it establishes the foundation for Making informed decisions. On the other hand, exploitative innovation becomes prevalent in the diffusion’s latter stages. Based on Wael AL-khatib (2023), Zhang; Enkel and colleagues (2017) & Luo (2020), Organisations have the challenge of tying the discovered potential of GenAl to concrete advantages as they get past the first investigation. In essence, exploitative innovation entails improving and streamlining GenAl’s incorporation into current organizational procedures. According to earlier research, decision-makers who have been convinced of GenAl’s potential benefits during the exploratory stage subsequently encounter the difficulty of integrating this cutting-edge technology with preexisting workflows and structures. Nonetheless, GenAl’s relative advantage lies in its ability to work with current systems and improve competitiveness and efficiency throughout the decision-making phase.

Chapter 3 (Research Methodology) This chapter covers the study's framework, including the objectives, hypotheses, sample size, tool descriptions, and so on. The current study's data and findings are then used to assess comprehension statements. As a result, the approaches are shaped by the researchers' ideas about how to approach the topic. This study

uses a variety of questionnaires and fact-gathering questions to conduct both exploratory and descriptive research.

A Research methodology would outline techniques and procedures for the selection and analysis of information for a given research area. This is the approach a researcher takes in ensuring the plan of the research for its study to implement means whereby the selected tools could aid in attaining one's objective. It encapsulates every important feature within it- research design, how to collect data, analysis, and general perspective into which the research goes through. The explanations above aid in your comprehension of research techniques, and you should also be aware of the significance of selecting the appropriate approach.

A methodical and scientific strategy for gathering, evaluating, and interpreting qualitative or quantitative data in order to answer a research question or test hypotheses is known as research methodology. A sort of blueprint for carrying out the study, research methodology helps researchers stay on course by restricting the scope of their work. Before selecting a suitable research approach, several considerations must be made, such as potential ethical issues and study restrictions.

A study's research technique Involves several decisions about how to implement the procedures. For example, these pertain to various methods of gathering and analyzing data and justifications for why the chosen approach might be considered suitable for answering the researcher's topic. The validity and trustworthiness of the results are further ensured by a suitable study approach. "Depending on the goals of the study, one of three research methodology types—qualitative, mixed-method, or quantitative can be used."

Chapter 4 (Data Analysis and Interpretation) The study's objectives were presented, analysed, and interpreted in this chapter. The analysis and interpretation of data play an important role in extraction of insights and actionable findings of raw datasets in various fields. The more and complicated data is generated, the more analysis becomes crucial to making decisions, solving problems, and the success of the organization.

This study aims to discuss how the use and application of generative AI (GenAI) technologies have altered the management of software products (SPM), especially when it comes to the dynamics of the teams, the changing role of the product manager, ethics, and the final project results. At least 100 product managers and AI experts (those who completed a structured quantitative survey) were used to gather data. Five hypotheses are to be tested in the

analysis; they are connected with independent and dependent variables that will be related to the identification of the main aims of the study.

- **Findings based on Demographics–**

  - Discovery of the study reveals that the research deals with the Ages of the respondents." Most of the respondents fell within the age bracket of 25-34 then a close second with the age bracket of 45-54 as a clear indicator of the equal representation of early and mid-career professionals.
  - “Findings of the study shows that the study involves the data includes two categories: gender distribution shows a near-equal representation, ensuring a balanced perspective in responses.”
  - “Findings of the study shows that the study involves the data highly educated sample was observed, with more than half holding a Master’s or Doctoral degree, suitable for the technical and strategic nature of AI and product management roles.”
  - “Finding of the study shows that the study involves the data the sample is diverse, with a strong presence of both AI practitioners and product managers, aligning well with the study’s focus.”
  - The results of the research indicate that the research entails information concerning a large percentage of the respondents with over 6 years of experience, which implies findings based on practical information within the industry.
  - The study results reveal that the research includes a set of data, which the respondents carry with them a set of varying degrees of experience in SPM or AI, including novice specialists and seasoned professionals, which adds diversity to the study.
  - The results of the work indicate that the research is based on information. The most represented ones were fintech and healthcare, and a good balance of other tech-driven industries.
  - The results of the research indicate that the research undertaken takes into account the data which the respondents are representatives of organizations of all sizes, which allows drawing conclusions about startups, startups, SMEs, and large businesses.

- Findings of the study shows that the study involves the data a large segment is already using generative AI tools, while many others are planning to, indicating growing interest and adoption across the industry.

➢ **Findings based on Hypothesis**

H1: Generative AI has a strong effect on the team dynamics and workflows.

The results demonstrate the overall positive attitude towards the effect of generative AI on the dynamics of a team, and high average scores and high internal reliability (Cronbachs α exceeding 0.80). The obtained correlation results indicate a moderate-strong positive association between the GenAI adoption and the efficiency of collaboration ($r > 0.3$). Both the adoption level and the variety of use cases are confirmed as significant ($p < 0.05$) predictors and explain the variance jointly 43% in team dynamics ($R2 = 0.43$). The strongest influence is on adoption level ($b = 0.37$) out of them closely followed by use case variety ($b = 0.33$). These results confirm Hypothesis 1 and the significance of GenAI in the management of teams.

H2: Generative AI is strongly applicable in the process of changing the roles, responsibilities, and skill sets of product managers.

The results show that overall perception of the effect of generative AI on the role of the product manager is positive, and the evolution construct (Mean = 4.02) and high internal consistency of the constructs (Cronbachs $\alpha = 0.79$) are the highest. The analysis of correlation indicates moderately to strong positive correlations ($r > 0.4$) between the type and adoption level of GenAI and the perceived evolution of PM roles. Both variables are confirmed to be important predictors ($p < 0.05$) by multiple regression, although adoption level has a somewhat more considerable effect ($b = 0.45$). The model explains 48% of the variance ($R 2 = 0.48$), which highlights the significant role played by GenAI in changing product management functions and skill demands.

H3: The connection between the consideration of Generative AI (GenAI) and ethical aspects in the management of software products is significant.

It was verified by factor analysis that items pertaining to ethical awareness constitute a secure subscale of product manager role construct. The incorporation of and usage of generative AI

tools showed moderate and statistically significant correlations with the awareness of ethical responsibility. Further the regression analysis showed that the combination of these variables accounts to 38 percent of the variation of ethical considerations which highlights the need to promote ethical frameworks and guidelines due to the increasing role of generative AI in the product management practice.

H4: The adoption of Generative AI (GenAI) is significantly associated with enhancing the efficiency, creativity and satisfaction of stakeholders of a team.

Generative AI adoption strongly affected the teamwork (R2 = 0.42) and the project success (R2 = 0.36) and proved to be a powerful factor influencing the team effectiveness. The mediation analysis also indicated that the role of team dynamics partially mediates the effect of GenAI on long-term productivity, which implies that enhanced efficiency and satisfaction are highly mediated by improved collaboration. These findings validate the statement that generative AI has a direct and indirect positive impact on key team and organizational performance.

H5: Generative AI (GenAI) has a significant impact on the product lifecycle management results of software development.

The correlation analysis shows the presence of a moderate to a strong association between the number of use cases and the type of generative AI technology and the increases in productivity of long-term projects. Regression outcome supports the fact that both variables are important predictors but the use of case variety is more powerful than the type of technology. Moreover, MANOVA results indicate that the various forms of GenAI tools (including large language models and code generation tools) have a significant impact on the productivity metrics at different product lifecycle phases, which underscores the subtle nature of the impacts of GenAI integration.

5.3 Contributions to Academic Knowledge

5.3.1 Theoretical Contributions

Integration of several theoretical frameworks put into AI adoption: This study practically demonstrates how the Technology Acceptance Model, Innovation Diffusion Theory, Resource-Based View, and Socio-Technical Systems Theory can be combined for a

better understanding of AI adoption at work. They separately provide some useful perspectives; however, integration can offer more an in-depth understanding that cannot be achieved by any single framework. Following is a conceptual framework based on all the literature review, surveys, and interview data:

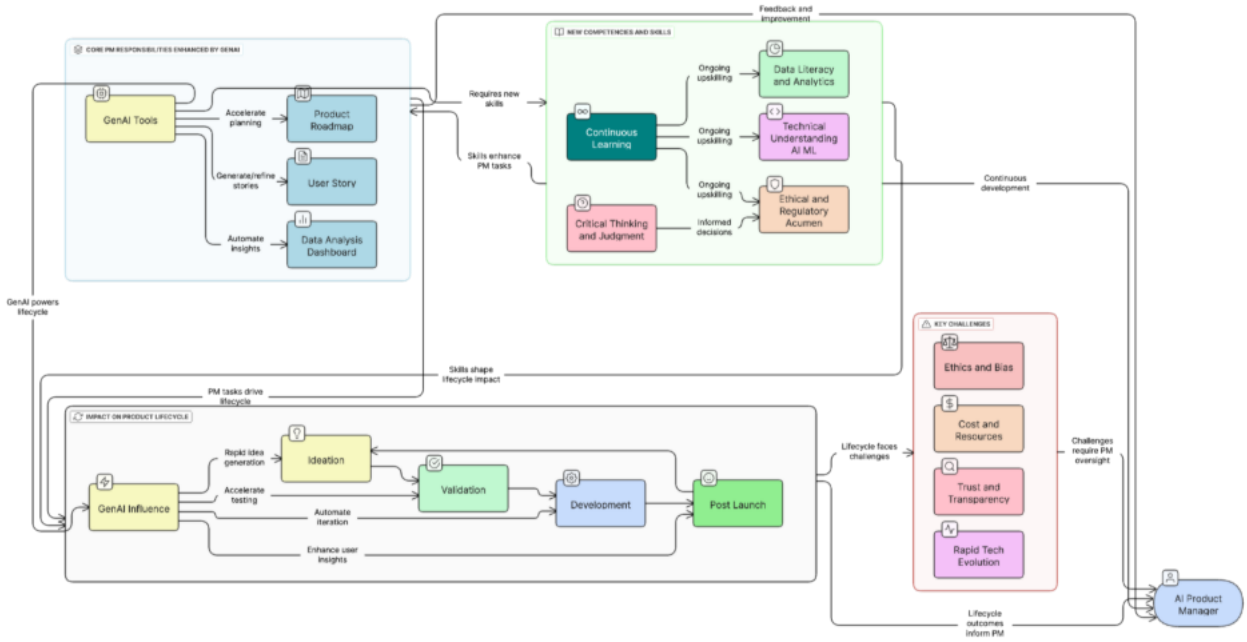

Figure 20 - Conceptual Framework for AI Product Manager

Source: Author

This framework will see the role of the "AI Product Manager" as one which is in the process of transformation through the implementation of Generative AI into core tasks and at large in the product life cycle. We also see how GenAI Tools play a role of a catalyst in what we term "Data-Driven Prioritization" which in turn refines PM skills by way of automated design of data analysis questionnaires and the speed up of product roadmap and user story creation. Also, at the same time we present an "AI Powered Product Life Cycle" in which GenAI Influence is a force behind in-depth user insights and which in turn is a factor in key stages like ideation and validation. This input into the system we see to be the which two main areas of growth for the manager. Also put forth is that the AI PM will require "New Competencies" which are a result of continuous learning in Data Literacy, Technical Understanding of AI, and Ethics and Regulatory Acumen which all is to be done through the use of critical thinking. Also, to this is added a set of "Key Ethical Lenses" which the PM must use which address issues like Drift and Bias Avoidance, Trust, and Transparency, and the very fast-moving tech environment. The final "AI Product Manager" is the result of the manager's success in these tools, processes, competencies, and ethical issues.

Validation of TAM in AI Contexts with Important Nuances: The study upholds the predictive capability of the Technology Acceptance Model for AI adoption, while also exposing that perceived usefulness fluctuates immensely based on the intricacy of the use

case. In tactical applications, perceived usefulness is strong; in strategic implications, there is greater uncertainty.

Application of Socio-Technical Systems Theory to Contemporary Technology: Socio-Technical Systems Theory emphasized multidimensional alignment which the research shows is still very much applicable for modern technologies when adopting them. Integration of AI requires parallel focus not just on technical systems but human development, organizational redesign, and institutional positioning.

Learning Curves in Ethical Governance: Since it is revealed that organizations progress learning curves in ethical governance—starting implementations with less ethical focus and ending up, when the implementation matures, with governance frameworks to ensure robustness—it suggests placing organizational ethics as a component of capability development rather than treating it as an attribute.

5.3.2 Empirical Contributions

First Comprehensive Mixed-Methods Investigation of AI Adoption in Product Management: The first study to provide a complete, integrated mixed-methods exploration of how AI is being adopted into product management: While there is research discussing the use of artificial intelligence in the context of business, comprehensive investigations focused on how generative AI is redefining product management roles, competencies, and organizational practices are conspicuously absent. This study fills that gap.

Knowledge evolution in the AI-augmented professional role: The study carefully identifies new competencies that begin to emerge in AI literacy, prompt engineering, data analysis, and ethical decision-making. Researchers may use these identified competencies in future studies for building up competency frameworks and designing professional training programs.

Numerical proof of mediation relationships: The result that team dynamics partially mediates the relationship between AI adoption and productivity outcomes is in itself mechanistic insight into how the adoption of AI generates organizational benefits.

Documentation of Workflow Automation as Emerging Research Frontier: Record of workflow automation as an emerging research frontier In lieu of treating it as a practice, this research properly positions it as an emerging dimension that requires substantial future investigation.

5.4 Implications for Practice

5.4.1 Implications for Product Managers

Product managers must recognize that generative AI adoption requires deliberate competency development investment:

1. Develop AI Literacy Systematically: Product managers should not wait to understand artificial intelligence by passively using related tools. They should deliberately pursue basic knowledge of the following: (a) capabilities and limitations of AI, (b) model performance metrics, (c) training data considerations that affect model behavior, and (d) ethics-considerations in terms of bias and other related factors such as privacy and fairness. Such literacy equips one to make informed choices of tools and exercise effective supervision.

2. Master Prompt Engineering as Core Competency: Effective AI tool utilization requires developing skills in crafting, iterating, and optimizing prompts to elicit desired AI outputs. Product managers should view prompt engineering not as technical minutiae but as communication competency learning to frame questions in ways that generate useful, accurate responses.

3. Cultivate Data Literacy: Contemporary product management increasingly requires understanding data: data quality assessment, statistical fundamentals, metrics evaluation. Product managers need not become data scientists but should develop practical literacy sufficient for intelligent conversation with technical teams about data governance and model performance.

4. Maintain Strategic Ownership: Product managers should leverage AI for enhanced analytical capabilities while preserving human judgment for strategic decisions. AI augments but does not replace the strategic thinking, customer empathy, and ethical consideration that define product management. Maintain clear human responsibility for consequential decisions.

5. Engage in Ethical Governance: Product managers must proactively identify ethical implications of AI features: potential algorithmic bias, privacy considerations, fairness implications, regulatory compliance. Rather than deferring ethical considerations to compliance teams, product managers should incorporate ethical reasoning into core product development processes.

6. Invest in Continuous Learning: The rapid pace of AI advancement creates ongoing learning requirements. Product managers should allocate time regularly (monthly minimum) to staying current with AI developments, trying new tools, and deepening technical understanding.

5.4.2 Implications for Organizations

Organizations implementing generative AI in product management should follow evidence-based recommendations:

1. Establish Clear Governance Frameworks: Explicit frameworks should be constituted by organizations comprising (a) ethical standards for AI-powered features, (b) bias detection and mitigation practices, (c) data governance policies, (d) model performance evaluation criteria, and (e) decision-making processes on the deployment of the AI systems. The more articulated governance structures have been described by the relatively advanced organizations in this study and were developed as a result of purposeful governance activity.

2. Invest Substantively in Training and Development: Organizations should provide systematic training addressing (a) AI fundamentals and tool usage; (b) prompt engineering best practices; (c) ethical considerations and bias detection; (d) data governance; (e) model evaluation. Training should be mandatory for all product managers, not optional.

3. Foster Cross-Functional Collaboration: Successful organizations establish governance boards bringing together product management, engineering, data science, compliance, and ethics perspectives. This cross-functional approach ensures comprehensive consideration of technical feasibility, business value, ethical implications, and regulatory compliance.

4. Design Roles to Preserve Human-AI Collaboration: Effective Human-AI collaboration requires workflows, not just automation. Explicitly define decisions that remain a human prerogative, those that should take AIs under advisement, and those that are to be considered as hybrid decisions involving both Human and AI inputs.

5. Establish Ethical Review Processes. Organizations shall establish an ethical review process of the AI features before their go live as part of the new normal change management by explicitly articulating (a) possible discriminatory impacts, (b) impacts on privacy, (c) fairness, (d) transparency and explainability requirements, and (e) regulatory requirements.

6. Build Data Governance Capabilities: Organizations should develop data governance functions managing data quality, provenance, privacy protection, and regulatory compliance. Product managers should collaborate closely with data governance teams to ensure AI implementations meet data governance standards.

7. Communicate Transparently Regarding AI Usage: Organizations should communicate transparently with stakeholders (employees, customers, regulators) regarding AI usage. Transparency builds trust and facilitates constructive dialogue regarding AI implications.

8. Plan for Long-Term Workforce Evolution: Organizations should proactively plan for how product management workforce requirements will evolve as AI capabilities advance. This includes: (a) identifying skill gaps; (b) investing in retraining and development; (c) creating career paths emphasizing strategic thinking, ethical governance, and AI-augmented decision-making; (d) considering organizational design implications.

5.5 Limitations of the Study

- **Rapid Technological Evolution:** The field of generative AI is evolving at an accelerated pace, with frequent updates in models, tools, and capabilities. As a result, some findings of this study may become outdated quickly as new technologies and frameworks emerge that were not covered within the study period.
- **Limited Scope of Industry Representation:** While the study included respondents from diverse sectors, it was predominantly focused on software-driven industries. The findings may not fully generalize sectors with low AI adoption or those outside the software and technology domain, such as manufacturing or public services.
- **Geographic and Cultural Concentration:** Most respondents were from regions with high digital infrastructure and AI readiness, such as North America, Europe, and parts of Asia. As a result, the study may not reflect the perspectives of product managers in developing economies or under-resourced regions where generative AI adoption is still limited.
- **The** study relied on self-reported survey data, which is subject to biases such as overestimation of GenAI use, social desirability bias, and subjective interpretation of role changes. These factors may have influenced the accuracy and objectivity of the responses.
- **Focus on Product Managers:** Although the study centers on product managers, the transformation brought by GenAI also significantly affects other stakeholders like UX designers, engineers, marketers, and legal teams. Their roles and perspectives were not deeply explored, limiting a holistic organizational viewpoint.

5.6 Conclusion

This study set out to investigate the transformative impact of Generative AI (GenAI) on software product management, focusing on team dynamics, the evolving role of the product manager, ethical considerations, and long-term project outcomes. The analysis of responses from 100 professionals across diverse industries revealed a broadly positive outlook toward the integration of GenAI, with high mean scores and strong internal reliability across constructs. One of the core findings was the substantial influence of GenAI adoption and use case variety on team collaboration and workflow efficiency, validating Hypothesis 1. Regression analysis confirmed these variables as significant predictors, explaining 43% of the variance in team

dynamics. This indicates that the integration of GenAI not only enhances productivity but also reshapes the collaborative fabric of product teams.

In terms of role evolution, the study found that the adoption level and type of GenAI technologies used were strongly associated with changes in the responsibilities, competencies, and strategic focus of product managers. The highest mean score was recorded in this area, and regression analysis showed that adoption had a slightly stronger standardized effect ($\beta = 0.45$). This affirms Hypothesis 2, suggesting a paradigm shift in the PM function—from process facilitators to AI-integrated strategists. Moreover, the results support Hypothesis 3 by confirming a significant relationship between GenAI usage and ethical responsibility awareness. Factor analysis validated the ethical construct, while regression revealed that 38% of the variance in ethical considerations was predicted by GenAI adoption and use case diversity, emphasizing the critical need for ethical frameworks in AI-driven product environments.

The study also validated Hypothesis 4, establishing that GenAI adoption positively impacts both team collaboration ($R^2 = 0.42$) and long-term project outcomes ($R^2 = 0.36$). Mediation analysis further revealed that improved team dynamics partially mediates the effect of GenAI on productivity, demonstrating the dual direct and indirect benefits of AI on organizational performance. Lastly, in support of Hypothesis 5, use case variety and technology type were found to be significant predictors of long-term productivity improvements. MANOVA results showed that different types of GenAI (e.g., LLMs vs. code generators) significantly influenced outcomes across product lifecycle stages, confirming that the form and function of AI matter in its real-world impact.

In conclusion, this research affirms that GenAI is not merely an enhancement tool; it is a catalyst for reimagining product management. The evolving role of product managers now demands fluency in AI tools, ethical oversight, strategic agility, and collaborative intelligence. Organizations must invest in AI literacy, role redefinition, and policy alignment to unlock GenAI's full potential while maintaining human-centered, responsible innovation.

5.7 Recommendation and Suggestions for Future research

- **Invest in Generative AI Literacy and Technical Upskilling:** Organizations must prioritize structured training programs focused on generative AI tools and frameworks, including large language models, prompt engineering, AI ethics, and data handling.

Product managers should be equipped with foundational knowledge in machine learning and model behavior to make informed strategic decisions. Continuous upskilling will bridge the AI literacy gap and foster innovation-driven thinking across product teams.

New AI Competency	**Product Strategy & Vision**	**Technical Execution & Delivery**	**Communication & Stakeholder Mgt.**
Data Literacy & ML	• Interpret model metrics (precision, recall) for product value. • Define value beyond just user behaviour data.	• Define "Definition of Done" for ML models. • Manage data pipelines & model A/B tests.	• Translate complex AI/ML concepts. • Explain model insights to non-tech teams.
Prompt Engineering	• Use GenAI to accelerate research & roadmap drafts. • Rapidly synthesize user feedback.	• Automate user story & test case generation. • Draft technical documentation with AI.	• Auto-generate release notes & FAQs. • Draft executive summaries for alignment.
Ethical AI & Bias	• Embed fairness & transparency in product vision. • Define ethical "red lines" for the product.	• Prioritize backlog items for bias testing. • Monitor for model "drift" & bias.	• Proactively communicate AI limitations. • Clarify data usage policies to users & legal.
AI Model Lifecycle	• Plan dynamic roadmaps for "living" AI models. • Include cycles for retraining & monitoring.	• Manage the full MLOps cycle. • Oversee data sourcing, annotation, & versioning.	• Manage expectations on AI's probabilistic nature. • Align stakeholders (it's "learned," not "coded").
AI Regulation	• Integrate AI regulations (e.g., EU AI Act) into strategy.	• Translate legal rules into technical/UI requirements.	• Act as liaison between dev, legal, & compliance.

	• Inform go-to-market compliance.	• Implement data governance & consent.	• Ensure "compliant by design" processes.

Table 25: AI Competency Mapping with Product Management Skills

- **Redefine Product Management Frameworks to Integrate AI Workflows:** Traditional product management models should be revisited to incorporate AI-enhanced processes with workflow automation such as automated prototyping, AI-assisted decision-making, and agile experimentation. This includes redefining roadmaps, sprint cycles, and KPIs to reflect AI-influenced product lifecycles. Establishing hybrid frameworks will help PMs effectively manage both technical and ethical dimensions of AI products.
- **Implement Ethical Governance Protocols and AI Risk Frameworks:** With the increasing influence of GenAI on product decisions, organizations must develop and enforce comprehensive ethical AI governance policies. These should cover data privacy, algorithmic transparency, bias mitigation, and regulatory compliance (e.g., GDPR, AI Act). Product managers should receive specific training to identify ethical dilemmas and act as custodians of responsible AI integration.
- **Facilitate Cross-Functional AI Collaboration Models:** To maximize AI-driven innovation, companies should design cross-functional collaboration structures that include product managers, data scientists, AI engineers, UX designers, and legal experts. Embedding collaborative AI experimentation within agile teams will enhance product value delivery and reduce silos between departments.
- **Encourage Scenario-Based Strategic Planning and AI Prototyping:** Product teams should adopt scenario planning and simulation-based forecasting using AI models to test multiple versions of product-market fit, user behavior, and feature performance. Tools like digital twins and GenAI-based simulations can help PMs de-risk innovation and accelerate time-to-market with greater confidence.

References

1. Al Naqbi, H., Bahroun, Z. and Ahmed, V., 2024. Enhancing work productivity through generative artificial intelligence: A comprehensive literature review. *Sustainability, 16*(3), p.1166.
2. Alahira, J., Mhlongo, N.Z., Falaiye, T., Olubusola, O., Daraojimba, A.I. and Oguejio for, B.B., 2024. The role of artificial intelligence in enhancing tax compliance and financial regulation. *Finance & Accounting Research Journal, 10*.
3. Anantrasirichai, N. & Bull, D. (2021). Artificial intelligence in the creative industries: a review. *Artificial Intelligence Review*, **55**(1), pp. 589–656.
4. Ashfaq, M., Yun, J., Yu, S., & Loureiro, S. M. C. (2020). I, Chatbot: Modeling the determinants of users' satisfaction and continuance intention of AI-powered service agents. *Telematics and informatics, 54*, 101473.
5. Bahi, A., GHARI, J. and Gahi, Y., 2024. Integrating Generative AI for Advancing Agile Software Development and Mitigating Project Management Challenges. I*nternational Journal of Advanced Computer Science & Applications, 15*(3).
6. Bainey, K., 2024. *AI-driven project management: Harnessing the power of artificial intelligence and ChatGPT to achieve peak productivity and success*. John Wiley & Sons.
7. Bello, I., 2021. Lambdanetworks: Modeling long-range interactions without attention. *arXiv preprint arXiv:2102.08602*.
8. Bhattacherjee, A., 2001. Understanding information systems continuance: An expectation-confirmation model. *MIS quarterly*, pp.351-370.
9. Bhinder, B., Gilvary, C., Madhukar, N.S. and Elemento, O., 2021. Artificial intelligence in cancer research and precision medicine. *Cancer discovery, 11*(4), pp.900-915.
10. Bian, L., 2024. Harnessing the potential of ai to revolutionize productivity: unveiling opportunities and tackling challenges. *Journal of productivity science*, p.12.
11. Black, J.S. and van Esch, P., 2020. AI-enabled recruiting: What is it and how should a manager use it? *Business horizons, 63*(2), pp.215-226.
12. Bove, T., 2023. Bill Gates says ChatGPT will 'change our world'but it doesn't mean your job is at risk. *Re-trieved from https://fortune. Com/2023/02/10/bill-gates-chatgpt-jobs-chatbot-microsoft-google-bard-bing/on February 24*, p.2023.

13. Bruce, K., 2006. Henry S. Dennison, Elton Mayo, and human relations historiography. *Management & Organizational History, 1*(2), pp.177-199.
14. Brynjolfsson, E., Rock, D. and Syverson, C., 2019. Artificial intelligence and the modern productivity paradox. *The economics of artificial intelligence: An agenda, 23*(2019), pp.23-57.
15. Dehouche, N. (2021). Plagiarism in the age of massive Generative Pre-trained Transformers (GPT-3): "The best time to act was yesterday. The next best time is now." *Ethics in Science and Environmental Politics*, **21**, pp. 17–23.
16. Dilmegani, C., 4. Reasons for Artificial Intelligence (AI) Project Failure in 2022. *AI Multiple*.
17. Cao, Y., Li, S., Liu, Y., Yan, Z., Dai, Y., Yu, P.S. and Sun, L., 2023. A comprehensive survey of ai-generated content (aigc): A history of generative ai from gan to chatgpt. *arXiv preprint arXiv:2303.04226*.
18. Cockburn, I.M., Henderson, R. and Stern, S., 2018. *The impact of artificial intelligence on innovation* (Vol. 24449). Cambridge, MA, USA: National bureau of economic research.
19. Colbert, A., Yee, N. and George, G., 2016. The digital workforce and the workplace of the future. *Academy of management journal, 59*(3), pp.731-739.
20. Cooley, S., 2016. Human relations theory of organizations. *Global encyclopedia of public administration, public policy, and governance,* pp.1-5.
21. Cooper, R.G., 2023. The artificial intelligence revolution in new-product development. *IEEE Engineering Management Review, 52*(1), pp.195-211.
22. Cooper, R.G., 2019. The drivers of success in new-product development. *Industrial marketing management, 76*, pp.36-47.
23. Cooper, R.G., 2024. Why AI projects fail: Lessons from new product development. *IEEE Engineering Management Review*.
24. Cooper, R.G., 2023. The artificial intelligence revolution in new-product development. *IEEE Engineering Management Review, 52*(1), pp.195-211.
25. Creswell, J.W. and Clark, V.L.P., 2017. *Designing and conducting mixed methods research*. Sage publications.
26. Cristofaro, M., 2017. Herbert Simon's bounded rationality: Its historical evolution in management and cross-fertilizing contribution. *Journal of Management History, 23*(2), pp.170-190.

27. Cullinane, N. and Cushen, J., 2019. Applying Scientific Management to modern employment relations and HRM. *Elgar Introduction to Theories of Human Resources and Employment Relations*, pp.53-66.
28. Dam, H.K., Tran, T., Grundy, J., Ghose, A. and Kamei, Y., 2019, May. Towards effective AI-powered agile project management. In *2019 IEEE/ACM 41st international conference on software engineering: new ideas and emerging results (ICSE-NIER)* (pp. 41-44). IEEE.
29. Davenport, T.H. and Kirby, J., 2016. *Only humans need apply: Winners and losers in the age of smart machines* (Vol. 1). New York: Harper Business.
30. Davis, E. and Marcus, G., 2015. Commonsense reasoning and commonsense knowledge in artificial intelligence. *Communications of the ACM, 58*(9), pp.92-103.
31. De Cicco, R., Silva, S.C.L.D.C.E. and Alparone, F.R., 2021. "It's on its way": Chatbots applied for online food delivery services, social or task-oriented interaction style?. *Journal of Foodservice Business Research, 24*(2), pp.140-164.
32. Dean Jr, J.W. and Sharfman, M.P., 1993. The relationship between procedural rationality and political behavior in strategic decision making. *Decision sciences, 24*(6), pp.1069-1083.
33. Dell'Acqua, F., McFowland III, E., Mollick, E.R., Lifshitz-Assaf, H., Kellogg, K., Rajendran, S., Krayer, L., Candelon, F. and Lakhani, K.R., 2023. Navigating the jagged technological frontier: Field experimental evidence of the effects of AI on knowledge worker productivity and quality. *Harvard Business School Technology & Operations Mgt. Unit Working Paper*, (24-013).
34. Kingston, J. (2017). Using artificial intelligence to support compliance with the general data protection regulation. *Artificial Intelligence and Law*, **25**(3), pp. 301–315.
35. Kshetri, N., Hughes, L., louise Slade, E., Jeyaraj, A., kumar Kar, A., Koohang, A., Raghavan, V., Ahuja, M., Albanna, H., ahmad Albashrawi, M. and Balakrishnan, J., 2023. "So, what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges, and implications of generative conversational AI for research, practice, and policy. *International Journal of Information Management, 71*, p.102642.
36. Ebert, C., 2007. The impacts of software product management. *Journal of systems and software, 80*(6), pp.850-861.
37. Ebert, C. and Louridas, P., 2023. Generative AI for software practitioners. *IEEE Software, 40*(4), pp.30-38.

38. Eubanks, B., 2022. *Artificial intelligence for HR: Use AI to support and develop a successful workforce*. Kogan Page Publishers.
39. Fischer, M. and Lanquillon, C., 2024, June. Evaluation of Generative AI-Assisted Software Design and Engineering: A User-Centered Approach. *In International Conference on Human-Computer Interaction* (pp. 31-47). Cham: Springer Nature Switzerland.
40. Flavián, C. and Casaló, L.V., 2021. Artificial intelligence in services: current trends, benefits, and challenges. *The Service Industries Journal, 41*(13-14), pp.853-859.
41. Ghimire, S. and Sagri, G.S., 2024. The Role of AI in Project Management.
42. Gnanasambandam, C., Harrysson, M. and Singh, R. (2024) *How generative AI could accelerate software product time to market*, *McKinsey & Company*. Available at: https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/how-generative-ai-could-accelerate-software-product-time-to-market.
43. Ghorbani, M.A., 2023. AI tools to support design activities and innovation processes.
44. Gonçalves, M.B., Cavalcante, E., Batista, T., Oquendo, F. and Nakagawa, E.Y., 2014, October. Towards a conceptual model for software-intensive system-of-systems. In 2014 *IEEE International Conference on Systems, Man, and Cybernetics (SMC)* (pp. 1605-1610). IEEE.
45. Gorchels, L., 2006. The product manager's handbook. *(No Title)*.
46. Gorchels, L., 2011. *The Product manager's handbook 4/E*. McGraw-Hill Professional.
47. Gupta, R., Nair, K., Mishra, M., Ibrahim, B. and Bhardwaj, S., 2024. Adoption and impacts of generative artificial intelligence: Theoretical underpinnings and research agenda. *International Journal of Information Management Data Insights, 4*(1), p.100232.
48. Gupta, S., Sharma, P., Chaudhary, S., Kumar, V., Singh, S.P., Lourens, M. and Beri, N., 2024. Study on the beneficial impacts and ethical dimensions of generative ai in software product management.
49. Hollstein, A., 2024. On the Test Bench: How to Evaluate the Quality of AI Systems?. *In Artificial Intelligence, Co-Creation and Creativity* (pp. 116-133). Routledge.
50. Holmström, J. and Carroll, N., 2024. How organizations can innovate with generative AI. *Business Horizons*.
51. How, M.L. and Cheah, S.M., 2024. Forging the future: Strategic approaches to quantum ai integration for industry transformation. *Ai, 5*(1), pp.290-323.

52. Hunt, S.D., Arnett, D.B. and Madhavaram, S., 2006. The explanatory foundations of relationship marketing theory. *Journal of business & industrial marketing, 21*(2), pp.72-87.
53. Ji, M., 2017. Are robots good fiduciaries: regulating robo-advisors under the investment advisers act of 1940. *Colum. L. Rev., 117*, p.1543.
54. Kamal, S.A., Shafiq, M. and Kakria, P., 2020. Investigating acceptance of telemedicine services through an extended technology acceptance model (TAM). *Technology in Society, 60*, p.101212.
55. Kao, W.K. and Huang, Y.S.S., 2023. Service robots in full-and limited-service restaurants: Extending technology acceptance model. *Journal of Hospitality and Tourism Management, 54*, pp.10-21.
56. Karim, M.R., Antar, S.S. and Khan, M.A., 2022, December. Idea generation using transformer decoder models. In *Proceedings of the 2022 5th international conference on algorithms, computing, and artificial Intelligence* (pp. 1-5).
57. Kim, H., Choi, B. and Cho, H., 2021. AI-driven user story points estimation based on natural language processing. *Journal of Systems and Software, 171*, p.110818.
58. Lee, M., 2023. A mathematical interpretation of autoregressive generative pre-trained transformer and self-supervised learning. *Mathematics, 11*(11), p.2451.
59. Legris, P., Ingham, J. and Collerette, P., 2003. Why do people use information technology? A critical review of the technology acceptance model. *Information & management, 40*(3), pp.191-204.
60. Li, N., Zhou, H. and Mikel-Hong, K., 2024. Generative AI Enhances Team Performance and Reduces Need for Traditional Teams. *arXiv preprint arXiv:2405.17924*.
61. Lv, Z., 2023. Generative artificial intelligence in the metaverse era. *Cognitive Robotics, 3*, pp.208-217.
62. Maglyas, A., Nikula, U. and Smolander, K., 2011, August. What do we know about software product management?-a systematic mapping study. In *2011 Fifth International Workshop on Software Product Management (IWSPM)* (pp. 26-35). IEEE.
63. Mannuru, N.R., Shahriar, S., Teel, Z.A., Wang, T., Lund, B.D., Tijani, S., Pohboon, C.O., Agbaji, D., Alhassan, J., Galley, J.K., Kousari, R., Ogbadu-Oladapo, L., Saurav, S.K., Srivastava, A., Tummuru, S.P., Uppala, S. & Vaidya, P. (2023). Artificial

intelligence in developing countries: The impact of generative artificial intelligence (AI) technologies for development. *Information Development*, 41(3), pp. 305–323.

64. Mayer, H. *et al.* (2025) *Superagency in the workplace: Empowering people to unlock AI's full potential*, *McKinsey & Company*. Available at: https://www.mckinsey.com/capabilities/tech-and-ai/our-insights/superagency-in-the-workplace-empowering-people-to-unlock-ais-full-potential-at-work (Accessed: 11 November 2025).
65. Monteiro, P. and Adler, P.S., 2022. Bureaucracy for the 21st century: Clarifying and expanding our view of bureaucratic organization. *Academy of Management Annals, 16*(2), pp.427-475.
66. Münch, C., Marx, E., Benz, L., Hartmann, E. and Matzner, M., 2022. Capabilities of digital servitization: Evidence from the socio-technical systems theory. *Technological Forecasting and Social Change, 176*, p.121361.
67. Namatherdhala, B., Mazher, N. and Sriram, G.K., 2022. Artificial intelligence in product management: Systematic review. *International Research Journal of Modernization in Engineering Technology and Science, 4*(7), pp.2914-2917.
68. Newman, J., Mintrom, M. and O'Neill, D., 2022. Digital technologies, artificial intelligence, and bureaucratic transformation. *Futures, 136*, p.102886.
69. Odonkor, B., Kaggwa, S., Uwaoma, P.U., Hassan, A.O., and Farayola, O.A., 2024. The impact of AI on accounting practices: A review: Exploring how artificial intelligence is transforming traditional accounting methods and financial reporting. *World Journal of Advanced Research and Reviews, 21*(1), pp.172-188.
70. Ogundipe, D.O., Babatunde, S.O. and Abaku, E.A., 2024. AI and product management: A theoretical overview from idea to market. *International Journal of Management & Entrepreneurship Research, 6*(3), pp.950-969.
71. Olinga, L., 2022. Elon Musk sounds the alarm about ChatGPT. *TheStreet. Retrieved April, 27*, p.2023.
72. Olsson, H.H. and Bosch, J., 2023, November. Strategic digital product management in the age of ai. In *International Conference on Software Business* (pp. 344-359). Cham: Springer Nature Switzerland.
73. Pagliaro, A. and Sangiorgi, P., 2023. AI in experiments: present status and future prospects. *Applied Sciences, 13*(18), p.10415.
74. 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.

75. 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.
76. Park, Y., Park, A. and Kim, C., 2023. ALSI-Transformer: Transformer-based code comment generation with aligned lexical and syntactic information. *IEEE Access, 11*, pp.39037-39047.
77. Patel, D.A., Aggrawal, S. and Dittman, K., 2023. Navigating the transition from project management to product management. *PM World Journal. XII, X*.
78. Patil, D., Rane, N.L. and Rane, J., 2024. *The Future Impact of ChatGPT on Several Business Sectors*. Deep Science Publishing.
79. Pattyn, F., 2023, September. Enhancing startup success rates: towards a pragmatic framework for product managers (PFPM). In *2023 IEEE 31st International Requirements Engineering Conference (RE)* (pp. 381-385). IEEE.
80. Pradeep, A.K., Appel, A. and Sthanunathan, S., 2018. *AI for marketing and product innovation: Powerful new tools for predicting trends, connecting with customers, and closing sales.* John Wiley & Sons.
81. Prentice, C. and Nguyen, M., 2020. Engaging and retaining customers with AI and employee service. *Journal of retailing and consumer services, 56,* p.102186.
82. Raghunathan, S., Manukonda, K.R.R., Das, R.S. and Emmanni, P.S., 2024. *Innovations in Tech Collaboration and Integration*. Cari Journals USA LLC.
83. Raisch, S. and Krakowski, S., 2021. Artificial intelligence and management: The automation–augmentation paradox. *Academy of management review, 46*(1), pp.192-210.
84. Rane, N., Choudhary, S. and Rane, J., 2024. A new era of automation in the construction industry: implementing leading-edge generative artificial intelligence, such as ChatGPT or Bard. *Available at SSRN 4681676*.
85. Rowe, S.F., 2020. *Project management for small projects*. Berrett-Koehler Publishers.
86. Salter, A., Ter Wal, A.L., Criscuolo, P. and Alexy, O., 2015. Open for ideation: Individual-level openness and idea generation in R&D. *Journal of Product Innovation Management, 32*(4), pp.488-504.

87. Sarker, I.H., 2022. AI-based modeling: techniques, applications and research issues towards automation, intelligent and smart systems. *SN computer science, 3*(2), p.158.
88. Sieja, M. and Wach, K., 2019. The use of evolutionary algorithms for optimization in the modern entrepreneurial economy: interdisciplinary perspective. *Entrepreneurial Business and Economics Review, 7*(4), pp.117-130.
89. Simon, H.A., 1987. Making management decisions: The role of intuition and emotion. *Academy of Management Perspectives, 1*(1), pp.57-64.
90. Singh, D.P.D., 2024. Generative AI through the Lens of Technology Acceptance Model. *Available at SSRN 4953174*.
91. Stallinger, F. and Neumann, R., 2012, September. From software to software system products: An add-on process reference model for enhancing ISO/IEC 12207 with product management and system-level reuse. In *2012 38th Euromicro Conference on Software Engineering and Advanced Applications* (pp. 307-314). IEEE.
92. Sung, E.C., Bae, S., Han, D.I.D. and Kwon, O., 2021. Consumer engagement via interactive artificial intelligence and mixed reality. *International journal of information management, 60*, p.102382.
93. Thorp, H.H., 2023. ChatGPT is fun, but not an author. *Science, 379*(6630), pp.313-313.
94. Tkalich, A., Ulfsnes, R. and Moe, N.B., 2022, June. Toward an agile product management: what do product managers do in agile companies?. In *International conference on agile software development* (pp. 168-184). Cham: Springer International Publishing.
95. Tominc, P., Oreški, D. and Rožman, M., 2023. Artificial intelligence and agility-based model for successful project implementation and company competitiveness. *Information, 14*(6), p.337.
96. Tse, T., Esposito, M., Mizuno, T. and Goh, D., 2020. The dumb reason your AI project will fail. *Harvard business review digital articles,* pp.2-5.
97. Udeh, C.A., Orieno, O.H., Daraojimba, O.D., Ndubuisi, N.L. and Oriekhoe, O.I., 2024. Big data analytics: a review of its transformative role in modern business intelligence. *Computer Science & IT Research Journal, 5*(1), pp.219-236.
98. Vaishya, R., Javaid, M., Khan, I.H. and Haleem, A., 2020. Artificial Intelligence (AI) applications for COVID-19 pandemic. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 14*(4), pp.337-339.
99. Van Dis, E.A., Bollen, J., Zuidema, W., Van Rooij, R. and Bockting, C.L., 2023. ChatGPT: five priorities for research. *Nature, 614*(7947), pp.224-226.

100. Venkataraman, R.R. and Pinto, J.K., 2023. *Cost and value management in projects*. John Wiley & Sons.

101. Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D., 2003. User acceptance of information technology: Toward a unified view. *MIS quarterly,* pp.425-478.

102. Verleyen, W. and McGinnis, W., 2022. Framework for disruptive AI/ML Innovation. *arXiv preprint arXiv:2204.12641.*

103. Vlaanderen, K., Jansen, S., Brinkkemper, S. and Jaspers, E., 2011. The agile requirements refinery: Applying SCRUM principles to software product management. *Information and software technology, 53*(1), pp.58-70.

104. Votto, A.M., Valecha, R., Najafirad, P. and Rao, H.R., 2021. Artificial intelligence in tactical human resource management: A systematic literature review. *International Journal of Information Management Data Insights, 1*(2), p.100047.

105. Walz, A. and Firth-Butterfield, K., 2019. Implementing ethics into artificial intelligence: a contribution, from a legal perspective, to the development of an AI governance regime. *Duke L. & Tech. Rev., 18*, p.176.

106. Wang, L., Liu, Z., Liu, A. and Tao, F., 2021. Artificial intelligence in product lifecycle management. *The International Journal of Advanced Manufacturing Technology, 114*, pp.771-796.

107. Weng, J.C., 2023. *Putting intellectual robots to work: Implementing generative ai tools in project management.* NYU SPS Applied Analytics Laboratory.

108. Wind, J. and Mahajan, V., 1997. Issues and opportunities in new product development: An introduction to the special issue. *Journal of marketing research, 34*(1), pp.1-12.

109. Zadeh, E.K., Khoulenjani, A.B. and Safaei, M., 2024. Integrating AI for agile Project Management: Innovations, challenges, and benefits. *International Journal of Industrial Engineering and Construction Management (IJIECM), 1*(1), pp.1-10.

110. Zhang, S., Xing, Z., Guo, R., Xu, F., Chen, L., Zhang, Z., Zhang, X., Feng, Z. and Zhuang, Z., 2024. Empowering Agile-Based Generative Software Development through Human-AI Teamwork. *arXiv preprint arXiv:2407.15568*.

111. Ziemba, E., Eisenbardt, M., Mullins, R. and Dettmer, S., 2022. Consumer engagement in business process innovation–ICT companies cases from Poland and UK. *Journal of Computer Information Systems, 62*(2), pp.302-315.

112. Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010) *Multivariate data analysis*. 7th edn. Upper Saddle River, NJ: Prentice Hall.

113. Kish, L. (1965) *Survey Sampling*. New York: John Wiley & Sons.

Appendix

"The Transformation of Software Product Management and The Role of the Product Manager in The Age of Generative AI"

Appendix A: Informed Consent Form – Quantitative Survey

RESEARCH STUDY INFORMED CONSENT FORM - QUANTITATIVE SURVEY PARTICIPATION

Study Title: The Transformation of Software Product Management and The Role of Product Manager in the Age of Generative AI

Principal Investigator: Abhinav Goel, Doctoral Candidate
Institution: Swiss School of Business and Management
Degree Program: Doctor of Business Administration (DBA)
Faculty Advisor: Dr. Gualdino Miguel de Jesus Vicente Cardoso
Contact Email: abhinav@theabhinavg.com

INVITATION TO PARTICIPATE

You are invited to participate in a research study examining how generative artificial intelligence (GenAI) technologies are transforming software product management practices, team dynamics, and the evolving role of product managers. This study is being conducted as part of a doctoral dissertation at the Swiss School of Business and Management.

Before you decide whether to participate, it is important that you understand why the research is being conducted and what it will involve. Please take time to read the following information carefully and feel free to ask questions if anything is unclear or if you would like more information.

PURPOSE OF THE STUDY

The primary purpose of this research is to investigate:

1. How generative artificial intelligence technologies are being adopted and integrated within software product management teams
2. The impact of GenAI adoption on team dynamics, collaboration, and productivity
3. The evolving competencies, skills, and responsibilities required of product managers in AI-augmented environments
4. Organizational factors that facilitate or impede successful AI adoption in product management contexts
5. Ethical considerations and governance frameworks for responsible AI integration

6. Long-term implications for the product manager role and product development practices

Your participation will contribute to understanding how organizations can effectively and responsibly integrate AI technologies while supporting product management professionals in developing necessary competencies for success in AI-augmented contexts.

PARTICIPANT ELIGIBILITY

To participate in this study, you must meet the following criteria:

- Currently employed as a product manager, senior product manager, AI product manager, data scientist, or AI/ML engineer working in software product development
- Minimum of 2 years of professional experience in product management or related roles
- Direct experience using generative AI tools (e.g., ChatGPT, Google Gemini, Claude, GitHub Copilot, or similar platforms) in professional contexts
- At least 18 years of age
- Able to read and respond to survey questions in English
- Willing to provide honest reflections about your experiences with AI adoption

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WHAT PARTICIPATION INVOLVES

Survey Overview

If you agree to participate, you will be asked to complete an online survey that will take approximately **15-20 minutes** to complete. The survey consists of the following sections:

Part A: Demographic Information (approximately 2 minutes) - Age, gender, educational background - Current job title and years of professional experience - Organization size and industry sector - Geographic location

Part B: Generative AI Adoption and Usage (approximately 3 minutes) - Which generative AI platforms you use (ChatGPT, Gemini, Claude, etc.) - Frequency and contexts of AI tool usage - Primary use cases and applications - Stage of organizational AI adoption

Part C: Technology Acceptance and Perceptions (approximately 3 minutes) - Perceived usefulness of AI tools for product management tasks - Perceived ease of use and learning curve - Attitudes toward AI-augmented workflows - Confidence in using AI tools effectively

Part D: Team Dynamics and Collaboration (approximately 2 minutes) - Impact of AI adoption on team communication and collaboration - Changes in decision-making processes - Effects on creativity and innovation - Team satisfaction and engagement

Part E: Role Evolution and Competency Development (approximately 3 minutes) - Changes in product manager responsibilities and priorities - New skills and competencies developed - Training and professional development experiences - Career trajectory perceptions

Part F: Ethical Governance and Responsible AI (approximately 2 minutes) - Organizational ethical frameworks and guidelines - Practices for bias identification and mitigation - Data privacy and security considerations - Regulatory compliance awareness

Part G: Adoption Barriers and Enablers (approximately 2 minutes) - Challenges encountered during AI adoption - Organizational support and resources - Success factors and best practices - Recommendations for other organizations

Part H: Long-Term Implications and Future Outlook (approximately 3 minutes) - Workflow automation interest and implementation - Predictions about AI's long-term impact - Organizational strategy and competitive positioning - Open-ended reflections and recommendations

Survey Format

- The survey will be administered online via a secure platform (Qualtrics or Google Forms)
- All questions are optional; you may skip any question you prefer not to answer
- Most questions use Likert-scale ratings (e.g., 1 = Strongly Disagree to 5 = Strongly Agree)
- Several open-ended questions allow you to provide detailed responses in your own words
- You may save your progress and return to complete the survey if needed
- You may withdraw from the survey at any time without penalty

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VOLUNTARY PARTICIPATION

Participation in this research study is **completely voluntary**. You have the right to:

- Decline to participate without any consequences
- Skip any questions you do not wish to answer
- Withdraw from the study at any time before submitting your completed survey
- Request that your data be removed from the study (if submitted anonymously, this may not be possible after submission as responses cannot be individually identified)

Your decision whether or not to participate will not affect your current or future relationship with Swiss School of Business and Management, the researcher, or your employer.

POTENTIAL RISKS AND DISCOMFORTS

The risks associated with participation in this study are minimal and comparable to those encountered in daily professional activities. Potential risks include:

Occupational Concerns: - Some questions address challenges with AI adoption, which may raise concerns about job security or role changes - **Mitigation:** All responses are confidential. No identifying information linking responses to specific individuals or organizations will be disclosed. Participation is voluntary, and you may skip any questions causing discomfort.

Time Commitment: - Completing the survey requires approximately 15-20 minutes of your time - **Mitigation:** The survey is designed to be efficient and can be completed at your convenience. You may save progress and return to complete it if needed.

Data Privacy: - As with any online activity, there is a minimal risk of data breach despite security measures - **Mitigation:** Survey responses are collected through secure, encrypted

platforms. Data is stored on password-protected systems accessible only to the research team. No personally identifiable information is collected in the survey itself.

Psychological Discomfort: - Reflecting on organizational challenges or personal competency gaps may cause minor discomfort - **Mitigation:** All questions are optional. You may skip any question you prefer not to answer. The survey focuses on professional experiences, not personal judgments.

POTENTIAL BENEFITS

Benefits to You

While there are no direct financial benefits for participating, you may experience the following potential benefits:

1. **Professional Reflection:** The survey provides structured opportunity to reflect on your experiences with AI adoption, potentially generating insights about your own practice and professional development needs
2. **Contribution to Knowledge:** Your participation contributes to advancing understanding of AI's impact on product management, potentially benefiting the broader professional community
3. **Access to Findings:** Participants who provide contact information (optional and stored separately from survey responses) will receive a summary of research findings upon study completion
4. **Professional Development Insights:** Research findings may inform training programs, competency frameworks, and organizational best practices that could benefit your career development

Benefits to Society and the Field

1. **Academic Knowledge Advancement:** Findings contribute to scholarly understanding of technology adoption in professional contexts, particularly regarding emerging AI technologies
2. **Professional Practice Guidance:** Results will provide evidence-based recommendations for product managers, organizations, and professional development institutions navigating AI integration
3. **Ethical Framework Development:** Research identifies ethical considerations and governance frameworks supporting responsible AI adoption in product management
4. **Organizational Strategy:** Findings illuminate success factors, common barriers, and best practices for effective AI implementation

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CONFIDENTIALITY AND DATA PROTECTION

Data Collection and Storage

Your privacy and confidentiality are of utmost importance. The following measures are in place to protect your information:

Anonymous Survey Design: - The survey does not collect personally identifiable information such as your name, email address, employer name, or specific job location - IP addresses are not recorded - Survey responses cannot be linked to individual participants - Demographic information is collected in aggregate categories (e.g., age ranges, organization size categories) to prevent identification

Secure Data Collection: - Survey responses are collected via secure, encrypted platforms (Qualtrics or Google Forms) with industry-standard security protocols - Data transmission uses SSL/TLS encryption - Access to survey administration platform is password-protected and limited to the research team

Data Storage Security: - All survey data is stored on password-protected, encrypted systems - Physical access is restricted to authorized research personnel - Digital access requires multi-factor authentication - Regular security audits are conducted

Data Retention: - Survey data will be retained for a minimum of 5 years following study completion, in accordance with institutional research data retention policies - After the retention period, all data will be securely deleted using data destruction protocols

Use of Data

Primary Research Use: - Survey responses will be analyzed in aggregate to identify patterns, trends, and relationships - Statistical analysis will examine correlations between variables (e.g., AI adoption intensity and team dynamics) - Findings will be reported in aggregate form only (e.g., "85% of respondents reported…") - No individual responses will be reported or identifiable in publications

Reporting and Dissemination: - Research findings will be included in the doctoral dissertation submitted to Swiss School of Business and Management - Results may be presented at academic conferences and professional events - Findings may be published in peer-reviewed academic journals or professional publications - Summary reports may be shared with participants who request them (optional) - All reporting uses aggregate data only; no individual participants or organizations will be identifiable

Data Sharing: - Aggregated, de-identified data may be shared with other researchers for verification or secondary analysis, but only after removing all potentially identifying information - No raw data containing any potentially identifiable information will be shared outside the research team - Any data sharing will comply with institutional data governance policies and research ethics requirements

Limits to Confidentiality

While every effort will be made to maintain confidentiality, there are legal and ethical limits:

- If you disclose information indicating imminent harm to yourself or others, the researcher may be legally obligated to report this to appropriate authorities
- If research records are subpoenaed by a court of law, confidentiality cannot be guaranteed, though the researcher will take all legally permissible steps to protect participant confidentiality
- Institutional review board members or regulatory authorities may access research records to verify compliance with ethical research conduct standards

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COMPENSATION

There is no financial compensation for participating in this survey. However, your contribution to advancing knowledge about AI adoption in product management is greatly valued and appreciated.

Participants who provide contact information (stored separately from survey responses) may receive: - Summary of research findings upon study completion - Invitation to optional follow-up interviews (separate consent required) - Access to professional development resources based on research findings

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FUTURE CONTACT AND FOLLOW-UP RESEARCH

Optional Interview Participation

At the end of the survey, you will have the opportunity to indicate whether you are willing to be contacted for a potential follow-up interview (approximately 45-60 minutes). Interview participation is entirely optional and requires separate informed consent.

If you indicate interest in interview participation: - You will provide contact information (email) stored separately from your survey responses to maintain confidentiality - The researcher will contact you to schedule an interview at your convenience - You will receive a separate informed consent form for the interview - You may decline the interview invitation without any consequences

Research Updates

If you would like to receive a summary of research findings upon study completion, you may provide your email address at the end of the survey. This contact information will be: - Stored separately from your survey responses - Used only to send research summaries and updates - Not shared with any third parties - Deleted after research findings are distributed

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QUESTIONS AND CONCERNS

If you have questions about this research study, you may contact:

Principal Investigator:
Abhinav Goel, Doctoral Candidate
Email: abhinav@theabhinavg.com

Faculty Advisor:
Dr. Gualdino Miguel de Jesus Vicente Cardoso
Email: gualdino.cardoso@ssbm.ch
Swiss School of Business and Management

Research Ethics Questions:

If you have questions about your rights as a research participant, concerns about the ethical conduct of this study, or wish to discuss problems or concerns with someone independent of the research team, you may contact:

Institutional Review Board (IRB)
Swiss School of Business and Management
Geneva, Switzerland

PARTICIPANT RIGHTS

As a research participant, you have the right to:

1. **Voluntary Participation:** Participate voluntarily without coercion or undue influence
2. **Informed Decision:** Receive clear, comprehensible information about the study before deciding to participate
3. **Ask Questions:** Ask questions about the research at any time and receive clear answers
4. **Withdraw:** Withdraw from the study at any time without penalty or negative consequences
5. **Privacy:** Have your privacy protected through confidentiality measures
6. **Access to Findings:** Request access to research findings upon study completion
7. **Respect:** Be treated with respect and dignity throughout the research process
8. **Grievance:** File a complaint with the IRB if you believe your rights have been violated

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CONSENT STATEMENT

By proceeding to the survey, you acknowledge that:

- I have read and understood the information provided in this consent form
- I have had the opportunity to ask questions about the research and have received satisfactory answers
- I understand that participation is voluntary and I may withdraw at any time without penalty
- I understand that my responses will be kept confidential and reported only in aggregate form
- I understand the potential risks and benefits of participation
- I understand how my data will be collected, stored, and used
- I consent to participate in this research study
- I am at least 18 years of age
- I meet the eligibility criteria for participation

Please save or print a copy of this consent form for your records.

If you agree to participate, please click “I Agree” below to proceed to the survey.

[ ] I AGREE - I have read the above information and consent to participate in this research study

[ ] I DO NOT AGREE - I do not wish to participate

Date of Consent Form: October 2025
Study Duration: October 2023 - December 2025

End of Informed Consent Form

Please click "I Agree" to proceed to the survey or close this window if you do not wish to participate.

Appendix B: Quantitative Survey Questionnaire

Section A: Demographic Information

Please answer the following questions. Your responses will remain confidential and are used for research purposes only.

1. **Full Name (Optional):**
2. **Age Group:**
   - ☐ Below 25
   - ☐ 25–34
   - ☐ 35–44
   - ☐ 45–54
   - ☐ 55 and above
3. **Gender:**
   - ☐ Male
   - ☐ Female
   - ☐ non-binary
   - ☐ Prefer not to say
4. **Highest Educational Qualification:**
   - ☐ Bachelor's Degree
   - ☐ Master's Degree
   - ☐ Doctorate (Ph.D./DBA)
   - ☐ Other (Please specify): _____
5. **Current Job Title:**
   - ☐ Product Manager
   - ☐ Senior Product Manager
   - ☐ AI/ML Engineer

☐ Data Scientist

☐ AI Researcher

☐ Other (Please specify): _____

6. **Total Work Experience:**

☐ Less than 2 years

☐ 2–5 years

☐ 6–10 years

☐ 11–15 years

☐ More than 15 years

7. **Years of Experience in Software Product Management or AI:**

☐ Less than 1 year

☐ 1–3 years

☐ 4–6 years

☐ 7–10 years

☐ More than 10 years

8. **Current Industry Sector:**

☐ IT Services

☐ Software Product Development

☐ E-commerce

☐ Fintech

☐ Healthcare Tech

☐ Education Tech

☐ Other (Please specify): _____

9. **Organization Size (Total Employees):**

☐ 1–50 (Startup)

☐ 51–200 (Small Enterprise)

☐ 201–1000 (Medium Enterprise)

☐ 1001 and above (Large Enterprise)

10. **Location (City & Country):**

11. **Are you currently working directly with or managing projects involving Generative AI?**

☐ Yes

☐ No

☐ Planning to in the next 6 months

Section B: Research Questionnaire

Instruction: Please indicate the extent to which you agree or disagree with the following statements. Use the scale below and tick the appropriate box:

[1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree]

	1. Adoption of Generative AI *(Independent Variable)*					
	Statement	**1**	**2**	**3**	**4**	**5**
1	My organization actively promotes the use of generative AI in product development.	☐	☐	☐	☐	☐
2	I am aware of how generative AI is being integrated into our workflows.	☐	☐	☐	☐	☐
3	Generative AI tools are widely adopted across different teams in my organization.	☐	☐	☐	☐	☐
4	There is a clear organizational strategy for adopting generative AI.	☐	☐	☐	☐	☐
5	I have personally adopted generative AI tools in my project work.	☐	☐	☐	☐	☐
	2. Use Cases of Generative AI *(Independent Variable)*					
	Statement	**1**	**2**	**3**	**4**	**5**
6	Generative AI is used for content generation in my organization.	☐	☐	☐	☐	☐
7	Our team uses generative AI for automating routine tasks.	☐	☐	☐	☐	☐
8	Generative AI supports idea generation and innovation in product features.	☐	☐	☐	☐	☐
9	Generative AI is applied in customer interaction and feedback systems.	☐	☐	☐	☐	☐
10	We explore multiple use cases of generative AI across the product lifecycle.	☐	☐	☐	☐	☐
	3. Type of Generative AI Technology Used *(Independent Variable)*					
	Statement	**1**	**2**	**3**	**4**	**5**
11	We use tools like ChatGPT, Bard, or similar LLMs in our product processes.	☐	☐	☐	☐	☐
12	Our systems include image, audio, or code-generating AI tools.	☐	☐	☐	☐	☐
13	We experiment with custom fine-tuned generative AI models.	☐	☐	☐	☐	☐

14	We prioritize adopting the latest generative AI technologies for product improvements.	☐	☐	☐	☐	☐
15	There is a systematic process to evaluate and choose different generative AI technologies.	☐	☐	☐	☐	☐
	4. Team Dynamics and Collaboration Efficiency *(Dependent Variable)*					
	Statement	**1**	**2**	**3**	**4**	**5**
16	Generative AI has improved communication and collaboration in my team.	☐	☐	☐	☐	☐
17	Task coordination has become more efficient with the help of generative AI tools.	☐	☐	☐	☐	☐
18	Our team's creative problem-solving has improved due to AI-generated suggestions.	☐	☐	☐	☐	☐
19	Team conflict and ambiguity have reduced since adopting AI-based systems.	☐	☐	☐	☐	☐
20	AI adoption encourages cross-functional collaboration in my projects.	☐	☐	☐	☐	☐
	5. Evolution of the Product Manager's Role and Skill Requirements *(Dependent Variable)*					
	Statement	**1**	**2**	**3**	**4**	**5**
21	My responsibilities as a product manager have evolved due to generative AI.	☐	☐	☐	☐	☐
22	I now require new technical skills (e.g., prompt engineering, model understanding).	☐	☐	☐	☐	☐
23	Ethical decision-making related to AI has become part of my role.	☐	☐	☐	☐	☐
24	I participate in AI-tool selection or training initiatives within the company.	☐	☐	☐	☐	☐
25	The shift toward AI demands continuous upskilling for product managers.	☐	☐	☐	☐	☐
	6. Long-term Impacts on Productivity and Project Outcomes *(Dependent Variable)*					
	Statement	**1**	**2**	**3**	**4**	**5**
26	Generative AI has significantly improved the overall productivity of our team.	☐	☐	☐	☐	☐
27	Project delivery timelines have shortened due to AI involvement.	☐	☐	☐	☐	☐

28	AI tools have increased the quality and innovation in final product outcomes.	☐	☐	☐	☐	☐
29	Long-term business goals are better aligned through AI-driven strategies.	☐	☐	☐	☐	☐
30	AI integration has improved customer satisfaction and stakeholder outcomes.	☐	☐	☐	☐	☐

Appendix C: Informed Consent Form – Qualitative Interviews

RESEARCH STUDY INFORMED CONSENT FORM - QUALITATIVE INTERVIEW PARTICIPATION

Study Title: The Transformation of Software Product Management and The Role of Product Manager in the Age of Generative AI

Principal Investigator: Abhinav Goel, Doctoral Candidate
Institution: Swiss School of Business and Management
Degree Program: Doctor of Business Administration (DBA)
Faculty Advisor: Dr. Gualdino Miguel de Jesus Vicente Cardoso
Contact Email: abhinav@theabhinavg.com

INVITATION TO PARTICIPATE IN INTERVIEW

You are invited to participate in a qualitative research interview as part of a doctoral dissertation study examining how generative artificial intelligence is transforming software product management. This interview is the qualitative component of a mixed-methods study and will provide in-depth insights complementing the quantitative survey data.

PURPOSE OF THE INTERVIEW

The interview aims to explore:

1. Your personal journey and experiences with AI adoption in product management
2. How AI integration has changed your workflows, responsibilities, and decision-making processes
3. Competencies you have developed and training you have received
4. Organizational factors supporting or hindering AI adoption
5. Ethical considerations and governance challenges you have encountered
6. Your perspectives on the long-term future of product management in the age of AI
7. Recommendations for other product managers and organizations

Your detailed insights will provide depth and context to help interpret quantitative findings and understand the human dimensions of AI adoption that surveys cannot fully capture.

WHAT INTERVIEW PARTICIPATION INVOLVES

Interview Format

- **Duration:** Approximately 45-60 minutes
- **Mode:** Video conference (Zoom, Microsoft Teams) or telephone, based on your preference
- **Structure:** Semi-structured interview with open-ended questions allowing you to share experiences in your own words
- **Recording:** Interview will be audio/video recorded with your consent for transcription purposes
- **Scheduling:** Conducted at a time convenient to your schedule

Interview Topics

The interview will cover the following areas (specific questions will be adapted based on your experiences):

8. **AI Adoption Journey**
   - How you were first introduced to generative AI tools
   - Your organization's AI adoption strategy and timeline
   - Your role in AI implementation decisions
9. **Workflow Integration**
   - Specific ways you use AI in daily product management activities
   - Changes to your work processes and routines
   - Integration with existing tools and systems
10. **Competency Development**
    - New skills you have developed
    - Training and learning experiences
    - Challenges in skill acquisition
11. **Organizational Context**
    - How your organization supports AI adoption
    - Cultural factors influencing adoption
    - Leadership and change management approaches
12. **Ethical Considerations**
    - Ethical dilemmas you have encountered
    - Governance frameworks and policies
    - Bias, privacy, and transparency concerns
13. **Role Evolution**
    - How your responsibilities have changed
    - Impact on job satisfaction and career trajectory
    - Relationship with traditional product management practices
14. **Team Dynamics**
    - Effects on team collaboration and communication
    - Human-AI interaction patterns
    - Team member reactions and adaptation
15. **Future Outlook**
    - Predictions about AI's long-term impact
    - Emerging trends and opportunities

– Recommendations for others

VOLUNTARY PARTICIPATION

Participation is completely voluntary. You may:

- Decline to participate without any consequences
- Refuse to answer any specific questions during the interview
- Stop the interview at any time without penalty
- Request that recording be paused at any point
- Withdraw from the study after the interview (within 2 weeks of interview completion)

POTENTIAL RISKS AND DISCOMFORTS

Risks associated with interview participation are minimal:

Privacy and Confidentiality Concerns: - Interviews involve more detailed discussion than surveys, potentially revealing identifying information - **Mitigation:** All interviews are de-identified using participant codes (e.g., PM-01). Names, organizations, and identifying details are removed from transcripts. You may request that specific statements be kept off-record.

Time Commitment: - Interviews require 45-60 minutes of your time - **Mitigation:** Interviews are scheduled at your convenience and can be rescheduled if needed

Emotional or Psychological Discomfort: - Discussing organizational challenges or competency gaps may cause minor discomfort - **Mitigation:** You may skip any questions or stop the interview at any time. The focus is on professional experiences, not personal judgments.

POTENTIAL BENEFITS

Direct Benefits: - Opportunity for structured professional reflection - Contribution to advancing knowledge in your field - Access to research findings summary - Potential professional development insights

Broader Benefits: - Advancement of scholarly understanding - Guidance for professional practice - Ethical framework development - Organizational strategy insights

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CONFIDENTIALITY AND DATA PROTECTION

Interview Recording and Transcription

- Interviews will be audio/video recorded only with your explicit consent
- Recordings will be professionally transcribed or transcribed using secure automated services
- Transcripts will be de-identified, removing names, organizations, and potentially identifying details
- You will be assigned a participant code (e.g., PM-01, PM-02)
- Original recordings will be deleted after transcription verification

Data Storage and Security

- Interview recordings stored on encrypted, password-protected systems
- Transcripts stored separately from contact information
- Access limited to research team members
- Data retention for 5 years per institutional policy
- Secure deletion after retention period

Use of Data

- Interview data will be analyzed thematically to identify patterns and themes
- Anonymized quotations may be used in dissertation, publications, or presentations
- Quotations will be attributed to participant codes (e.g., "PM-01 stated…")
- No identifying information will be included in any reports or publications

Member Checking

You may request to review your interview transcript to: - Verify accuracy of transcription - Clarify statements - Request removal of specific content - Confirm comfort with how information will be used

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COMPENSATION

There is no financial compensation for interview participation. Your time and insights are greatly appreciated.

AUDIO/VIDEO RECORDING CONSENT

I consent to having this interview audio/video recorded for research purposes:

[ ] YES, I consent to recording
[ ] NO, I do not consent to recording (If no, interview cannot proceed as recording is necessary for accurate data collection)

I understand that: - Recordings will be used solely for research transcription and analysis - Recordings will be stored securely and accessible only to the research team - Recordings will be deleted after transcription verification - I may request recording be paused at any time during the interview

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QUESTIONS AND CONCERNS

Principal Investigator:
Abhinav Goel, Doctoral Candidate
Email: abhinav@theabhinavg.com

Faculty Advisor:
Dr. Gualdino Miguel de Jesus Vicente Cardoso
Email: gualdino.cardoso@ssbm.ch

Institutional Review Board:
Swiss School of Business and Management
Geneva, Switzerland

PARTICIPANT CONSENT STATEMENT

By signing below, I acknowledge that:

- I have read and understood this consent form
- I have had opportunity to ask questions and received satisfactory answers
- I understand participation is voluntary and I may withdraw at any time
- I understand how interview data will be collected, stored, and used
- I understand confidentiality measures and their limitations
- I consent to participate in this research interview
- I consent to audio/video recording of the interview
- I am at least 18 years of age

Participant Name (Printed): _____

Participant Signature: _____

Date: _____

Researcher Name (Printed): Abhinav Goel

Researcher Signature: _____

Date: _____

Interview Details:

Interview Date: _____

Interview Time: _____

Interview Mode: [ ] Zoom [ ] Teams [ ] Phone [ ] Other: _____

Participant Code Assigned: PM-_____ (For researcher use only)

Copies: - Original retained in research records - Copy provided to participant

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Date of Consent Form: MM, YYYY

Appendix D: Sample Interview Codes

Qualitative Interview Analysis: Sample Codes

The following table presents representative sample codes developed from the qualitative interviews conducted with 13 product managers and AI specialists. Codes were derived using thematic analysis following Braun and Clarke (2006).

Code	Description	Example Quote (Participant ID)
Ethical_Responsibility	Awareness and actions related to ethical AI use, bias mitigation, and transparency	"We rigorously test models for bias before deployment." (PM-02)
AI_Literacy_Gap	Gaps in understanding AI capabilities, limitations, and effective use	"Many colleagues struggle to understand the nuances of prompt engineering." (PM-07)
Workflow_Automation	Emerging use of AI for automating routine product management tasks	"Automation is helpful for sprint planning, but human oversight is critical." (PM-04)
Competency_Evolution	Development of new skills and knowledge required for AI-augmented roles	"AI literacy has become a mandatory skill for product managers now." (PM-11)
Role_Evolution	Changes in product manager responsibilities and priorities	"I spend more time on ethical review and governance than before." (PM-13)
Team_Dynamics	Impact of AI on collaboration, communication, and decision-making within teams	"AI insights have improved how we brainstorm as a team." (PM-05)
Adoption_Barriers	Organizational or technical challenges hindering AI adoption	"There is resistance due to fear of job displacement." (PM-01)
Competitive_Advantage	Perceived benefits of AI in gaining market advantage	"Early AI adoption has given us significant edge over competitors." (PM-08)
Data_Quality_Concerns	Issues related to training data quality, representativeness, and governance	"The quality of our AI outputs depends entirely on data quality." (PM-03)
Change_Management	Organizational approaches to managing AI adoption and transformation	"Leadership support was critical for smooth AI implementation." (PM-09)
Training_Needs	Identified gaps and requirements for professional development	"We need structured training programs, not just self-learning." (PM-06)
Trust_Transparency	Concerns about AI system transparency and stakeholder trust	"Customers ask how our AI makes decisions—we need better explanations." (PM-10)

Code	Description	Example Quote (Participant ID)
Human_AI_Collaboration	Patterns of human-AI interaction and authority distribution	"AI suggests, but humans decide—that's our principle." (PM-12)
Strategic_Shift	Movement from tactical execution to strategic thinking	"AI handles routine tasks, freeing me for strategic work." (PM-05)
Regulatory_Compliance	Awareness and actions regarding AI regulations and legal requirements	"GDPR compliance is our top concern with AI-driven features." (PM-02)