

## Emerging Roles and Qualifications of AI Product Managers: A Topic Modeling Approach

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### Abstract

**Purpose:** This study aims to investigate the key responsibilities and qualifications of AI Product Managers, providing insights that can support human resource management in workforce planning, and assist educational institutions in curriculum design.

**Methodology:** The study employs BERTopic, an unsupervised machine learning technique for topic modeling. The dataset consists of 426 AI Product Manager job postings obtained from an international source. The model's parameters were tuned using Bayesian optimization. This approach focuses on extracting thematic clusters that represent the roles and qualification requirements of AI Product Managers.

**Findings:** Eleven thematic roles and eight qualification clusters were identified. Emerging roles include conversational AI and multimodal design, generative AI integration, and strategic ecosystem partnerships. AI Product Managers are expected to be familiar with cloud platforms and related tools, demonstrate empathy and a deep understanding of customers, and possess both domain knowledge and industry experience. These requirements signify the growing need for professionals with T-shaped skills.

**Applications of this study:** The findings support the design of educational programs, recruitment strategies, and workforce development initiatives across fields related to AI product development.

**Keywords:** AI Product Managers, BERTopic, T-shaped Skills, Artificial Intelligence

## 1. Introduction

In the digital era, Artificial Intelligence (AI) has become a transformative force, reshaping industries and revolutionizing business practices. The phenomenon is widely observed in several sectors including manufacturing, logistics, media, commerce, healthcare, and financial services (Du & Xie, 2021). Among these sectors, marketing stands out as one of the most significantly impacted by AI. Applications range from analyzing customer data to inform strategic decisions, to using Generative AI for content creation, and implementing AI-driven programmatic media buying to optimize advertising efficiency (Kumar, Ashraf, & Nadeem, 2024).

Another emerging area in marketing is the incorporation of AI into products and services. This results in AI-powered offerings that not only enhance the customer experience but also serve as unique selling points, strengthening firms' competitive advantage. Additionally, from the customer's perspective, products with intelligent features can add new value, making them more user-friendly and versatile (Aldoseri, Al-Khalifa, & Hamouda, 2024). These products range from vehicles with autonomous functions and digital personal assistants to virtual nurses (Du & Xie, 2021). As AI-powered products continue to evolve, it's only natural that the role of product managers changes too. Today's AI Product Managers are expected to go beyond traditional duties—they need to manage ethical concerns, make data-driven decisions, and keep pace with rapid advancements in AI (Parikh, 2025a).

Although the number of AI-powered products and services continues to grow, research on how the roles and qualifications of the product managers overseeing them are evolving remains limited. One study highlights the growing demand for experts with the ability to develop and commercialize AI-integrated products (Ahmadi, Kheslat, & Akintomide, 2024). Parikh (2024) also examined the evolving role of AI Product Managers, noting that AI introduces new dimensions to the position. For example, product managers are now expected to ensure that data is both available and of high quality, which is essential for effective model training and deployment. However, these studies tend to focus primarily on the software and technology sectors (Parikh, 2025b). Beyond that, academic literature often overlooks the specific qualifications needed for AI Product Managers.

To address these gaps, this study adopts the T-shaped skills profile framework introduced by David Guest in 1991. The framework highlights the need for deep expertise in a specific area—the vertical bar of the 'T'—complemented by the ability to collaborate and communicate across diverse disciplines, represented by the horizontal bar (Ninan, Hertogh, &

Liu, 2022). The contributions of this study are summarized in Table 1, which provides a comparative analysis of our research against key existing literature. The objective of this study is to explore the role and qualifications of AI Product Managers using a text analytics approach. The findings can be applied in several ways. Employers can use the insights to identify suitable candidates and guide interview criteria, while educational institutions can utilize them to design relevant curricula. The results also assist individuals who plan to pursue careers in AI product management.

**Table 1** Comparative Analysis of Related Literature

Study	Focus	Methodology	Key Findings	Contribution	Gaps
Ahmadi et al. (2024)	Demand for ChatGPT-related skills	Latent Dirichlet Allocation (LDA) on job advertisement data	Five ChatGPT-related skill sets	Empirical evidence on ChatGPT-related skills reshaping job roles	Limited focus on ChatGPT-specific skills
Parikh (2024)	Evolving role of AI Product Managers	Qualitative study using grounded theory	AI introduces new dimensions to the product manager role	Characteristics of the software product manager's role in managing AI-based products	Limited sample — only software organizations
Parikh (2025a)	Evolving roles, challenges, and skills of AI Product Managers managing AI-first products	Qualitative study using grounded theory	AI Product Managers roles, challenges, skills, and traits summarized in the AI PM Archetype Persona Framework	Develop AI Product Managers Archetype Persona Framework	Limited sample — only US-based technology companies
Parikh (2025b)	Evolution and responsibilities of product managers	Systematic literature review	Clarifies evolving product managers' responsibilities across contexts	Clarifies product managers' responsibilities through literature synthesis	Primarily focuses on software industry; Does not mention qualifications or skills

Study	Focus	Methodology	Key Findings	Contribution	Gaps
Current Study	Emerging roles & qualifications of AI Product Managers	Topic modeling (BERTopic) on 426 postings	11 roles, 8 qualification clusters, T-shaped skills	Data-driven evidence; highlights T-shaped skills for HR and education; covers multiple industries	-

This study employs BERTopic as the topic modeling tool. As outlined by Borčič & Jose (2024), BERTopic follows a five-step process that begins with embedding the text and continues through dimensionality reduction, clustering, vectorization, and concludes with topic representation. BERTopic has been extensively used in research focused on job posting texts. For example, Lertmethaphat, Lekfuangfu & Treeratpituk (2025) explored characteristics of Thailand's labor market, while Raman et al. (2024) analyzed skill demand using job description data from a U.K. job board.

## 2. Purpose

To explore the role and qualifications of AI Product Managers

## 3. Methodology

### 3.1 Dataset

The data used in this study consist of job postings collected from job listing sites such as ZipRecruiter, Indeed, JobsDB, JobStreet, and Glassdoor. To broaden coverage, we supplemented these sources with job vacancy announcements from leading corporate websites and professional social networks like LinkedIn.

Data were collected manually between June 2024 and May 2025, resulting in a total of 426 job postings. To ensure relevance, we applied the following inclusion criteria: (1) the posting explicitly referred to AI- or generative AI-related product management roles, (2) the job description provided sufficient detail on both responsibilities and required qualifications, and (3) the posting could represent any work-location type (remote, hybrid, or on-site). We excluded postings that were duplicates, not in English, or lacked substantive

descriptions. From each posting, we extracted only the content related to job responsibilities and applicant qualifications for further analysis.

Because job titles related to AI product management vary widely, we adopted a job title taxonomy to ensure a consistent and relevant dataset. This taxonomy grouped roles into distinct categories based on the primary function of each position within the AI product lifecycle. Example categories included Core AI/Generative AI Product Managers, AI Data & Analytics Product Managers, Technical AI Product Managers/Product Owners, and Specialized AI Domain Managers (covering niche applications such as healthcare, gaming, or safety). Each category was represented by specific keywords and example job titles from our dataset. Each of the 426 job postings was manually mapped to one or more categories, considering both job title and description to verify primary responsibilities and qualifications. Postings that did not fit any category or were duplicates were excluded.

In terms of sectoral and geographical coverage, the dataset includes postings from various sectors including technology & software, finance & banking, healthcare & life sciences, consumer & retail, consulting, EdTech, energy, etc. These job postings were collected from companies globally. Therefore, while the sample is not exhaustive, it reflects diverse industry contexts and global hiring patterns.

### **3.2 Data preparation**

As we used BERTopic, a semantic-based topic modeling technique, our preprocessing aimed to preserve the original semantic structure of the text. To achieve this, we adopted a minimal approach and did not perform manual tokenization, punctuation removal, or stop word removal in the initial stage. Instead, the following essential steps were applied to reduce noise:

- 1) All text was converted to lowercase to ensure consistent treatment of similar words. For example, ‘Manager’ and ‘manager’ were treated as the same token.

- 2) Entries with fewer than five words were excluded, as they typically lack meaningful content.

- 3) Boilerplate phrases commonly found in job postings, such as “what you will do,” “in this role,” “you are,” and “you have” were removed. These phrases were identified manually during an initial review of the dataset, as they do not contribute to the unique semantic content of the documents.

4) In the later stage, after topic modeling was complete, stop word removal was applied during the extraction of representative words for each topic to enhance interpretability and reduce noise in the keyword extraction process.

### 3.3 Topic extraction with BERTopic

Topic modeling is a natural language processing (NLP) technique used to automatically analyze text and uncover hidden topics. In this study, BERTopic is chosen for its flexibility over traditional approaches like Latent Dirichlet Allocation (LDA), which require a predetermined number of topics. Additionally, BERTopic is based on transformer architecture, enabling it to capture semantic relationships among words and their context.

The BERTopic process consists of four main stages. First, job posting texts are converted into embedding vector representations using a BERT-based language model such as Sentence-BERT. Next, the dimensions of the embeddings are reduced using UMAP (Uniform Manifold Approximation and Projection), as most clustering techniques struggle with high-dimensional data. Third, HDBSCAN is employed to cluster the texts into topics. In the last step, words that best represent each topic are highlighted using a weighting scheme called class-based TF-IDF (c-TF-IDF) (Khodeir & Elghannam, 2024; Madrid-García et al., 2024). The overall research process is summarized in Figure 1.

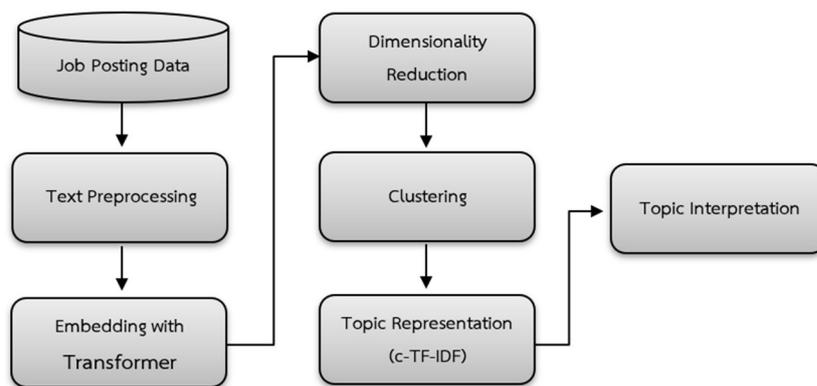


Figure 1 Key research process

To achieve better model performance, we tuned key parameters using Bayesian optimization. This method selects the next combination of parameters to test by learning from previous trials (del-Pozo-Bueno et al., 2023). We ran 50 iterations of hyperparameter search (Moreira-Filho et al., 2024), adjusting three main parameters: `n_neighbors`, which affects local neighborhood size in UMAP, was tested at 5, 10, 15, and 20; `n_components`, which

determines the target dimensionality, was also varied across the same range; and `min_cluster_size`, which defines the minimum number of data points required to form a cluster in HDBSCAN, was searched from 5 to 10 in increments of 1.

We chose these parameter ranges to strike a balance between generating meaningful topics and avoiding excessive detail. After tuning, we applied the best-performing parameters to extract topics and assessed their coherence using the `c_v` metric, which helps evaluate how interpretable the topics are in practice. Hierarchical clustering is applied to visualize topic similarity, and closely related topics within the hierarchy may be manually merged to generate the final results.

## 4. Research results

### 4.1 Responsibilities of AI Product Managers

We applied BERTopic to the role subdataset using optimized parameters obtained through the tuning process. Specifically, we set `n_neighbors = 5`, `n_components = 10`, and `min_cluster_size = 10`, which resulted in a moderate coherence score (`c_v`) of 0.44. To complement this quantitative measure, we manually reviewed the resulting clusters and assigned topic labels based on the top terms and representative job postings within each cluster, ensuring interpretability and alignment with domain knowledge. The model identified 11 distinct topics, each representing a core area of responsibility for AI Product Managers. Table 2 presents these topics along with their associated top keywords.

**Table 2** Thematic Topics of AI Product Manager Responsibilities

Topics	Keywords	Label
1	ensuring, capabilities, collaboration, learning, prioritize, services, models, machine, stay, powered	Ongoing Learners
2	backlog, sprint, stories, scrum, agile, program, owner, governance, prioritization, progress	Agile Delivery & Backlog Management
3	generative, concept, quality, evaluate, serve, results, ensuring, operations, models, risks	Responsible AI Operations
4	content, positioning, compelling, messaging, google, salaries, webinars, enablement, range, launches	Go-to-Market Responsibilities
5	environment, state, foster, complexity, maximizing, mapping, netflix, informed, challenges, partnership	Strategic Ecosystem Partnerships
6	genai, gen, level, applications, policy, using, like, application, feature, operationalize	Operationalizing GenAI applications

Topics	Keywords	Label
7	quality, studio, engage, gather, ensuring, developer, prioritize, term, outbound, varying	Developer Engagement & Feature Prioritization
8	conversational, search, personalized, voice, models, powered, chat, natural, multimodal, language	Specialist in Conversational AI and Multimodal Design
9	learning, machine, problems, personalization, engine, scientists, capabilities, testing, direction, using	Driving ML Problem Framing and Experimentation
10	compliance, ensuring, oversee, governance, offering, deployment, prioritizing, standards, capabilities, operations	AI Governance and Compliance Lead
11	commercial, world, manager, join, projects, pm, project, problems, client, portfolio	Client-Centric and Commercial Portfolio Management

Having identified the 11 core thematic topics, we now provide a closer look at each one to better understand the responsibilities they represent.

#### **Topic 1: Ongoing learners**

With keywords such as “ensuring,” “capabilities,” “learning,” and “stay,” this topic suggests that a key responsibility of an AI Product Managers is to maintain an appropriate fundamental mindset and expected behavior. Specifically, they are expected to stay up to date with the latest developments in the AI field, continuously upgrade their capabilities, and share emerging trends with their teams.

#### **Topic 2: Agile Delivery & Backlog Management**

Topic 2 represents the traditional execution- and team-facing role of a product manager. Key concepts include backlog, sprint, scrum, and agile, reflecting responsibilities such as prioritizing and managing tasks to build and improve products—encompassing features, user stories, enhancements, and bug fixes. When it comes to AI products, this duty means tackling complex projects under time constraints (like sprints) and fostering structured iteration and team coordination (through Scrum).

#### **Topic 3: Responsible AI Operations**

This topic highlights how the role of AI Product Managers is evolving. They now combine technical quality assurance with ethical oversight and operational responsibilities, especially for generative AI. In addition to building features, they must also ensure that model outputs are safe, ethical, and reliable. This is especially important because the outputs are probabilistic in nature and can have disruptive real-world impacts.

**Topic 4: Go-to-Market Responsibilities**

Product launch is a core responsibility of product managers, and this remains true even in the AI context. The role involves designing the product's value proposition and defining its market positioning. In addition, product managers are expected to craft engaging content and prepare relevant marketing enablement materials to support a successful launch.

**Topic 5: Strategic Ecosystem Partnerships**

AI product development involves multiple stakeholders, both internal and external. As a result, cross-functional collaboration within the organization alone is no longer sufficient. Today, AI Product Managers must stay informed about industry trends and be able to build strategic relationships with external partners.

**Topic 6: Operationalizing GenAI applications**

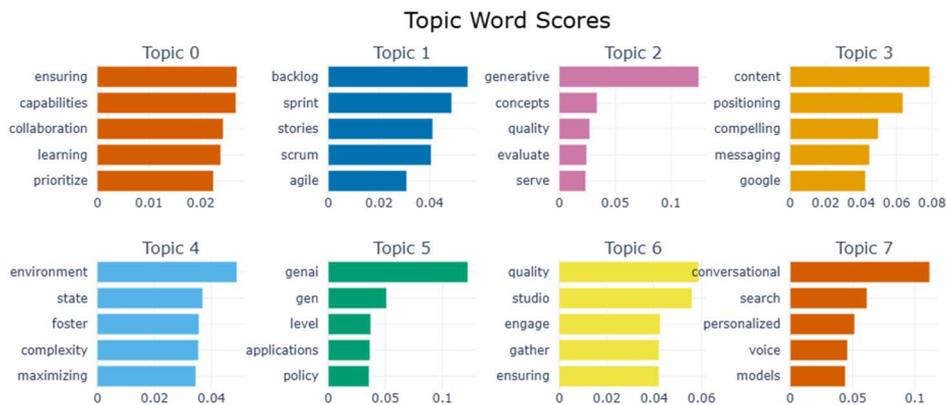
This aspect of the AI Product Manager's role reflects the growing demand for professionals who not only understand the principles of generative AI but can also apply them in real-world contexts. A key task is to identify essential features and transform them into useful applications for end users. In other words, the role focuses on integrating generative AI into practical products.

**Topic 7: Developer Engagement & Feature Prioritization**

AI Product Managers must work closely with developers to ensure that the right product is built. The primary objective of these engagements—whether internal or with external partners—is to gather information and feedback that are critical to product development. This collaboration supports both the collection of technical insights and the effective prioritization of competing factors.

**Topic 8: Specialist in conversational AI and multimodal design**

The presence of keywords such as conversational, voice, chat, natural, multimodal, and language suggests that AI Product Managers are expected to apply natural language processing (NLP) techniques to build customer-friendly applications. These NLP-enabled products include voice assistants, chatbots, and multimodal interfaces that combine voice, text, and images, enabling human-like interactions and personalized responses tailored to individual users.



**Figure 2** Example of Keyword Distribution Across Thematic Topics of AI Product Manager Roles

#### **Topic 9: Driving ML Problem Framing and Experimentation**

This role highlights the AI Product Manager's responsibility for identifying the right business problems and translating them into data science problems. These challenges can then be addressed using various machine learning techniques. The tasks require close collaboration and experimentation with data scientists.

#### **Topic 10: AI Governance and Compliance Lead**

With the growing introduction of regulations aimed at protecting society from unintended harm, it is the responsibility of AI Product Managers to oversee the deployment and operation of AI products and ensure compliance with relevant laws. In addition, they need to prioritize operational and capability-related issues that align product offerings with ethical and legal standards.

#### **Topic 11: Client-Centric and Commercial Portfolio Management**

This topic highlights the growing importance of the B2B market. As a result, AI Product Managers are expected to be familiar with overseeing a portfolio of commercial projects for customers in this space. Their tasks involve identifying problems faced by clients and translating them into AI solutions that deliver value to the client while aligning with the organization's goals.

### **4.2 Qualifications of AI Product Managers**

For the qualification subdataset, the optimal parameters identified were  $n\_neighbors = 15$ ,  $n\_components = 10$ , and  $min\_cluster\_size = 8$ . This configuration yielded a

coherence score ( $c_v$ ) of 0.46. Using these parameters, BERTopic extracted eight thematic groups that represent the diverse qualifications expected of AI Product Managers. These groups were validated through a manual review of representative job postings to ensure their interpretability and alignment with industry requirements. The details of each topic, along with its corresponding top keywords, are presented in Table 3.

The extracted topics reveal distinct qualification domains required for AI Product Managers. We now examine each topic in detail, beginning with educational background.

### Topic 1: Educational background

The first topic outlines the foundational educational requirement for an AI Product Manager. A minimum of a bachelor's degree in Computer Science or a related field is typically expected. In addition to technical knowledge, strong presentation skills are also important for effectively communicating ideas.

**Table 3** Thematic Topics of AI Product Manager Qualifications

Topics	Keywords	Label	T-Shaped Skill Dimension
1	field, computer, related, science, minimum, bachelors, education, bachelor, software, presentation	Educational Background	Horizontal
2	customer, user, effectively, empathy, machine, saas, complex, executive, highly, features	Customer-Centric Mindset and Empathy	Horizontal
3	consumer, market, user, applications, portfolio, domains, industry, enterprise, extensive, customer	Domain Knowledge & Industry Experience	Horizontal
4	complex, features, market, high, quality, ensuring, trends, goals, customer, project	Product Quality & Market Orientation	Horizontal
5	science, related, computer, field, market, bachelors, tools, industry, mba, proficiency	Technical and Business Blend	Horizontal
6	cloud, science, services, azure, aws, platform, like, tools, including, computer	Cloud Platforms & Tools Familiarity	Vertical
7	automation, computer, science, pc, customer, field, related, user, features, gen	Automation & Generative AI Knowledge	Vertical

Topics	Keywords	Label	T-Shaped Skill Dimension
8	build, amazon, genai, program, enterprise, businesses, responsible, impact, environments, driving	Driving Responsible Generative AI Projects in Enterprise Environments	Vertical

### Topic 2: Customer-Centric Mindset and Empathy

This topic highlights that AI Product Managers should have a deep understanding of their customers. They must be able to translate users' pain points into features suitable for machine learning experimentation, ultimately leading to valuable Software-as-a-Service (SaaS) solutions. Additionally, they are expected to effectively communicate these complex tasks to executive stakeholders.

### Topic 3: Domain Knowledge & Industry Experience

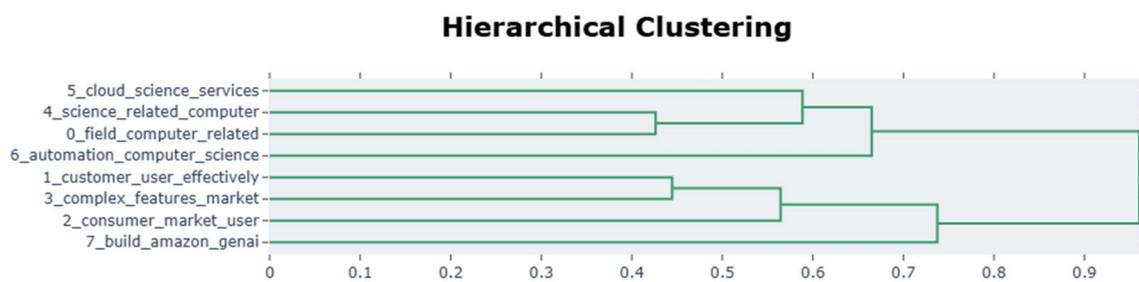
With the appearance of keywords like consumer, market, domains, enterprise, portfolio, and industry, this topic highlights that domain knowledge in either enterprise or consumer markets, along with experience in managing a portfolio of AI applications, is highly valued by employers. Possessing extensive expertise in a particular industry is also considered a strong advantage.

### Topic 4: Product Quality & Market Orientation

This topic emphasizes the ability to manage complex product feature development that aligns with customer needs, market trends, and broader business goals. Strong project management skills are also essential to ensure high product quality.

### Topic 5: Technical and Business Blend

In addition to holding a bachelor's degree in Computer Science or a related field, employers also value candidates with strong business domain knowledge—particularly those with an MBA. Therefore, AI Product Managers are expected to excel not only in technical tools but also in industry and market understanding. It is worth noting that hierarchical topic similarity analysis (see Figure 3) indicates that this topic is closely related to the foundational educational background (Topic 1) and could potentially be merged into a single, broader topic.



**Figure 3** Hierarchical Clustering of Thematic Topics Related to AI Product Manager Qualifications

#### **Topic 6:** Cloud Platforms & Tools Familiarity

This topic indicates that AI Product Managers must be proficient in cloud platforms like AWS or Microsoft Azure and the associated tools. This reflects the fact that most AI products today are delivered as cloud-based service.

#### **Topic 7:** Automation & Generative AI Knowledge

This topic suggests that AI Product Managers should have a strong foundation in Computer Science or a related field, especially in the area of automation. In addition, there is a need to align customer desires with feature development—particularly in the emerging area of generative AI.

#### **Topic 8:** Driving Responsible Generative AI Projects in Enterprise Environments

AI Product Managers need solid skills to lead generative AI projects within enterprise settings. This means not only understanding the technology but also connecting AI capabilities directly to business goals — especially in B2B contexts. Beyond that, they take full responsibility for their projects, turning ideas into tangible results while ensuring responsible and ethical practices.

## **5. Conclusion**

This study has explored the roles and required qualifications of AI Product Managers using BERTopic, a topic modeling technique. By analyzing 426 job postings, we identified 11 key responsibilities and 8 qualification clusters. These roles include both traditional product management tasks—such as go-to-market strategy—and emerging responsibilities like deploying generative AI applications and designing multimodal systems. In addition to cross-team collaboration within the firm, AI Product Managers are now also expected to engage in strategic ecosystem partnerships, coordinating with external stakeholders.

In terms of required qualifications, an AI Product Manager is typically expected to have an educational background in computer science, often complemented by an MBA. In addition, they should possess domain or industry knowledge. Furthermore, they are expected to demonstrate empathy and a deep understanding of customers, as well as proficiency in tools and environments related to generative AI and cloud platforms such as AWS or Microsoft Azure. These findings highlight the growing demand for T-shaped product managers, a topic we explore further in the discussion section.

## **6. Discussion**

By leveraging BERTopic topic modeling on a job postings dataset, this study sheds light on 11 distinct roles and 8 key qualifications that characterize the diverse responsibilities of AI Product Managers. The findings illustrate how these roles and qualifications have expanded beyond traditional product management to address the rapid advancement of AI technologies. These insights carry important implications for curriculum designers, HR practitioners, and future researchers, which will be discussed below.

### **6.1 Contribution to Existing Literature**

While previous studies have relied on grounded qualitative approaches to explore this issue (Parikh, 2024; Parikh, 2025b), the present study contributes to the literature by adopting a quantitative, data-driven approach. Specifically, it employs unsupervised machine learning to analyze over 400 job-related texts, thereby validating and extending prior conceptual insights at scale.

In line with prior work, our study confirms that AI Product Managers must take on new responsibilities, including ensuring data availability and quality for model development, overseeing AI systems for transparency, fairness, and legal compliance, and collaborating with cross-functional teams—particularly data scientists and machine learning engineers (Parikh, 2024). However, we extend this understanding by highlighting responsibilities that go beyond internal collaboration. AI Product Managers today are expected to stay informed about industry trends, navigate external ecosystems, and build strategic partnerships. These findings reflect the reality that AI products often depend on third-party APIs, cloud platforms, legal frameworks, and even coordination with regulators.

In addition, our analysis reveals frontier responsibilities that are not yet widely addressed in academic literature. First, AI Product Managers play a pivotal role in operationalizing generative AI—embedding capabilities into real-world products. Second,

there is a growing need for specialization in conversational AI and multimodal design, especially where NLP and user experience intersect to enable human-like interaction. It is worth noting that we observe a shift in how continuous learning is perceived. Once regarded as a qualification, it has evolved into a core responsibility, underscoring the fast-changing nature of the field.

Regarding the required qualifications of AI Product Managers, our findings reinforce several well-established themes in the literature. Specifically, our findings align with Parikh (2025a), emphasizing that AI Product Managers should possess a strong combination of technical expertise and domain knowledge, demonstrate effective communication skills, and exhibit strong analytical abilities.

Beyond these established themes, this study contributes to the existing literature by identifying emerging qualification areas that have received limited attention. It is worth noting that our analysis highlights the growing importance of cloud platform proficiency and the ability to operationalize generative AI in enterprise settings. Furthermore, empathy emerges as a critical qualification—not only for understanding user needs and solving real-world problems, but also for navigating ethical considerations such as fairness, inclusivity, and the responsible use of AI.

## **6.2 T-Shaped Skill and The Skill Mapping Framework**

In line with the concept of T-shaped skills, AI Product Managers are expected to combine broad interdisciplinary knowledge (the horizontal bar) with deep expertise in a specific domain (the vertical stem). This hybrid skill profile is becoming increasingly common, as traditional disciplines integrate with digital technologies. For instance, to collaborate effectively with cross-functional teams, social media marketers now need to understand product design—including UX and software engineering—as well as data science (Hafezieh, Pollock, & Ryan, 2023).

Similar to infrastructure projects, which are often large-scale, complex, and disruptive (Ninan, Hertogh, & Liu, 2022), the development and deployment of AI products involve probabilistic outcomes that carry significant risks. These risks may include unintended societal, ethical, or technical consequences. To navigate such uncertainty, AI Product Managers must possess T-shaped skills—combining deep technical or domain expertise with broad competencies across areas such as ethics, policy, UX, data science, and business strategy. This diverse skill set enables them to foresee and mitigate potential harms while aligning product decisions with organizational goals and public interests.

Drawing from the topics identified in our BERTopic analysis, we propose a skill mapping framework that connects key thematic clusters—spanning both qualification expectations and role-based responsibilities—to relevant skills and curriculum components. This framework offers actionable insights for developing training programs and academic curricula that meet the evolving demands of AI Product Management. Table 4 maps each identified topic to corresponding skills and example curriculum areas, providing a practical foundation for curriculum design.

**Table 4** Skill Mapping Framework for AI Product Managers

Topic	Skills Mapped	Curriculum Focus Example
User-Centric Thinking & Empathy	Empathy, user experience (UX), communication	User research, design thinking
Agile Delivery & Backlog	Agile methodology, Scrum, prioritization	Agile frameworks, sprint planning
Responsible AI Operations	AI ethics, model evaluation, quality assurance	Bias mitigation, responsible AI, QA processes
Cloud Platforms & Tools	Cloud infrastructure, AWS, Azure, deployment	Cloud services fundamentals, hands-on labs
Strategic Ecosystem Partnerships	Industry analysis, partnerships, ecosystem strategy	Partner management, business environment analysis
Conversational AI	Natural Language Processing (NLP), voice interfaces	NLP fundamental, chatbot and voice UI design

In addition to informing curriculum development, the skill mapping framework in Table 4 and the T-Shaped Skills mapping shown in Figure 4 provide practical guidance for HR managers and hiring teams. It provides a structured reference for defining job requirements, designing interview criteria, and developing internal training or upskilling programs tailored to the evolving AI product landscape.

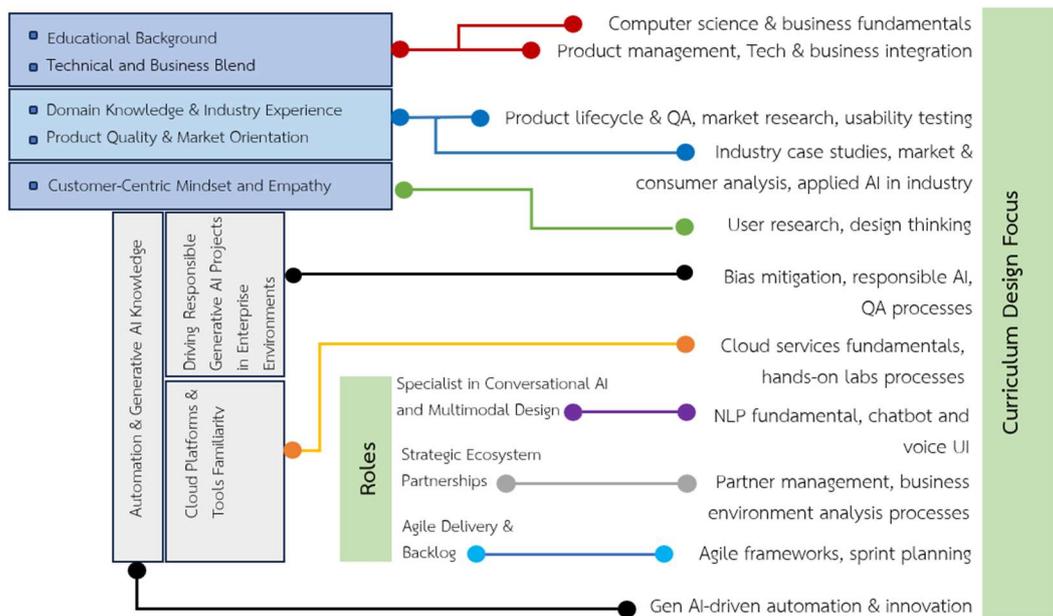


Figure 4 Mapping T-Shaped Skills and Selected Roles to Curriculum Development

Although the dataset for this study primarily draws from international job postings, the insights remain highly relevant to Thailand businesses community. As AI capabilities increasingly become integrated into products and services, organizations in Thailand are also facing a growing demand for product managers who can bridge the gap between technical development and business strategy. This framework can help local firms proactively prepare for AI adoption by identifying and cultivating the interdisciplinary skill sets essential for future-ready product management roles.

### 6.3 Limitation and Future Research

While this study provides valuable insights into the qualifications and roles of AI Product Managers through topic modeling and skill mapping, several limitations should be acknowledged. The first limitation concerns the size of the dataset; future research could benefit from analyzing a larger number of job postings to enhance the reliability and generalizability of the results.

Second, although BERTopic provides a structured approach to thematic discovery, the granularity and labeling of topics still required researcher interpretation, introducing potential bias—especially when categorizing abstract roles or hybrid skill sets. Furthermore, overlapping or ambiguous language in job descriptions makes the interpretation of certain topics inherently subjective.

The third limitation concerns the fast-evolving nature of the AI landscape, which means that certain roles or competencies identified in this study may change over time, making some findings time-sensitive. Finally, the fourth limitation stems from inherent constraints of the BERTopic algorithm, which can influence how topics are detected and clusters are formed. For one, it assumes that each document is about just one topic, which can make the topics seem more separate and distinct than they really are. It can also produce repetitive keywords — for example, 'AI' and 'artificial intelligence' appearing in the same topic. This not only can make certain ideas seem more important than they are, but it can also crowd out other, more nuanced terms that are still relevant.

Future research could evaluate the influence of specific competencies—such as ethical AI practices, user experience design, or cloud platform proficiency—on actual product outcomes. It would also be valuable to analyze the evolution of roles and qualifications over a longer period, using a 5-year dataset, and to leverage BERTopic's Dynamic Topic Modeling capability to investigate changes in skills and responsibilities over time. Furthermore, building upon the proposed skill mapping framework, scholars could examine how academic curricula or corporate training programs align with the identified skill sets, providing a practical roadmap for addressing competency gaps in the evolving AI talent landscape.

In addition to these avenues, methods such as KeyBERT could be explored to enhance topic representations beyond c-TF-IDF. Additionally, BERTopic could be compared with other topic modeling approaches, such as Latent Dirichlet Allocation (LDA), and qualitative validation could be incorporated to ensure that the topics are interpretable and robust.

## References

- Ahmadi, M., Kheslat, N. K., & Akintomide, A. (2024). Generative AI Impact on Labor Market: Analyzing ChatGPT's Demand in Job Advertisements. *ArXiv*. <https://doi.org/10.48550/arxiv.2412.07042>
- Aldoseri, A., Al-Khalifa, K. N., & Hamouda, A. M. (2024). AI-powered innovation in digital transformation: Key pillars and industry impact. *Sustainability*, **16**(5), 1790. <https://www.mdpi.com/2071-1050/16/5/1790>
- Borčin, M., & Jose, J. M. (2024). Optimizing bertopic: Analysis and reproducibility study of parameter influences on topic modeling. In *European conference on information retrieval* (pp. 147-160). Springer Nature Switzerland.
- del-Pozo-Bueno, D., Kepaptsoglou, D., Peiró, F., & Estradé, S. (2023). Comparative of machine learning classification strategies for electron energy loss spectroscopy: Support vector machines and artificial neural networks. *Ultramicroscopy*, **253**, 113828.

- Du, S., & Xie, C. (2021). Paradoxes of artificial intelligence in consumer markets: Ethical challenges and opportunities. **Journal of Business Research**, **129**, 961-974.
- Hafezieh, N., Pollock, N., & Ryan, A. (2023). "Hacking marketing": how do firms develop marketers' expertise and practices in a digital era?. **Journal of Enterprise Information Management**, **36**(2), 655-679. <https://doi.org/10.1108/jeim-12-2021-0530>
- Khodeir, N., & Elghannam, F. (2024). Efficient topic identification for urgent MOOC Forum posts using BERTopic and traditional topic modeling techniques. **Education and Information Technologies**, 1-27. <https://doi.org/10.1007/s10639-024-13003-4>
- Kumar, V., Ashraf, A. R., & Nadeem, W. (2024). AI-powered marketing: What, where, and how?. **International Journal of Information Management**, **77**, 102783. <https://doi.org/10.1016/j.ijinfomgt.2024.102783>
- Lertmethaphat, N., Lekfuangfu, N., & Treeratpituk, P. (2025). **Exploring the Thai job market through the lens of natural language processing and machine learning**. Puey Ungphakorn Institute for Economic Research.
- Madrid-García, A., Freitas-Núñez, D., Merino-Barbancho, B., Pérez Sancristobal, I., & Rodríguez-Rodríguez, L. (2024). Mapping two decades of research in rheumatology-specific journals: A topic modeling analysis with BERTopic. **Therapeutic Advances in Musculoskeletal Disease**, **16**, <https://doi.org/10.1177/1759720x241308037>.
- Moreira-Filho, J. T., Ranganath, D., Conway, M., Schmitt, C., Kleinstreuer, N., & Mansouri, K. (2024). Democratizing cheminformatics: Interpretable chemical grouping using an automated KNIME workflow. **Journal of Cheminformatics**, **16**(1), 101. <https://doi.org/10.1186/s13321-024-00894-1>
- Ninan, J., Hertogh, M., & Liu, Y. (2022). Educating engineers of the future: T-shaped professionals for managing infrastructure projects. **Project Leadership and Society**, **3**, 100071.
- Parikh, N. (2024). Unveiling the role of AI product managers: Shaping the future. **TechRxiv**. <https://doi.org/10.36227/techrxiv.172504030.01820212/v1>
- Parikh, N. A. (2025). Managing AI-first products: Roles, skills, challenges, and strategies of AI product managers. **IEEE Engineering Management Review**, 1–11. <https://doi.org/10.1109/emr.2025.3530942>
- Parikh, N. (2025b). The evolving role of product manager-a systematic review. **Foundations of Management**, **17**(1), 37-56.
- Raman, R., Pattnaik, D., Hughes, L., & Nedungadi, P. (2024). Unveiling the dynamics of AI applications: A review of reviews using scientometrics and BERTopic modeling. **Journal of Innovation & Knowledge**, **9**(3), 100517.