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► To cite this version:

Victoria Zago Mendes, Claudio Vitari. A Systematic Literature Review on the Use of Artificial Intelligence in New Product Development. R&D Management Conference, R&D Management; KTH Royal Institute of Technology, Jun 2024, Stockholm, Sweden. ⟨hal-04627520⟩

HAL Id: hal-04627520

<https://hal.science/hal-04627520v1>

Submitted on 27 Jun 2024

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A Systematic Literature Review on the Use of Artificial Intelligence in New Product Development

Victoria Zago Mendes¹, Claudio Vitari¹

¹ Aix Marseille Université, CERGAM, Aix-en-Provence, France

Abstract:

The paper provides an overview of using Artificial Intelligence (AI) in New Product Development (NPD). The main objective of the research is to analyze AI tools that can assist companies in NPD. To accomplish that, a sample of 431 papers, published from September 2016 to 2023, in the management and computer sciences fields have been collected using the Web of Science and ScienceDirect databases. Methodologically, we conducted a Systematic Literature Review (SLR); we first started measuring the author's network and the keywords that appears the most in the field, consequently doing a content analysis of the articles' full texts. We systematically analyze at which stage NPD AI is used, the impact of NPD when AI is used, and the most commonly adopted AI technologies in NPD. Finally, drawing on the key findings, it was evident that AI allows for innovating and accelerating NPD. Together with these contributions, we conclude by explaining the future investigations into the additional impact AI may have in NPD and how AI can result in more valuable roles and an effective system in NPD.

Keywords:

IT adoption; Artificial Intelligence; New Product Development; IT Impact; Literature Review

1. Introduction

Nowadays, most companies face similar problems related to human and management difficulties, which are related to the issues of communication, creativity, and scalability. These challenges generated problems in the companies' New Product Development (NPD) in optimizing procedures and making efficient decision-making to improve results in the companies' productivity and reduce expenses. Despite technological advances, there is a gap between idea development and the successful launch of new products using Artificial Intelligence (AI) to increase efficiency and impact decision-making, innovation, and strategic planning. However, there is a lack of detailed knowledge on using technologies such as AI to accelerate NPD (Zhang et al., 2021).

The importance of NPD in companies has increased to face competition, market changeability, and better lever technology (Chen et al., 2010). NPD is the process that brings a new product to the market or improves an existing one (Karakoylu et al.,2020). As Zhang et al. (2021) explained, NPD is a process divided into seven stages.

Some companies manage NPD successfully by balancing creativity and efficiency (Naveh, 2005). NPD is essential for companies to develop additional abilities and better prepare for technological improvements while creating a new product or service (Chen et al., 2010). Hence, nowadays, managers and researchers have yet to find how to avoid the failure of NPD, so they are still concerned with learning how NPD could be better executed to produce successful new products and services. (Kahn et al., 2012).

To address NPD's high failure rates and the use of AI for improvements, this scenario can show that AI applies to improve product design efficiency and optimize the process, which offers a variety of opportunities for entrepreneurs and companies to benefit from AI (Brown, 2017). AI tools have been expanded to assist companies in NPD (Soltani-Fesaghandis & Pooya, 2018). Today, companies commonly use AI to interpret data via machine learning to support human decision-makers (Duan et al., 2019; Jarrahi, 2018). According to the McKinsey (2018) survey, AI is being adopted across industries as a valuable tool for increasing efficiency in NPD.

The debate about AI replacing human labor is endless. In the recent past, the authors Kolbjrnsrud et al. (2017) and Wang et al. (2019) demonstrated that AI could replicate some human actions. In contrast with these insights, Wamba-Taguimdje et al. (2020) claim that AI is a tool that can not replace what humans can do. AI was introduced in 1956 by Jonh McCarty and other researchers at the Dartmouth Conference; however, due to technology limitations in 1956, the use of AI in NPD was limited (Collins et al., 2021).

During the 1980s and 1990s, AI emerged in companies related to manufacturing operations and control quality (Berente et al., 2021; Hunt et al., 1986). Hence, at the beginning of the 2000s, AI developed beyond automation fields, but AI also started to be applied by machine learning, allowing AI to develop from vast data sets (Brynjolfsson et al., 2017; Lavallin et al., 2021). So, this opens the way for AI usage to become broader in NPD because companies have started to rely on data sets to create product design and development products (Karakoylu et al., 2020).

Since then, AI knowledge has developed and is used in numerous ways (Cantu-Ortiz, 2014). So, companies have used AI technology differently. (Dwivedi et al., 2021). Consequently, companies face significant impacts, causing them to go through digital transformations (Kraus et al., 2022). For companies, the use of AI has produced several benefits, including more flexibility due to the optimization process from AI tools, which also makes product design simpler to perform (Ali et al., 2018).

Managers already see AI as essential in developing new products, not only as an automatic tool but also as a collaboration tool for managing NPD. (Takyar, 2023). AI is significant in creating NPD in companies. (Huo et al., 2020). According to a PwC analysis from the formal document

Digital Product Development 2025, companies increasingly use AI to develop new products. Furthermore, 41% of companies use AI during NPD to accelerate processes and provide better designs (PwC, 2019). However, AI plays an essential role in the successful introduction of NPD (Huo et al., 2020), in which AI performance in NPD can be very different according to the segment and goal of each company (Kakatkar et al., 2020).

A significant part of the research on AI usage in NPD is being analyzed from the perspective of companies and entrepreneurs. This paper aims to focus methodologically on a systematic literature review to clarify this topic, addressing the following research question: What do we know about using AI in NPD? This research question still needs to be answered. Prior studies have suggested that companies should discover how to incorporate AI in the NPD process (Campbell et al., 2020; Hoffman, 2018). Since the relationship between AI and NPD is emerging in research, we will conduct a systematic analysis (Peters et al., 2020).

This paper will provide knowledge about the use of AI in NPD to answer the previous main research question. We will apply a systematic method to find answers to the following five specific questions: (1) What are co-authorship networks? (2) What are the keywords co-occurrences? (3) At which stages of NPD is AI employed? (4) Which AI technologies are most commonly adopted in NPD? (5) What is the impact of integrating AI into the NPD? For this reason, this research aims to obtain a general understanding of the topic and clarify some confusing outcomes in the existing literature (Creevey et al., 2022; Liberati et al., 2009).

This is how the paper is structured. Sections 1.1 and 1.2 address the study's theoretical background about AI and NPD, respectively, followed by the Research Agenda in Section 1.3. The Research Design is described in the Section 2. The study's Methodology and Data Collection are explained in Section 3, and Section 4 gives the Data Analysis and Findings. In Sections 4.1 to 4.3, the results for each Research question are also included with the Quality Assessment of the overall research. Section 5 presents the contributions and the study's limitations. Finally, Section 6 presents the conclusions and future research directions.

1.1. Artificial Intelligence

The first academics to study AI were McCarthy, Minsky, Newell, and Simon at the Dartmouth Conference in 1956. These researchers are among the most influential in the field (Collins et al., 2021). These academics defined AI as an “Intelligent system *created to use data, analysis, and observations to perform certain tasks without needing to be programmed to do so*” (Lee et al., 2019, p.1).

Over the years, AI went through a few modifications. Additionally, since the 2000s, AI has assisted companies in using datasets more effectively. However, AI has developed into a tool that other companies can easily apply in the NPD, reflecting how AI usage can impact operations in the

market (PwC, 2019). Nowadays, AI is based on deep learning or machine learning, so AI is being applied in companies where tasks can be solved more quickly than humans (Brynjolfsson & McAfee, 2017).

One example of a company using AI techniques known as deep learning to produce NPD is Enlitic, which scans photos to identify cancer (Jha & Topol, 2016). This example shows that modern AI is remodeling our society because this intelligence can be a simulation of what a human can do, but what will make the difference is how this intelligence will be applied in the growth of digital technology (Guszcza et al., 2017).

AI continues to be a tool to transform the world more efficiently and technologically. (Simon, 1995; Tang et al., 2020). According to Collins' research, there has been an increase in AI field studies since 2017, which resulted in more research since AI is being investigated in more areas (Collins, 2021).

Different AI applications are being used in multiple fields (Stafford et al., 2020). However, there are additional applications of AI being utilized these days in companies that deal with AI, including chatbots, intelligent personal assistants, robots, and analytical AI (Akter et al., 2023; Ponce et al., 2022; Prem, 2019). AI plays an essential role in successfully introducing new products (Huo et al., 2020), in which AI performance in NPD can be very different according to the segment and goal of each company (Kakatkar et al., 2020).

1.2 New Product Development

The literature on Engineering Management and Research and Development from the 1960s and early 1970s had a significant influence on the growth of NPD studies (Nambisan, 2003). In the 1970s, NPD was introduced as a formal process in companies to create new products or services, and this also started to be a part of academic research, where some researchers began to study NPD (Wind et al., 1997).

Throughout the years, many models for NPD have been created. The most well-known model is from the authors Booz, Allen, and Hamilton's (1982) model. This model provides a starting point for the seven stages of NPD. NPD has become defined as “*the process of bringing a new product to market, including idea generation and idea screening, concept development and testing, business analysis, prototype and market testing, technical implementation, and plans for product commercialization and launch*” (Pavlou & El Sawy, 2006, p.199).

In addition, the importance of NPD in companies was discovered, and it was found that managers need to be trained to execute NPD and to understand in which scenarios NPD could fail due to product defects or process execution issues (Cooper, 1983). According to Griffin's studies, almost

thirty percent of a company's profits are generated by products that did not exist five years ago (Griffin 1997).

Consequently, in the early 1990s, as market competitiveness and globalization increased, more projects to develop products emerged to reduce costs and time. So, NPD was incorporated into supply chain operations to improve operational efficiency, resulting in an optimization process (Nambisan, 2003).

That is why NPD has become an interdisciplinary study area within the Information Systems (IS) field. Later, NPD was incorporated into other fields of expertise, like Management and Information Technology (IT). NPD was analyzed in four dimensions: process management, project management, information, and knowledge management, and collaboration and communication (Nambisan, 2003). For process management, companies have started inserting NPD to bring more stability and organization to the various stages of product development; one example is Stage-Gate, a tool for managing new products (Cooper, 1990; Nambisan, 2003). The dimension of project management NPD is used for managing resources and time management, which allows the coordination of tasks in real-time (McGrath and Lansiti, 1998; Nambisan, 2003).

Regarding the information and knowledge management dimension, NPD significantly impacts the amount of data shared. This provides decision-makers more options when it comes to combining shared knowledge and information in real-time (Nambisan, 2003). So, the number of participants in NPD projects has increased among consumers and suppliers (Dahan and Hauser, 2000). As a result, NPD becomes more significant in the collaboration and communication dimension since the majority of companies' projects involving NPD develop into a multidisciplinary field with organizational, cultural, and regional borders, so the collaboration and communication platforms need to be well-integrated and adaptable (Nambisan, 2003).

Some companies manage NPD successfully by establishing a balance between creativity and efficiency (Naveh, 2005). NPD is essential for companies to develop additional abilities and better prepare for technological improvements while creating a new product or service (Chen et al., 2010). Hence, nowadays, managers and researchers have yet to find how to avoid the failure of NPD, so they are still concerned with learning how NPD could be better executed to produce successful new products and services. (Kahn et al., 2012).

Due to the changes over time, Zhang et al. (2021) updated the NPD stages based on nowadays in idea development, business analysis, product design, product testing, commercialization, post-commercialization, and operations management. However, these days, product developers in companies deal with many challenges. NPD has been introduced in many new procedures. Today,

the research on NPD success in companies must continue (Cooper, 2019). Moreover, managers use the knowledge gained from NPD's failures to improve the process. (Tao et al., 2023).

1.2. Research Agenda

1.2.1. Identified Gaps and Proposed Research Question:

AI is essential in different fields, providing solutions and changing how products are created and brought to the market. However, there is a gap in the literature about the use of AI in NPD. This happened because the use of AI in NPD is still in the early stages in many companies, which lack the expertise and trust to use AI in the NPD. This means a knowledge gap exists, which results in a slower approval and less impact on NPD (Tai et al., 2018; Venesz et al., 2022). For this reason, this research aims to focus on understanding the use of AI in NPD with the main research question: What do we know about using AI in NPD?

1.2.2. Impact and Relevance:

Since the relationship between AI and NPD is emerging, a significant part of the research on AI usage in NPD is being analyzed from the perspective of companies and entrepreneurs. (Peters et al., 2020). AI has significantly improved NPD's efficiency and automation of processes, but there are still certain areas where AI's full potential has yet to be reached (Mariani et al., 2023; Zhang et al., 2021). There are scenarios where AI can enhance the process of creating new products and optimize the process (Huo et al., 2020). Few studies analyze the broader impact of using AI in healthcare NPD from an academic perspective; instead, most concentrate on the technical or industry perspectives (Alowais, 2023; Davenport et al., 2019). This PhD thesis aims to fill this understanding gap by researching the use of AI.

2. Research Design

The previous research literature suggests conducting a qualitative study with the main research question of "What do we know about using AI in NPD?" to analyze the topic in detail (Silverman, 2021). We employed a systematic literature review study approach to collect data and understand the factors behind the use of AI in NPD (Paul & Criado, 2020). Also, this research conducted a bibliometric review. It allowed us to collect extensive data and apply two methods (Mariani et al., 2023).

To answer the main research question, five additional research questions were formulated using theoretical selection methods (Patton, 2002). These questions were used as the starting point for the literature selection criteria: (1) What are co-authorship networks? (2) What are the keywords

co-occurrences? (3) At which stage of NPD is AI employed? (4) Which AI technologies are most commonly adopted in NPD? (5) What is the impact of integrating AI into the NPD?

This research has been carried out from October 2023 to April 2024. Our main fields of focus were management and computer sciences, which we examined through articles published from September 2016 to 2023 and available in the ScienceDirect (SD) and Web of Science (WOS) databases. Specifically, we conducted a qualitative study via a systematic analysis. Then, we validated the data through VOSViewer and Covidence software, which allows for a deep investigation and provides findings for further insights (Harrison et al., 2020; Mariani et al., 2023).

3. Methodology and Data Collection

This paper employed one technique in its methodology by applying systematic content analysis (Mariani et al., 2023). The bibliographic analysis was chosen to illustrate the most prominent research examining AI usage in NPD (Mariani et al., 2023). The Systematic Literature Review (SLR) benefits researchers who want to structure and analyze a specific field (Paul & Criado, 2020). We can leverage our body of literature to answer our research questions by adopting these two approaches to study. Moreover, the research gaps for future studies should be identified (Paré et al., 2015).

The data was obtained by gathering articles from two databases, Science Direct (SD) and Web of Science (WOS), using the SLR methodology from Liberati et al. (2009). These two databases were selected as they list the most significant academic research and scholarly article sources related to the subject (Vieira & Gomes, 2009). The same search parameters were applied to both databases: only English-language publications from any journal in management, information systems, computer science, business, and accounting. We retrieved 484 articles combining *"artificial intelligence"* and *"new product development."*

The period for the retention of the article is September 2016 to December 2023. We chose this date as it is the moment of creation of the Partnership on AI to Benefit People and Society (PAI) non-profit organization. The PAI was established by the leaders of major tech companies, including Amazon, Facebook, Google, Facebook, Microsoft, Deep Mind, and IBM, to collaborate in the research about understanding AI and how AI can help people worldwide. (Morandín-Ahuerma, 2023; Partnership on AI, 2016). Google Trends application also shows a rapid increase in popularity of the AI term after that date.

The articles have been stored in Zotero and Covidence applications to facilitate our paper selection since it made screening less complicated and more structured than a spreadsheet (Harrison et al., 2020). Figure 1 below shows the preferred Reporting Items for Systematic Reviews and Meta-

Analyses (PRISMA). We initially imported the 484 publications in Covidence from the SD and WOS databases. The Covidence program first identified 52 duplicate studies.



Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

We set eligibility criteria for the remaining 431 articles to apply to the title, abstract, and keywords to screen for relevant papers about AI usage in NPD. On the contrary, we excluded documents about using NPD to develop an AI, a business strategy, and a business plan; 389 articles were considered irrelevant, while 42 were retained as relevant documents. From these 42 articles, we did a full-text review where we additionally excluded 15 by giving reasons: wrong definition of NPD, wrong outcomes, close access article, and wrong study design.

These findings by Covidence searching multiple bibliographic databases helped develop a better Systematic Literature Review (SLR) to answer our research questions: (1) What are co-authorship networks? (2) What are the keywords co-occurrences? (3) At which stage of NPD is AI employed? (4) What is the impact of integrating AI into the NPD? (5) Which AI technologies are most commonly adopted in NPD? (McKeown & Mir, 2021).

The most significant papers addressing the use of AI in NPD were selected to be illustrated by the systematic analysis, leveraging the authors' and keywords' acknowledgments in the papers. Lastly, we extracted these 27 articles from the Zotero application, which we processed with VOSViewer results, including corresponding networks between authors and keywords extracted. Consequently, following an SLR protocol, the final step guided us through the Extraction process, where we created our template for Data Extraction per the research question, including in Annexes A to C and the Quality Assessment related to the overall research, which corresponds to Annex D. The answers to the research questions were identified throughout the Extraction process. Some terminologies indicated in Annexes A to C were extracted from the literature (Liberati et al., 2009; Mariani et al., 2023).

4. Data Analysis and Findings

4.1. Research Questions 1 and 2:

The algorithmic computational tool, VOSViewer, developed the viewing bibliometric maps to answer the two first research questions: (1) What are co-authorship networks? (2) What are the keywords co-occurrences? In order to emphasize and map the research question in the software, the 27 final extracted papers were displayed in the VOSViewer to construct a map of the relationship between the primary authors and the keywords according to the co-occurrence data (Mariani et al., 2023, Van et al., 2010).

Figure 2 shows the map of the author networks according to the publication year. The information extracted from this map was developed by analyzing the terms used across the literature to determine the link between the writers on the topic and the concepts. The map makes it possible to display several network analyses, especially the co-authorship analysis that provides 109 relationships between 27 groups (Linnenluecke, 2020).

The bibliographic coupling was applied by the recommendation of Zupic and Cater authors (2015) for an SLR. Figure 2 presents the bibliographic data extracted from the 27 final papers, which shows that authors Volker (2020) and Füller (2022) have 6 link strengths. That is why both authors share the idea of AI revolutionizing NPD. Additionally, Ponce et al. (2022) are in the group with other authors like Mata and Molina, who address the use of AI in NPD during COVID-19, resulting then in this map of 5 link strengths. This implies that the research shows how intellectual networks have emerged and developed within this knowledge base (Mariani et al., 2023). The connection between the researchers was determined by the results from Figure 2 with the average year of publication according to the authors. This technique gives us an accurate empirical foundation for mapping science.

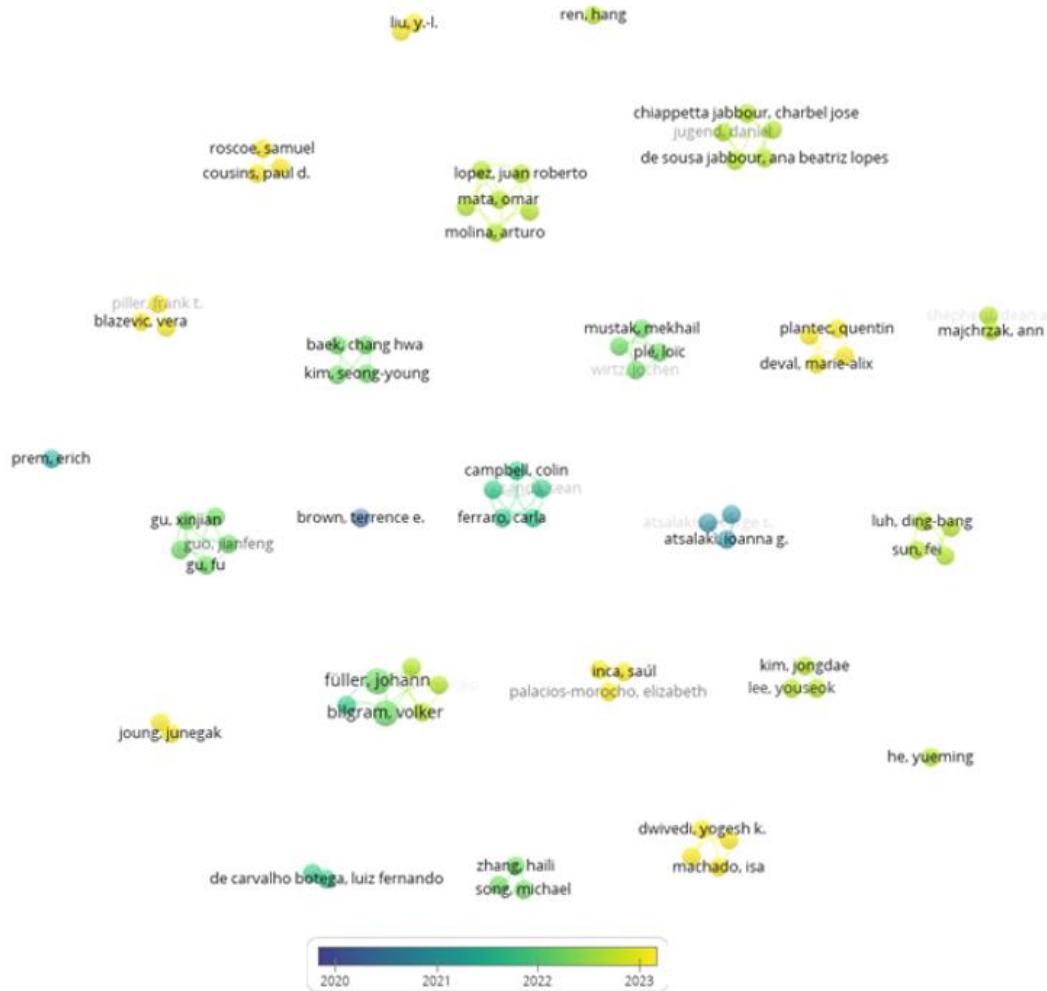


Figure 2: Co-authorship networks with the average year of publication in the literature base from VOSViewer

In addition to completing the bibliometric study, co-occurrence networks of the keywords were developed to find several linked terms based on the literature to answer the second research question: (2) What are the keywords co-occurrences? (Mustak et al., 2021). The map shown in Figure 3 was constructed based on the keyword analysis applied to reveal the connections between conceptual items and general topics (Mariani et al., 2023).

As can be seen, Figure 3 displays the most significant occurrence in each keyword co-occurrence, resulting in a total of 10 words with 40 connections from the year 2016 to 2024. For this reason, the word “entrepreneur” has the highest co-occurrence frequency in Figure 3 because of its close relationship with other words like “entrepreneurship,” “us,” “service,” “new product,” “development,” “technology,” and “product.” In order to identify the other keywords with an extensive co-occurrence network, the word needs to appear more frequently in the network, and some of them are: “technology,” “development,” and “product.”

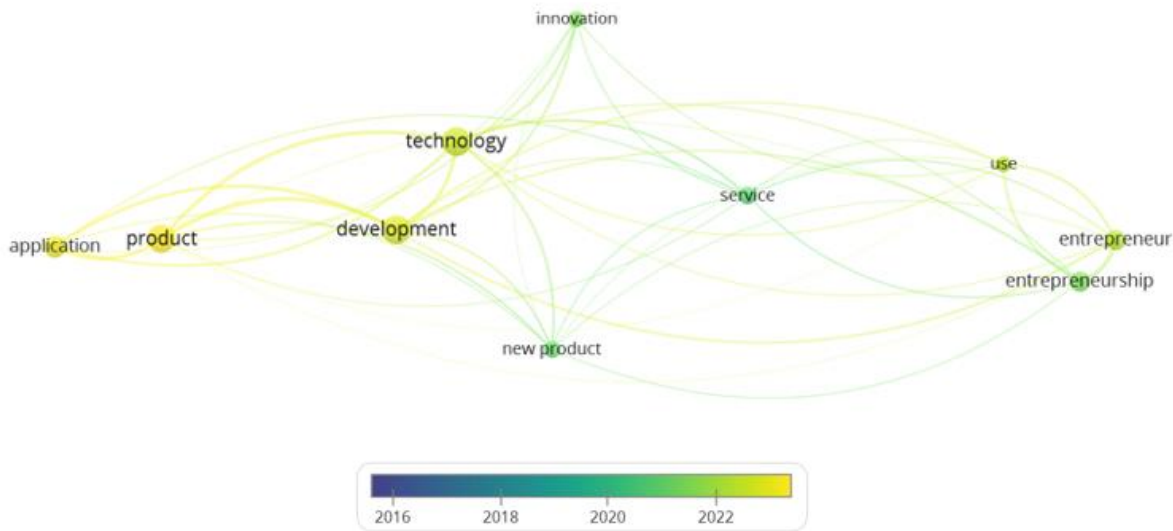


Figure 3: Keyword co-occurrences with the average year of publication in the literature-base from VOSViewer.

More precisely, around 2016, the research about “entrepreneurship” became more frequent, and papers began to be related to “new products” and “services.” Beginning in 2018, “innovation” has started to take center stage in all scientific publications associated with “development” and “technology.” However, “innovation” continues to be an important keyword in 2020, but it appears more often with other keywords like “new product” and “service.” So, from 2022, the most frequently used words were “application,” “product,” “development,” and “technology,” which are all correlated to each other and are more applied in the literature.

4.2 Research Questions 3, 4, and 5:

In order to answer the last three research questions: (3) At which stages of NPD is AI employed? (4) Which AI technologies are most commonly adopted in NPD? (5) What is the impact of integrating AI into the NPD? From Covidence software, we developed a feature analysis framework suitable to answer these three research questions, and the results are shown in Annexes A to C, which were collected from the data from the 27 final articles. The full literature review was analyzed to obtain the findings (Harrison et al., 2020).

The results show that operation management and idea generation are the two primary stages in NPD where most companies apply AI, as all of the results shown in Annex A point to. This is

because AI develops new product ideas, optimizes procedures, and improves management effectiveness (Dwivedi, 2023).

Also, AI is used as a technology to assist in product design during the product process, where AI supports the expert system, builds on a knowledge system, and assists managers in complementing the team's creativity during NPD's brainstorming and product design phases. For this reason, AI will improve these three primary steps of NPD (Botega & Silva, 2020; Ponce, 2022).

So, according to Annex A, only 7% of companies use AI in product testing. Especially since managers find it more efficient to use AI for ceramic product testing, therefore managers need to know the market introduction of AI for the goal of product testing. (He, 2022; Wang & Liu, 2023).

Subsequently, Annex B exhibits which AI technology is most used in NPD. The literature review allows us to discover that analytic AI, machine learning, deep learning, functional AI, interactive AI, and big data are all AI technologies applied in NPD. Thus, this implies that companies use multiple AI technologies for NPD, applying different tools and techniques to reach the specific needs of the company (Ren, 2022; Roscoe et al., 2023; Wang et al., 2023).

One of the most used is machine learning, with 59% which could be used for customer service, for example, based on the importance of product features from online product reviews by measuring the significance of a product's attributes according to online product evaluations (Joung & Kim, 2023). The use of extensive data use assists NPD companies with 22% by managing data to identify new markets and maintain their competitive advantage throughout various industries and scenarios (Ren, 2022; Prem, 2019; Zhang et al., 2019).

Following this, we analyzed the literature to identify the impact of AI on NPD. Annex C classifies and shows the impact of AI in NPD: profitability, customer service, optimization operations, creativity, productive gains, replacing human work, reducing financial risk, and reducing environmental impacts. AI can be considered a broad term that includes various activities and results, which could be positive and negative, by utilizing software and algorithms to carry out tasks that a human would have done (Mustak et al., 2021).

Companies may choose to use AI technology for management or economic uses. Regardless of what the company attempts to do, it will impact NPD. For example, optimization management reduces costs NPD. According to the full-text screening result, Annex C shows optimization operations with 67% of the primary impact of AI in NPD. Moreover, Annex C illustrates the second impact of productivity, which is 48%. This indicates that AI supports decision-making

processes more effectively, improving results and generating NPD productivity (Campbell et al., 2020; Kakatkar et al., 2020; Roscoe et al., 2023).

The combination of the findings for all five research questions contributes to finding an answer to the main research question of this paper: What do we know about using AI in NPD? By examining co-authorship networks and co-occurrences we create a base to understand the subject landscape. The study of AI usage in NPD phases, together with the identification of the most often used AI technology, provides practical insights into how AI is employed. Finally, a review of AI's influence on outcomes such as productivity, profitability, and risk reduction connects everything together, illustrating the larger implications and advantages of AI in NPD.

5. Contributions and Limitations

This paper provides a significant contribution to the academic literature. A critical theoretical contribution of this study was a depth of understanding of the use of AI in NPD in a systematic technique (Mariani et al., 2023; Liberati et al., 2009; Paul & Criado, 2020). In an analysis of this study research, we confirm, according to the results, that the usage of AI in NPD across many industries is beginning to increase (Dwivedi, 2023; Huo et al., 2020; Kakatkar et al., 2020). Therefore, our research shows that AI is being implemented with different purposes and creating various impacts in NPD (Ren, 2022; Prem, 2019; Zhang et al., 2019). Finally, we contribute to the emerging research literature on AI's use in NPD.

As a practical contribution, our research contributes to the companies by helping managers understand the impact of AI usage in NPD and the potential advantages of implementing AI usage in NPD. Managers can get further helpful suggestions on using AI in NPD by consulting Annexes A through C (Takyar, 2023; Tao et al., 2023).

Even though this research has literature and practical implications, a few limitations must be noted. Firstly, the results may not be specific because the present research applies to multiple companies. Thus, the findings apply to any company. Secondly, the research focuses on a systematic method without employing study cases or interviews to confirm some of these findings in practical applications. Lastly, NPD was examined as an entire process instead of individual steps.

6. Conclusion and Further Research

This paper has been developed to understand AI usage in NPD. As highlighted in this paper, there has been an emerging application of AI in NPD through machine learning since the 2000s. For

example, AI can assist companies in identifying market gaps that a new product could fill, provide resources for idea creation, and improve the efficiency of processes (Campbell et al., 2020).

Therefore, this paper reveals that AI usage impacts NPD for managerial, environmental, and economic reasons. According to Annexes A to C result, AI's use in NPD impacts companies positively and negatively. Recent studies reveal that companies aim to use AI in NPD, and entrepreneurs use AI to develop new services or products to start from scratch with an innovative idea for a product or service while also being aware that AI may be helpful (Brown, 2017).

Most researchers concluded that AI adds value to NPD, particularly in the idea development and operations management stages. (Kim et al., 2022; Ponce et al., 2022; Shepherd & Majchrzak, 2022). Furthermore, our analysis shows that only a few studies focus on the reason for NPD's failures. On the contrary, they investigate AI usage but must be more focused on understanding how AI can successfully execute NPD when it fails. (Zhang et al., 2021).

Our research concludes that further research must focus on one specific industry to avoid general. Our finding shows that we must point our study to the healthcare industry. Since AI provides several opportunities for innovation in the knowledge-based healthcare industry, it has gained interest from researchers, doctors, technology and program developers, and clients in the healthcare industry (Safavi, K.; Kalis, B., 2019). AI technologies and their applications can help people live better lives (Abe et al.; H., 2019).

Our research concludes that further research must focus on one specific industry to avoid general. Further research could provide a deeper understanding of the usage of AI in NPD in the real world by applying a case study methodology. We will apply this methodology to the healthcare industry and the process of NPD. We will develop this method by monitoring organizations, collecting data, analyzing them, and presenting results (Dubé & Paré, 2003).

Therefore, this method will be important in providing information on data, investigations, supervision, validation, and visualization to comprehend better how AI's impact can create challenges and opportunities in the healthcare industry (Kaul et al., 2023). So, the analysis could be further extended to include other relevant points that influence AI usage in NPD.

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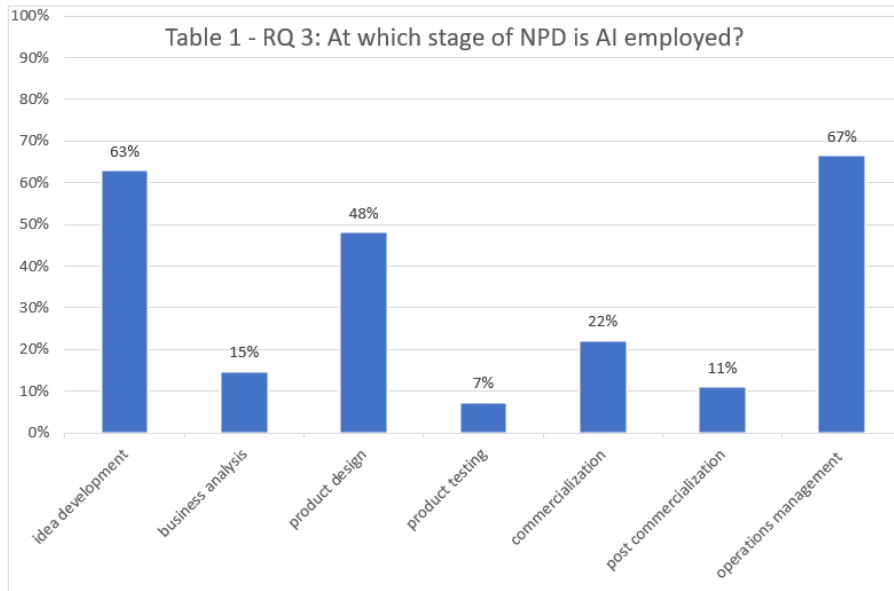
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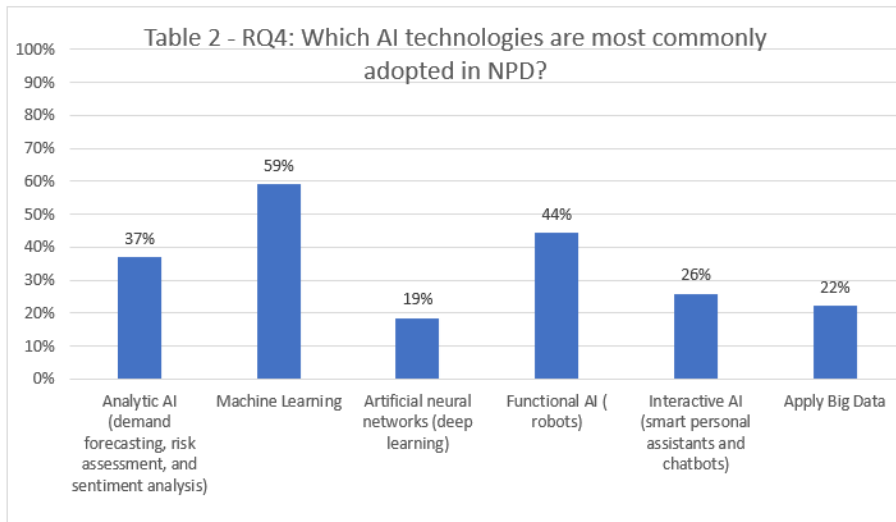
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Annexes

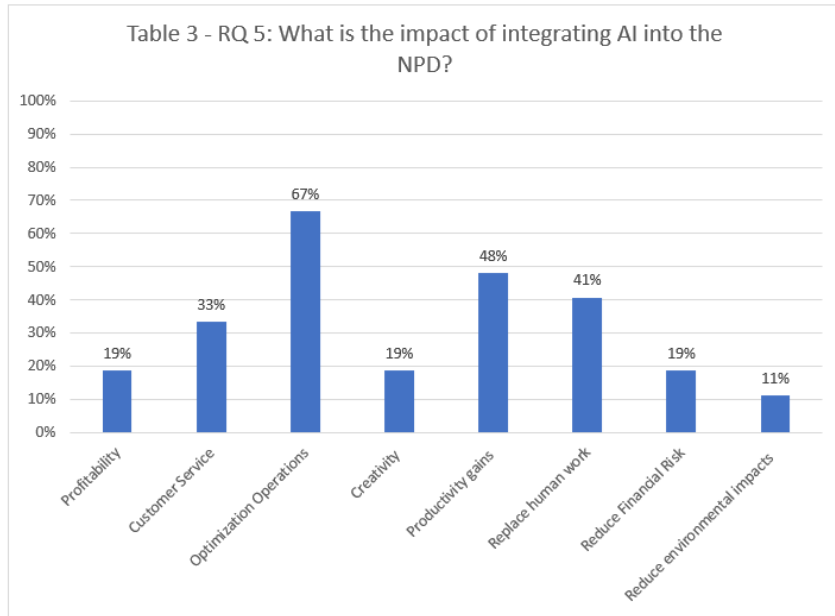
Annex A: Table 1 Data Extraction Research Question 3



Annex B: Table 2 Data Extraction Research Question 4



Annex C: Table 3 Data Extraction Research Question 5



Annex D: Quality Assessment Overall Research

