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**Use of Generative
Artificial Intelligence
in Business Models**

Ricardo Alexandre Dias Menor

NOVA Information Management School
Instituto Superior de Estatística e Gestão de Informação
Universidade Nova de Lisboa

USE OF GENERATIVE ARTIFICIAL INTELLIGENCE IN BUSINESS MODELS

by

Ricardo Alexandre Dias Menor

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Supervised by

Vítor Manuel Pereira Duarte dos Santos, NOVA Information Management School

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STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism, any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledged the Rules of Conduct and Code of Honor from the NOVA Information Management School.

[Lisbon, 2025]

Ricardo Alexandre Dias Menor

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ABSTRACT

The rapid advancement of Generative Artificial Intelligence, driven by Large Language Models such as ChatGPT, has received significant attention and generated extensive debate. Despite this growing interest, many organizations remain unprepared to adopt and scale AI technologies effectively. A lack of expertise and organizational capabilities often limits AI initiatives to conceptual discussions, preventing their integration into strategic business processes. This research adopts the Design Science Research methodology to address this challenge through three main stages: a systematic literature review, the development of a framework for integrating GenAI into business models, and validation through expert interviews. The findings reveal that existing research predominantly focuses on AI's impact on internal processes and value creation, emphasizing automation, decision support, and enhanced engagement with customers and employees. However, less attention has been paid to AI's potential to enable entirely new products, services, and value propositions. To bridge this gap, this thesis introduces the AI-Enhanced Business Model Canvas, a framework that systematically embeds GenAI capabilities into the components of business models. This framework supports organizations in strategically leveraging AI to foster creativity, innovation, and sustainable value creation. The study contributes to the emerging body of knowledge at the intersection of GenAI and business models, providing both theoretical insights and practical guidance for organizations aiming to harness AI's transformative potential.

KEYWORDS

Business Model Canvas; Business Innovation; Generative AI; Creativity; Innovation

Sustainable Development Goals (SDG):



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LIST OF ABBREVIATIONS AND ACRONYMS

AI	Artificial Intelligence
BM	Business Model
BMC	Business Model Canvas
BMI	Business Model Innovation
ESG	Environment, Social and Governance
GANs	Generative Adversarial Networks
GDP	Gross Domestic Product
GenAI	Generative Artificial Intelligence
GPT	Generative Pre-trained Transformer
IS	Information Systems
KPI	Key Performance Indicator
LLM	Large Language Model
NLP	Natural Language Processing
SMEs	Small and Medium-sized Enterprises



1 INTRODUCTION

1.1 CONTEXT AND PROBLEM IDENTIFICATION

Artificial Intelligence (AI) has a very complex history, generating enthusiasm and concern over the years. It has been a topic of ongoing debate, with questions continually arising about its effectiveness and potential impact (Cao et al., 2021). AI has significantly impacted organizations, societies, and individuals by providing structured reasoning that processes inputs, learns from deviations between predicted and actual outcomes, and continuously adapts to environmental changes (Dwivedi et al., 2023). In recent times, the business community has shown heightened interest in AI, as it is increasingly viewed as the pivotal technology of the 21st century (Brem et al., 2023; Magistretti et al., 2019).

The rise of generative artificial intelligence (GenAI), primarily driven by advanced large language models (LLMs) such as ChatGPT, has garnered considerable media attention and sparked intense debate. The tech industry, renowned for its rapid growth and dynamic nature, often exhibits patterns of heightened enthusiasm. A notable wave of excitement surrounds GenAI, reminiscent of the early days of social media, when there was widespread optimism about its commercial potential and role in driving innovation (Roberts & Candi, 2014). This pattern aligns with a common theme in the technology adoption life cycle, where initial excitement, often more driven by hype than solid evidence, accelerates the adoption of new technologies.

Current research on the connection between AI and business models primarily examines the impact of AI on internal processes for value creation. AI can enable automation, support decision-making, and offer innovative ways to engage customers and employees. However, AI solutions that make inaccurate or biased decisions can adversely affect value creation. While AI technology influences operations, it also facilitates the development of new products and services. It is essential to note that current research has not yet fully explored the potential new products and services that AI technology could generate. (Riya Widayanti & Lista Meria, 2023).

Lee et al. (2019) report that over 80% of business executives believe AI will help companies sustain or gain competitive advantages, while more than 70% believe AI will create opportunities for new business models (Soni et al., 2020; Vocke et al., 2019). To harness the value-creation potential of AI, established companies must engage in business model innovation (BMI) when utilizing and integrating AI into their business processes (M. M. Mariani et al., 2023). Consequently, many companies are adopting AI technology, with managers seeking to identify the most promising business models (Burström et al., 2021; Coskun-Setirek & Tanrikulu, 2021). The potential applications of AI in business processes are extensive, and one practical application is data-driven decision-making, which enhances decision-making procedures by increasing their accuracy and reliability (Battisti et al., 2022).



However, many business leaders feel unprepared to accelerate the adoption of AI across their organizations (Sjödín et al., 2021). Many organizations lack the necessary expertise and capabilities to implement AI effectively, resulting in their inability to advance AI initiatives beyond the initial concept stage (Burström et al., 2021; Marinakis et al., 2021).

In this context, the use of GenAI in business is highly relevant. While AI offers significant benefits, it is also essential to consider its potential drawbacks. Therefore, there is a need to investigate how GenAI can be effectively employed to develop new business models and to establish best practices and guidelines for their implementation. Building on this premise, two research questions come up, which are:

RQ1: How to develop business models successfully using GenAI?

RQ2: What are the best guidelines for implementing GenAI in business models?

1.2 OBJECTIVES

The primary research objective is to propose a framework for utilizing Generative AI to develop business models.

To achieve the primary goal, the following intermediate objectives were defined:

1. Analyze the development of new business models.
2. Conduct a comprehensive study on the role of Generative AI in enhancing innovation and creativity in business models.
3. Develop a framework for utilizing Generative AI in business model development.
4. Run a fictional use case (apply the proposed framework in a specific context).
5. Evaluate the framework and its use case.
6. Identify key factors that influence the successful adoption of Generative AI for creative purposes in business contexts.
7. List the potential benefits and challenges of integrating Generative AI-driven creativity in business model development.

1.3 STUDY OUTCOMES AND CONTRIBUTIONS

This study's outcomes and contributions focus on understanding the role of GenAI in developing business models, particularly in enhancing creativity and driving innovation.

The advancement of AI capabilities presents substantial opportunities to stimulate business model innovation and unlock new revenue streams and competitive



advantages for manufacturers pursuing digital specialization. However, this transformation is confronted by numerous challenges and uncertainties, with limited research available to provide clear guidance on navigating these complexities (Jorzik et al., 2024).

The use of AI in conventional business strategies represents a transformative change in the corporate environment, combining AI's capabilities with time-tested business methods. This convergence drives new approaches to innovation, strategic planning, and competitive positioning. Consequently, the global GDP is projected to grow by as much as 14%, equivalent to \$15.7 trillion, by 2030, due to the implementation of this technology (Bretones Cassoli et al., 2021; Oluwatoyin Ajoke Farayola et al., 2023).

This study aims to contribute to the growing academic discussion in management research on the potential impact of GenAI, offering practical guidance on leveraging this technology to develop new business models or refine existing ones.





2 LITERATURE REVIEW

2.1 BUSINESS MODELS

2.1.1 OVERVIEW

The business model serves as the cornerstone of strategic business development, providing entrepreneurs with a framework to understand the connections between their organization, its offerings, and the markets in which they operate (Morris et al., 2006). The concept of business models (BM) has been around for more than two decades (Zott et al., 2011). Despite the growing literature on the topic, a universally accepted operational definition remains elusive (Massa et al., 2017).

Bocken (2014) conducted a thorough literature review on business models, discovering that they are frequently seen as an overarching explanation of "how a company operates" (Beattie & Smith, 2013; Margretta, 2002; Zott & Amit, 2010). Teece (2010) also explains that a business model clarifies how a firm turns its resources and capabilities into economic value. It presents the logic behind the company's strategy, including supporting data and evidence that illustrate how value is generated and delivered to customers. Additionally, it outlines the company's revenue sources, cost structures, and profits associated with providing that value (Teece, 2010).

Osterwalder (2004, p. 15), who developed the Business Model Canvas (BMC) in 2010, defines a business model as "*a conceptual tool made up of a set of elements and their relationships, which allows for the expression of a company's logic for generating revenue.*" It explains the value a company offers to specific customer segments, its structure, and its network of partners needed to create, market, and deliver this value. Additionally, it highlights the role of relationship capital in building sustainable and profitable revenue streams. Expanding on this idea, a business model comprises several essential components: the value proposition (including the product or service offering, customer segments, and customer relationships), key activities, resources, partnerships, and distribution channels, which collectively represent the value creation and delivery process. It also includes the cost structure and revenue model, illustrating how the company captures value (Osterwalder et al., 2005; Osterwalder & Pigneur, 2010).

Business models are essential in market economies where consumer choice, transaction costs, diversity among consumers and producers, and competition exist (Spiegler, 2016). Profit-driven companies operating in competitive markets strive to meet varying consumer demands by continuously creating and offering new value propositions. Technological advancements often necessitate new business models, as they require bringing innovations to market and offer the opportunity to address unmet customer needs (Tallman et al., 2018). Furthermore, as previously mentioned, new business models can be a form of innovation in their own right. There are numerous



potential BMs; some will be far more suited to specific customer needs and market conditions than others. Selecting, refining, and improving these models is a complex skill. Effective designs are often highly situational and require iterative development. As history has shown, new business models can both drive and embody innovation (Teece, 2010).

2.1.2 BUSINESS MODEL CANVAS

The BMC is a visual framework that outlines the essential components of a business model. It comprises nine interconnected blocks (customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure), which enable the discussion and analysis of both existing and new business models (Osterwalder & Pigneur, 2010), as illustrated in Figure 2.1.

This framework enables the evaluation of how a company creates and delivers value to its customers, providing insights into its key activities, cost structure, and other significant attributes. Furthermore, integrating these building blocks establishes the BMC as an organization-centric business model structured around delivering value propositions to specific customer segments (Graves, 2023). Additionally, the BMC illustrates the entrepreneurial journey, emphasizing the essential components that define the business itself (Murray & Scuotto, 2016).

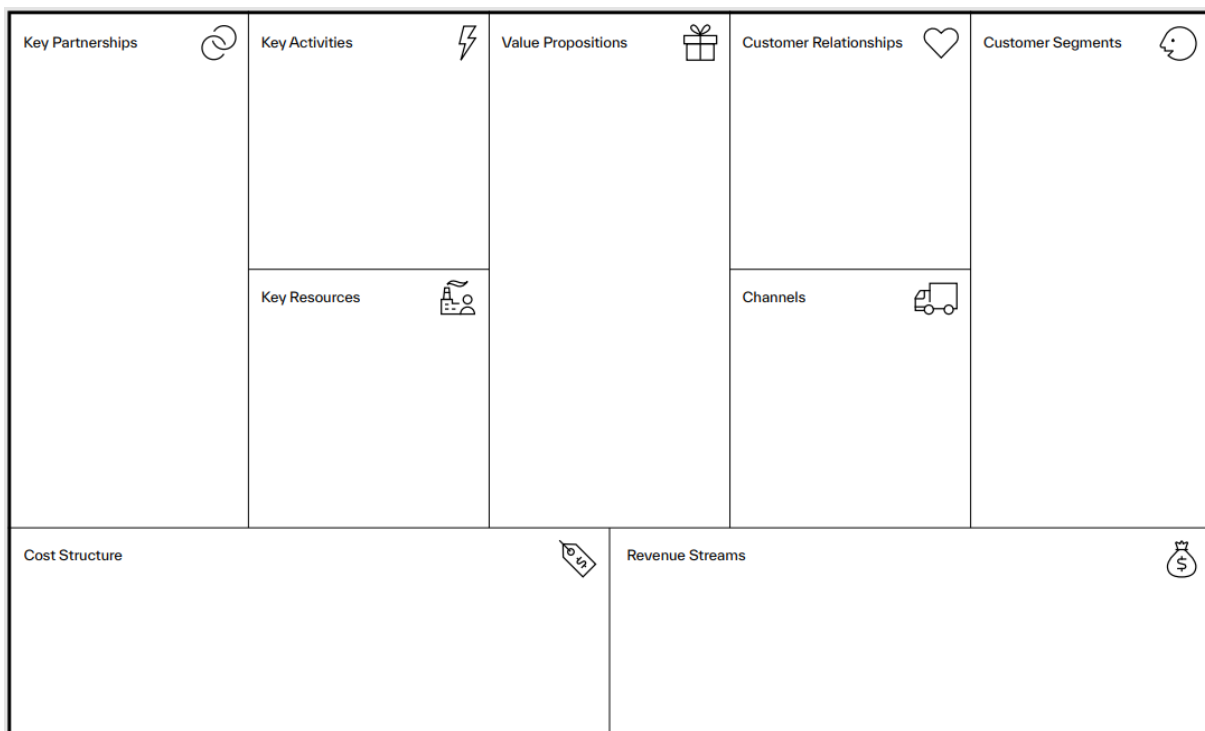


Figure 2.1 – Business Model Canvas Framework.
Adapted by Osterwalder A. & Pigneur Y. (2010)



According to Osterwalder and Pigneur (2010), the building blocks have the following description:

- **Key partners:** Describes the network of suppliers and partners that make the business model work.
- **Key activities:** Describes the most important things a company must do to make its business model work.
- **Key resources:** Describes the most important assets required to make a business model work.
- **Customer relationships:** Describes the types of relationships a company establishes with specific customer segments.
- **Customer segments:** Defines the different groups of people or organizations an enterprise aims to reach and serve.
- **Channels:** Describes how a company communicates and reaches its customer segments to deliver a value proposition.
- **Value propositions:** Describes the bundle of products and services that create value for a specific customer segment.
- **Revenue streams:** Represent the cash a company generates from each customer segment.
- **Cost structure:** Describes all costs incurred to operate a business model.

2.1.3 BUSINESS MODEL INNOVATION

Business Model Innovation (BMI) involves reimagining the core components of a business model to achieve long-term success and maintain a sustainable competitive edge (Bucherer et al., 2012). This approach focuses on analyzing and restructuring how businesses create, distribute, and capture value (Euchner & Ganguly, 2014). Rather than merely innovating products or services, BMI encompasses transformative changes across the entire business ecosystem, including areas such as partnerships, revenue streams, customer segments, distribution channels, and cost frameworks (Anwar, 2018; Bucherer et al., 2012; Tavassoli & Bengtsson, 2018). It is critical in helping organizations grow, adapt to evolving market dynamics, and ensure long-term sustainability. Organizations can establish a unique position and stand out from competitors by adopting novel business models, developing fresh market perspectives, and effectively addressing disruptive technologies and market changes (Anwar, 2018; Birnbaum et al., 2005)



2.2 GENERATIVE AI

2.2.1 OVERVIEW

A GenAI model is a machine learning architecture that leverages AI algorithms to generate new data instances based on patterns and relationships identified in the training data. While such models are fundamentally important, they remain incomplete without further fine-tuning for specific tasks through additional systems and applications (Feuerriegel et al., 2024; Noy & Zhang, 2023). GenAI has the potential to enhance human intelligence, drive data-based discoveries, and create new opportunities for creativity and innovation, making it an essential tool for knowledge acquisition across various sectors. However, to ensure the beneficial use of these technologies, it is crucial to address ethical concerns, such as biases in generated content and the responsible deployment of AI.

The emergence of LLMs has significantly transformed the AI landscape. Models like ChatGPT or GitHub Copilot have been the most disruptive technologies in recent years. They exhibit a deep comprehension of human natural language and have been applied across various fields, including reasoning, creative writing, code generation, translation, and information retrieval (Dwivedi et al., 2023; Shanahan, 2024).

2.2.2 MAIN TOOLS

Generative AI encompasses a range of powerful tools and technologies for creating new content, including text, images, audio, and video. LLMs are at the heart of generative AI, which uses deep learning techniques to produce human-like text based on extensive training data. This is especially relevant considering the broad accessibility of generative AI chatbots, including OpenAI's ChatGPT Plus and Microsoft's Copilot, both of which utilize the GPT-4 LLM (OpenAI et al., 2023), as well as Google Bard, which the Gemini Pro LLM powers. The advantages of generative AI tools are substantial for professionals in quantitative fields. These tools can fit statistical models, generate visualizations, and integrate with computational engines like Wolfram Alpha to execute complex tasks and analyses. Furthermore, they serve as powerful educational resources, acting as informal tutors by offering concise summaries of unfamiliar topics with greater precision than conventional web searches can provide.

As said before, Generative Pre-trained Transformer (GPT) is a type of LLM introduced by OpenAI in 2018 (Vaswani et al., 2017). It employs unsupervised pre-training and fine-tuning to produce responses that closely mimic human-like conversations, resembling those provided by an expert. The GPT-3 model is a language model with 175 billion parameters, trained on a vast, diverse dataset compiled from sources such as web pages, books, academic papers, and online discussions. Although current models predominantly rely on deep learning and emphasize supervised learning,



future advancements may shift toward reinforcement learning (Uc-Cetina et al., 2023). The global rise of ChatGPT has showcased its versatility across a wide range of applications, from software development and testing to writing poetry, essays, business correspondence, and legal contracts. However, its rapid adoption has sparked concerns about distinguishing between human and AI-generated content, particularly within academic and educational circles. This has reignited debates on the future of traditional human efforts in these fields (Else, 2023; Stokel-Walker, 2023).

2.2.3 PROMPT ENGINEERING

A prompt serves as a set of guidelines for a large language model (LLM), effectively programming it by shaping its behavior and refining its capabilities. This skill has become essential for effectively engaging with models like ChatGPT. Prompts provide instructions that direct the LLM, facilitating rules enforcement, automating tasks, and ensuring that the output aligns with specific criteria. In this sense, prompts act as a programming tool, allowing users to tailor the model's responses and interactions (White et al., 2023).

An LLM's output is closely tied to the quality of the prompts it receives. By establishing the initial context, a prompt conveys essential information for the LLM to process and specifies the desired format and content of the response. For instance, a prompt might ask the model to generate code following a particular programming style or highlight specific keywords in a document while providing relevant information. These guidelines lead to more structured and detailed outputs, enhancing the LLM's ability to address various software engineering challenges (White et al., 2023).

2.2.4 ADVANTAGES AND DISADVANTAGES OF ARTIFICIAL INTELLIGENCE

While AI is an essential technology in the present and will continue to be so in the future, it comes with its own set of challenges. Like any technological advancement, AI provides numerous benefits but introduces certain drawbacks (Regona et al., 2022). One of the primary advantages of AI is its ability to reduce human error, boasting greater precision, speed, and accuracy across various tasks. These systems often outperform humans in many areas. Moreover, AI can operate in hazardous environments, bypassing the physical and psychological limitations that humans face. For example, in high-risk situations such as space exploration or oil and gas operations, AI-driven machines can perform tasks that pose a risk to human safety. By doing so, they remove the dangers associated with such activities. Additionally, when it comes to repetitive and tedious tasks, AI maintains a level of consistency and efficiency that humans, prone to fatigue or distraction, may struggle to achieve. Machines also lack emotions, allowing them to make objective decisions without biases affecting human reasoning (Padamkar, 2020).



Despite these advantages, implementing AI presents notable challenges. Developing, maintaining, and supporting AI systems requires highly skilled professionals, which can be expensive. The underlying technology, particularly the data storage needed for processing large volumes of information, also incurs substantial costs. While AI systems can learn and adapt through machine learning, they still cannot replicate human creativity, a distinctly human trait. (Pedamkar, 2020)

Another primary concern is AI's impact on the workforce, as the increasing automation of jobs could lead to significant unemployment. Furthermore, the misuse of AI by unethical individuals raises the risk of cybercrime, a pressing issue explored in this study (Pedamkar, 2020).

2.2.5 THE ROLE OF GENAI IN CREATIVITY AND INNOVATION

The innovative landscape is undergoing a profound transformation, marked by the rise of LLMs with conversational interfaces. These sophisticated AI systems function as highly effective problem-solving agents, prompting individuals and organizations to rely more heavily on them throughout the creative process (Sedkaoui & Benaichouba, 2024). Notably, researchers integrate generative AI into idea generation and solution development during the ideation phase (Bilgram & Laarmann, 2023; Bouschery et al., 2023). The innovation process is a continuous loop that involves recognizing challenges, gathering insights, brainstorming ideas, developing prototypes, testing them, implementing solutions, and scaling their impact. This iterative approach closely mirrors the principles of design thinking, which prioritize empathy, a user-centered focus, and a deep understanding of user needs and contexts as essential components for developing innovative and impactful solutions (Beckman & Barry, 2007).

The rise of artificial intelligence is driving a significant shift in how businesses approach innovation management, offering a range of new tools and strategies (Haefner et al., 2021). Rather than merely optimizing existing products through incremental updates, AI holds the potential to transform the innovation process completely (Verganti et al., 2020). Many experts view the integration of AI as a breakthrough that could dramatically accelerate innovation, improve productivity, and enhance the quality of life across various sectors (Dogru et al., 2023).

AI-powered algorithms enable organizations to quickly extract valuable insights, helping them make strategic decisions on how to allocate their innovation resources best (Kakatkar et al., 2020). Fast-paced advancements in natural language processing (NLP) also play a key role in allowing AI to detect early-stage creative opportunities autonomously and spot emerging trends (Just, 2024). Furthermore, AI can efficiently organize and assess crowdsourced ideas, ensuring that the most innovative and creative solutions are chosen (Just, 2024). The capability of AI to enhance and actively engage in design thinking by offering critical insights highlights its disruptive influence in the field of innovation (Micheli et al., 2019).



2.3 SYSTEMATIC LITERATURE REVIEW ON USING GENAI CREATIVITY AND INNOVATION IN THE DEVELOPMENT OF BUSINESS MODELS

2.3.1 PRISMA PROTOCOL

The PRISMA methodology, which stands for “Preferred Reporting Items for Systematic Reviews and Meta-Analyses,” was first introduced in 2009 to provide researchers with a structured set of guidelines for conducting systematic literature reviews, critical analyses, and meta-analyses (Moher et al., 2009). Its primary purpose was to assist in the transparent reporting of review objectives, methodologies, and findings, enhancing the rigor and reliability of systematic reviews (Moher et al., 2009).

Over the past decade, advancements in systematic review methods and terminology have prompted an update to these guidelines. The PRISMA 2020 statement replaces the original, incorporating updated recommendations to reflect these developments and improve processes for identifying, selecting, appraising, and synthesizing studies (Page, 2021). By standardizing reviews across disciplines, the PRISMA protocol promotes consistency and reduces bias through precise, reliable screening processes. However, it also has limitations, such as its lack of temporal flexibility, as studies published after the initial Boolean searches may not be captured (Page et al., 2022).

2.3.2 PRISMA EXECUTION

This section provides the theoretical background for the two topics under investigation. Based on this foundation, key terms were identified to formulate a search string to locate pertinent scientific articles. The objective is to gain a comprehensive understanding of the current advancements in applying artificial intelligence, creativity, and innovation to business models.

The proposed research aims to address the following questions (Table 2.1):

Table 2.1 – Systematic Review’s Research Questions

SLRQ1	What is the current status of research on GenAI driving creativity and innovation in business models?
SQLQ2	What are the major issues of using GenAI in creativity and innovation?
SLRQ3	What AI techniques are currently valuable for creativity and innovation?
SLRQ4	What are the advantages of applying GenAI techniques in creativity and innovation?



The most pertinent studies in this area have been selected to address this topic and ensure its alignment with the PRISMA guidelines. The search was conducted using a carefully selected set of keywords deemed most relevant to the concepts analyzed in the theoretical framework. Only English terms were used in the search, resulting in predominantly English-language articles. Articles in languages other than English were excluded from the selection process, in accordance with the PRISMA methodology criteria. The keywords utilized include:

Table 2.2 – Systematic Review’s Keywords

Keywords	Creativity and Innovation	Business Models	Generative Artificial Intelligence
	Creativity	Business	Generative Artificial Intelligence
	Innovation	Business Models	Generative AI
	Ideation	Business Model Canvas	Gen AI
	-	Business Strategy	GEN-AI

A tailored search string was created to identify the aforementioned words and terms across articles and the abstracts, titles, or keywords of other scientific publications. This selection of terms ensured that the search results would yield relevant data to the topics under investigation:

(“Creativity” OR “Innovation” OR “Ideation”) AND (“Business” OR “Business Models” OR “Business Model Canvas” OR “Business Strategy”) AND (“Generative Artificial Intelligence” OR “Generative AI” OR “Gen AI” OR “GEN-AI”)

It is essential to note that, in addition to searching for keywords explicitly related to Generative AI, creativity, and innovation in business models, a Boolean query should incorporate terms directly linked to the research questions. This approach aimed to identify articles addressing the issues under investigation. The search was carried out in December 2024 using the following scientific information resource databases:

Table 2.3 – Systematic Review’s Resource Databases

Resource Database	Resource URL
Scopus	https://www.scopus.com/home.uri
Web of Science	https://www.webofknowledge.com/
IEEE Xplore	https://ieeexplore.ieee.org/Xplore/home.jsp

Following the PRISMA methodology, the next step was to define the inclusion and exclusion criteria for the articles in the mentioned search (Table 2.4). The inclusion criteria required that the articles demonstrate evidence of Generative AI's utilization in fostering creativity and innovation in the development of business models. Furthermore, the selected articles needed to be peer-reviewed from academic journals or conference proceedings and written in English to ensure reliability and accessibility. Additionally, only studies published between 2020 and 2025 were considered, focusing on recent advancements and trends in the field. Moreover, only articles with full access



were included in the review, as this allowed for a thorough evaluation of their content, ensuring that all selected studies could be thoroughly analyzed for relevance and quality.

Table 2.4 – Systematic Review’s inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Any scientific article showing evidence of GenAI utilization in creativity and innovation of business models	Reason 1: Articles published before 2020
The paper must be a peer-reviewed conference or journal paper written in English	Reason 2: Articles not in English
The paper is published between 2020 and 2025	Reason 3: Non-academic or non-scientific papers (e.g., websites, magazine reports, newspapers, consulting articles, books, citations)
	Reason 4: Papers with titles outside the scope of this work
	Reason 5: Papers with titles or abstracts focusing on Generative AI creativity but not on business
	Reason 6: Not available as full text

During the identification stage of the PRISMA process, a predefined search string was applied across three academic databases: Scopus, Web of Science, and IEEE. This query yielded 131 articles from Scopus, 182 from Web of Science, and 134 from IEEE. Following this initial retrieval, 59 duplicate records were removed during the screening phase.

The remaining publications were then assessed using predefined exclusion criteria. Only two studies were excluded because they were published before 2020, underscoring the topic's contemporaneity, with the majority of research emerging from 2024 onward. Additionally, five studies were removed because they were not written in English, and 77 records were excluded for failing to meet academic or scientific publication standards. A further 217 articles were excluded for being unrelated to the research topic, and 11 were excluded because their titles did not clearly connect generative AI to business models.

When titles did not provide sufficient clarity, abstracts were screened to confirm relevance. By the end of this phase, all remaining studies were written in English and peer-reviewed, eliminating the need for further exclusions. Consequently, 27 articles advanced to the eligibility stage.

During eligibility assessment, each full text was analyzed in detail to verify its scientific contribution and alignment with the research objectives. Ultimately, 14 journal articles and two conference papers were deemed suitable for inclusion in the final review.



This process is represented in the following workflow diagram (Figure 2.2):

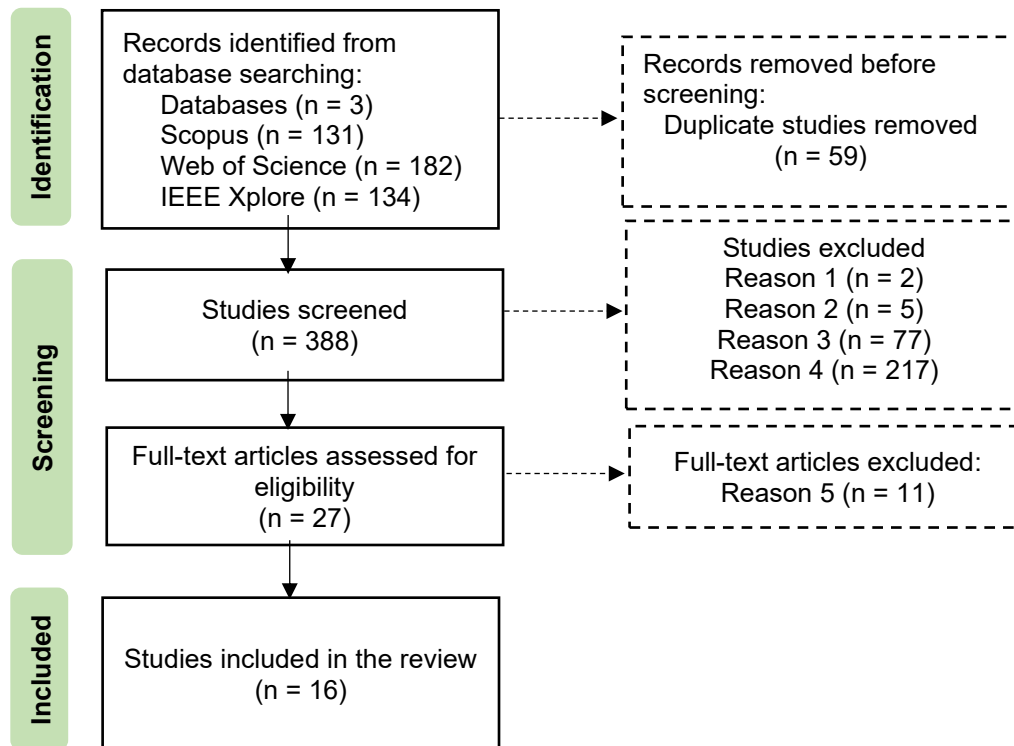


Figure 2.2 – PRISMA flowchart.

The following table (Table 2.5) provides a brief characterization of the 14 journal articles and two conference papers included in the final phase of the PRISMA protocol.

Table 2.5 – Systematic Literature Review’s output

#	Authors	Title	Contribution	Pub. Type
1	(A & A, 2024)	Generative AI: A Transformative Force in Business Intelligence	Demonstrates how GenAI improves predictive analytics, automates reporting, enhances personalization, and drives innovation in Business Intelligence (BI). Emphasizes the need for ethical data governance and rigorous frameworks to maximize these benefits while mitigating risks.	Conference paper
2	(AL-Khatib, 2024)	Prioritizing factors for generative artificial intelligence-based innovation adoption in hospitality industry	It uses the TOE framework to identify drivers of GenAI adoption in the hospitality industry. Key factors include relative advantage, organizational readiness, and competitive pressures, with technological complexity as a barrier. The paper highlights	Journal article



#	Authors	Title	Contribution	Pub. Type
			GenAI's role in personalization and operational efficiency.	
3	(Carayannis et al., 2024)	Empowering SMEs "Harnessing the Potential of Gen AI for Resilience and Competitiveness"	Investigate the transformative potential of GenAI for small and medium enterprises (SMEs), focusing on enhancing resilience and competitiveness. Discusses strategic AI integration, associated challenges, and policy recommendations.	Journal article
4	(Hao et al., 2024)	Exploring collaborative decision-making: A quasi-experimental study of human and Generative AI interaction	This paper examines the synergistic effects of human intelligence (HI) and GenAI in collaborative decision-making. It highlights AI's role in reducing cognitive burdens and mitigating biases while emphasizing transparency and accountability in AI-human collaboration frameworks.	Journal article
5	(Holmström & Carroll, 2024)	How organizations can innovate with generative AI	Introduces a typology of four innovation strategies (e.g., Assisted Augmentation) to harness GenAI effectively. Provides practical insights for aligning innovation objectives with appropriate strategies for business growth.	Journal article
6	(Joosten et al., 2024)	Comparing the Ideation Quality of Humans with Generative Artificial Intelligence	Conducts a comparative analysis of ideas generated by human professionals and GenAI, finding AI ideas often score higher in novelty and customer benefit. Offers insights on integrating AI into creative processes for improved ideation outcomes.	Journal article
7	(Kanbach et al., 2024)	The GenAI is out of the bottle: generative artificial intelligence from a business model innovation perspective	Examines GenAI's transformative impact on business model innovation (BMI) with six propositions and three industry examples. Emphasizes GenAI's role in value creation, new proposition innovation, and evolving skill requirements for integrating emerging technologies into businesses.	Journal article
8	(Kostis et al., 2024)	Too Much AI Hype, Too Little Emphasis on Learning? Entrepreneurs Designing Business Models Through Learning-	Explores "learning-by-conversing" as a novel approach for integrating GenAI in entrepreneurial processes, complementing traditional business model development methods.	Journal article



#	Authors	Title	Contribution	Pub. Type
		by-Conversing with Generative AI	Presents reflexive and confirmatory learning modes and proposes a generative startup methodology.	
9	(M. Mariani & Dwivedi, 2024)	Generative artificial intelligence in innovation management: A preview of future research developments	Identifies ten key research themes for GenAI's role in innovation management, including its effects on creativity, intellectual property, and regulatory frameworks. Provides a roadmap for future research developments at the intersection of GenAI and innovation management.	Journal article
10	(Marshall et al., 2024)	How generative AI will drive enterprise innovation	Analyzes how GenAI fuels innovation across operational, product, and business model dimensions. It highlights a fragmented investment landscape but underscores GenAI's potential to impact ROI and innovation strategies in enterprises significantly.	Journal article
11	(Paliwal et al., 2024)	Accelerating Time-to-Market: The Role of Generative AI in Product Development	Explores how GenAI accelerates product development by automating design, prototyping, and predictive analytics. Discusses case studies showcasing reduced development timelines, improved workflows, and enhanced innovation strategies.	Conference paper
12	(Piller et al., 2024)	Generative AI, Innovation, and Trust	Proposes a framework for assessing trust in AI-generated outcomes for innovation processes. Differentiates between general and task-specific models and examines their implications for innovation performance.	Journal article
13	(Roberts & Candi, 2024)	Artificial intelligence and innovation management: Charting the evolving landscape	Surveys managers to examine AI's role in innovation processes, revealing widespread use in the development stage over idea generation. Contrasts generative AI with traditional AI, highlighting its potential for enriching employee satisfaction and transforming the innovation landscape.	Journal article
14	(Singh et al., 2024)	Applications of generative AI and future organizational performance: The mediating role of	Highlights how GenAI improves organizational performance through exploratory and exploitative innovation, moderated by ethical dilemmas and environmental	Journal article



#	Authors	Title	Contribution	Pub. Type
		explorative and exploitative innovation and the moderating role of ethical dilemmas and environmental dynamism	dynamism. Uses a PLS-SEM model to validate relationships between GenAI adoption, innovation capabilities, and future performance.	
15	(Sundberg & Holmström, 2024)	Innovating by prompting: How to facilitate innovation in the age of generative AI	Explores how LLMs support innovation through mechanisms like summarization and classification. Offers practical guidance on scaling projects and employing prompt engineering to maximize innovation potential.	Journal article
16	(Yudhistyra & Srinuan, 2024)	Exploring the Acceptance of Technological Innovation Among Employees in the Mining Industry: A Study on Generative Artificial Intelligence	Investigates the factors influencing GenAI adoption in the mining sector. Key drivers include attitude, perceived usefulness, and managerial support, with minimal influence from company size. Highlights significant theoretical and managerial implications in fostering technological innovation acceptance.	Journal article

2.3.3 RESULTS ANALYSIS

After gathering the necessary information for the study and adhering to the PRISMA Protocol methodology, as detailed in the previous section, the next step is to analyze the research results. This entails examining each selected article to identify its primary contributions and to extract insights that address the systematic literature review questions.

SLRQ1 - What is the current status of research on GenAI driving creativity and innovation in business models?

Generative AI profoundly impacts sectors such as art, entertainment, healthcare, and finance (A & A, 2024). In creative industries, it is transforming content creation by empowering artists, writers, and musicians to explore new artistic possibilities, collaborate with intelligent systems, and push the boundaries of creativity beyond human limitations (Carayannis et al., 2024). However, despite its transformative potential, innovation managers in 2021 still viewed AI as less critical for idea generation than for areas such as data analytics. At the time, they believed humans would retain an edge in creativity for the next 5-10 years (Joosten et al., 2024).

More recently, understanding how entrepreneurs can harness GenAI as a digital innovation resource has become timely and essential. With AI playing an increasingly



central role in driving innovation, GenAI is now positioned as a business mentor, offering valuable support and guidance to entrepreneurs (Kostis et al., 2024).

While AI has traditionally been associated with saving time and reducing manufacturing costs, it redefines innovation processes across industries. For instance, GenAI, including transformer-based language models, significantly enhances the capabilities of human innovation teams. These systems support creative, analytical, and decision-making tasks, making them invaluable for generating ideas and creating content. Moreover, their versatility spans multiple formats, including text, images, videos, and audio (A & A, 2024; Hao et al., 2024; Joosten et al., 2024; Kanbach et al., 2024; M. Mariani & Dwivedi, 2024; Roberts & Candi, 2024).

The transformative power of GenAI has sparked significant interest in its use for fostering exploratory innovation (M. Mariani & Dwivedi, 2024). By employing GenAI for tasks such as text summarization and generating ideas, innovation teams can work more effectively, tackling complex challenges while producing novel and impactful ideas. This capability highlights how GenAI can significantly improve innovation outcomes and help teams drive creativity forward (Roberts & Candi, 2024). As a result, many organizations are now strategically aligning their resources to maximize their investments in GenAI (Singh et al., 2024).

Beyond improving innovation processes, GenAI is also reshaping business models, particularly in sectors that rely on rapid product development. Its integration enables companies to optimize workflows, automate complex tasks, and accelerate prototyping. This has significantly reduced development time and costs (Paliwal et al., 2024; Roberts & Candi, 2024). In fact, over the past few years, organizations have seen a noticeable surge in adopting GenAI, which has fuelled impactful growth (M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Singh et al., 2024).

For example, some companies report that using GenAI has reduced their time-to-market for specific activities by up to 75%. Its adoption has become so widespread that over 80% of Fortune 500 companies now use generative AI applications, illustrating its potential to revolutionize entire industries (Paliwal et al., 2024)

However, while the adoption of GenAI continues to grow, research on its role in innovation management remains limited and fragmented. There is still much to uncover about how this dynamic process evolves and how GenAI can be optimally leveraged to enhance learning and innovation processes. Addressing these gaps is critical for unlocking AI's full potential in transforming business and innovation (AL-Khatib, 2024; Roberts & Candi, 2024).

SLRQ2 - What are the major issues of using GenAI in creativity and innovation?



Using GenAI in creativity and innovation holds transformative potential, but it also presents several significant challenges. These challenges are not isolated; they cut across many articles analyzed, highlighting recurring themes and concerns. By examining these issues collectively, it becomes evident that the opportunities offered by GenAI are accompanied by complex questions that require thoughtful consideration.

One primary issue lies in the ethical and regulatory concerns associated with its use. Organizations must navigate concerns about bias, misuse, and accountability (Carayannis et al., 2024; Joosten et al., 2024; Paliwal et al., 2024; Roberts & Candi, 2024; Singh et al., 2024), as the unpredictable nature of AI-generated outputs increases the importance of strong ethical and regulatory frameworks (A & A, 2024; Singh et al., 2024).

Managers are responsible for ensuring AI's responsible use, focusing on transparency, accountability, and bias mitigation (A & A, 2024; Roberts & Candi, 2024; Sundberg & Holmström, 2024), as the misuse of GenAI can lead to biased innovation outcomes, such as the creation of misinformation, deepfakes, or could be used for cyber-attacks that benefit only select groups while disadvantaging others (A & A, 2024; Kanbach et al., 2024; M. Mariani & Dwivedi, 2024).

Data quality is another challenge that arises, as GenAI requires large and diverse volumes of high-quality data to function effectively because the results can be inaccurate, biased, or suboptimal, limiting its ability to enhance creativity or drive innovation in a meaningful way (Hao et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Paliwal et al., 2024)

This leads us to another challenge: striking a balance between efficiency and depth in idea generation. While AI-based ideation processes are often more efficient, they still require significant time; even brief ideation sessions with a group of five to ten managers can take at least half a day (Joosten et al., 2024).

Another important factor to consider is the hallucinations and inconsistencies in GenAI outputs, which necessitate the implementation of guardrails to ensure their relevance and alignment with the entrepreneur's goals (Kostis et al., 2024).

Moreover, the feasibility of AI-generated ideas tends to be relatively low, underscoring the importance of human professionals in refining and developing the most promising concepts (Joosten et al., 2024), which may lead to resistance from teams as they are accustomed to conventional methods (Carayannis et al., 2024; Paliwal et al., 2024; Roberts & Candi, 2024).

This hesitation can hinder the adoption of AI-driven approaches, potentially resulting in limited and slow progress (AL-Khatib, 2024; Paliwal et al., 2024). In fact, organizations must invest in the necessary technological infrastructure and develop



the human expertise required to interpret and utilize AI outputs effectively (Holmström & Carroll, 2024; Kanbach et al., 2024; Piller et al., 2024).

However, the computational demands of generative AI, particularly during training and deployment, create accessibility challenges. Small and medium-sized enterprises may struggle to fully harness GenAI's potential due to the high costs associated with computational resources (Carayannis et al., 2024; Hao et al., 2024; Paliwal et al., 2024; Yudhistyra & Srinuan, 2024).

Additionally, as generative AI automates aspects of the creative process, it risks traditional jobs due to automation, leading to concerns about workforce sustainability (Carayannis et al., 2024; Paliwal et al., 2024).

SLRQ3 - What Generative AI techniques are currently valuable for creativity and innovation?

Many generative AI techniques have emerged as transformative tools for creativity and innovation, with various methods and techniques proving particularly valuable across multiple domains.

Probably the most well-known LLMs, such as ChatGPT and Bard, are central to this transformation because they enable the generation of novel content, including text, audio, video, and images, as already said, and are widely recognized for their utility in ideation and problem-solving (Holmström & Carroll, 2024; Joosten et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Roberts & Candi, 2024).

Generative Adversarial Networks (GANs) are another significant technique widely used for synthesizing realistic images, datasets, and other visual content, and these capabilities are particularly valuable in predictive modeling and creative design tasks, where GANs can enhance the quality and realism of outputs (A & A, 2024; Holmström & Carroll, 2024; M. Mariani & Dwivedi, 2024). Similarly, multimodal models, which process and integrate diverse data types such as text, images, and audio simultaneously, are instrumental in expanding creative possibilities and fostering innovation (M. Mariani & Dwivedi, 2024; Roberts & Candi, 2024).

Additionally, diffusion models have also gained prominence for generating high-quality images and designs through iterative refinement, which is especially relevant for artistic and visual applications (M. Mariani & Dwivedi, 2024). In addition, advanced Natural Language Processing (NLP) techniques within LLMs support text generation, ideation, and the identification of emerging trends, further driving creative and innovative processes (Carayannis et al., 2024; Joosten et al., 2024; M. Mariani & Dwivedi, 2024).

Automated prototyping is another valuable application of generative AI, as it facilitates rapid iteration in design cycles, significantly reducing the time and resources required to develop innovative solutions (Holmström & Carroll, 2024; Roberts & Candi, 2024).



Similarly, synthetic data generation provides an efficient means for testing business models and validating ideas in controlled environments, enabling faster iteration and reduced reliance on real-world testing (Kostis et al., 2024; Sundberg & Holmström, 2024).

Generative AI fosters creative rationality by leveraging large datasets to identify unconventional solutions and enhance iterative design processes. This capability, described as enabling "creative rationality," allows users to explore a broader range of possibilities and refine their ideas systematically (Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Roberts & Candi, 2024). Techniques such as in-dialogue ideation, where users interact with AI in conversational formats to generate and refine ideas, are particularly valuable in the early stages of innovation (Holmström & Carroll, 2024; Kostis et al., 2024).

Finally, it is essential to note that domain-specific models tailored to particular industries or applications are increasingly significant. These expert models, trained on niche datasets, outperform general-purpose models in delivering precise and impactful solutions (M. Mariani & Dwivedi, 2024; Roberts & Candi, 2024).

SLRQ4 - What are the advantages of applying generative AI techniques in creativity and innovation?

One of the most prominent advantages of applying GenAI is its ability to catalyze creativity and ideation by generating novel and unconventional outputs, particularly beneficial during the brainstorming phase, where "hallucinations" or seemingly inaccurate outputs from GenAI can spark ideas that might not occur through traditional human creativity by simulating various scenarios and offering alternative perspectives, facilitating innovative thinking and the exploration of uncharted territories (A & A, 2024; M. Mariani & Dwivedi, 2024; Piller et al., 2024).

In addition to sparking creativity, GenAI enhances productivity by automating routine tasks while augmenting human capabilities. For instance, tools like ChatGPT and DALL-E allow users to quickly draft, summarize, or create prototypes, freeing time for individuals to focus on higher-level, strategic work. This synergy of automation and augmentation not only streamlines workflows but also improves creative depth, enabling professionals to iterate and refine ideas more efficiently (Holmström & Carroll, 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024).

Furthermore, GenAI accelerates product and service innovation by reducing development time. In industries such as pharmaceuticals, drug discovery is transformed through the optimization of molecule design and research processes, significantly decreasing time-to-market. Similarly, its application in manufacturing, software development, and other sectors emphasizes its ability to modernize traditional workflows and enhance operational efficiency (AL-Khatib, 2024; M. Mariani & Dwivedi, 2024).



Generative AI also plays a key role in personalizing customer experiences. By analyzing vast datasets, it predicts customer preferences and behaviors, enabling businesses to create tailored solutions that meet their needs. GenAI designs personalized marketing campaigns and services for industries such as hospitality and retail, enhancing customer satisfaction and loyalty. This focus on customer-centric innovation has proven to be a significant driver of value creation (AL-Khatib, 2024; Yudhistyra & Srinuan, 2024).

Moreover, GenAI facilitates business model innovation by allowing organizations to reimagine their strategies and operations. It provides insights that uncover new revenue streams, optimize cost structures, and foster agility in adapting to changing market dynamics. This adaptability enables businesses to remain competitive while exploring innovative approaches to value delivery (Kanbach et al., 2024; Kostis et al., 2024).

GenAI also enhances collaboration and dynamic engagement by serving as an intelligent partner in ideation and decision-making. By enabling "learning-by-conversing," GenAI encourages teams and entrepreneurs to use AI tools to refine strategies and foster diverse perspectives. This iterative feedback loop enriches innovation and supports informed decision-making (Kostis et al., 2024; Yudhistyra & Srinuan, 2024).

A notable advantage of GenAI is its ability to lower barriers to innovation by democratizing access to advanced tools. This enables smaller organizations and individuals to participate in creative ecosystems previously dominated by large corporations with significant resources. Its intuitive interfaces and cost-effective solutions empower a broader audience to contribute meaningfully to innovation (Holmström & Carroll, 2024; Kanbach et al., 2024).

GenAI also transforms the innovation process by integrating data-driven insights with creative exploration. Its ability to identify patterns and generate unique solutions reshapes traditional innovation methods, making the process more systematic and impactful (A & A, 2024; M. Mariani & Dwivedi, 2024).

In conclusion, Generative AI is a powerful enabler of creativity and innovation. Automating routine tasks, personalizing customer experiences, and driving business model transformation significantly augment human capabilities while democratizing access to advanced technologies. Its applications span a range of industries, from pharmaceuticals to media, illustrating its potential to revolutionize how we create, innovate, and deliver value in the modern era (AL-Khatib, 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024).



3 METHODOLOGY

The primary goal of this dissertation is to develop a conceptual framework for leveraging generative AI in enhancing creativity and innovation within business models. The Design Science Research (DSR) methodology is the most suitable approach for achieving this goal because it focuses on combining various elements to construct an artifact. A conceptual model qualifies as an artifact because it is designed to address a specific problem or enhance existing solutions (Simon, 2008). Through the construction of this model, a tangible solution is created, which can subsequently be implemented and assessed. This process aligns directly with the principles of design science research methodology.

3.1 DESIGN SCIENCE RESEARCH

Design Science Research (DSR) has become a widely employed methodology in Information Systems (IS) research, aiming to develop and evaluate innovative IT artifacts. These artifacts address practical problems while advancing scientific knowledge (Rai, 2017; Vom Brocke et al., 2020). To guide the appropriate conduct, presentation, and evaluation of DSR, Peffers et al. (2007) proposed a widely recognized framework. Their approach outlines a structured process consisting of several interconnected steps. The process begins with identifying a relevant real-world problem and establishing clear objectives for the solution. Next, it involves designing and developing the artifact, demonstrating its application in a practical context, and concluding with an evaluation of its effectiveness. Finally, the findings and insights are communicated to contribute to practice and academic discourse (Peffers et al., 2007). This systematic approach ensures that DSR outcomes are rigorously validated and have a practical impact.

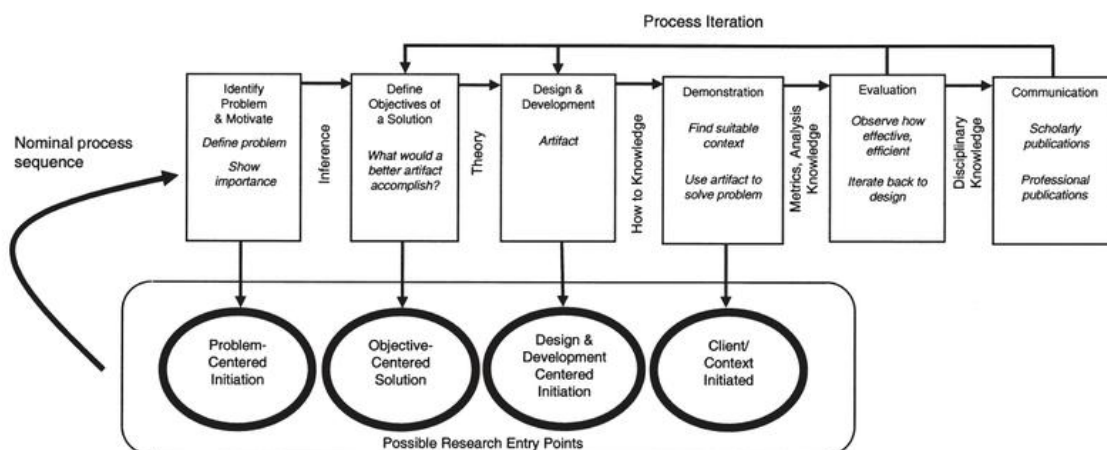


Figure 3.1– DSRM process model
Source: Peffers et al. (2007)



The Design Science Research model consists of six phases:

- **Problem Identification and Motivation:** The initial phase aims to pinpoint a problem that lends itself to resolution through research. This problem should address existing knowledge gaps and solve practical, real-world challenges. Moreover, it is crucial in this phase to establish the significance of the problem by situating it within a broader context. This involves clearly articulating the reasons and motivations behind the need to address the issue, highlighting its relevance and importance.
- **Objectives Definition:** The objectives for developing a new or improved artifact are established based on insights gathered during the initial phase. As illustrated in Figure 3.1, these objectives should be drawn from the findings of the first phase and, where applicable, from documented prior work. This prior work may offer opportunities for refinement or reengineering, guiding the formulation of objectives for the artifact's design and development.
- **Design and Development:** The artifact integrates existing knowledge and newly acquired insights. The methodology employed during this phase can differ depending on the nature of the artifact being created. It is essential to select an approach that best aligns with the specific requirements and characteristics of the artifact under design.
- **Demonstration:** Once the artifact has been designed, its usability must be assessed by applying it within an appropriate context. This involves utilizing the artifact to address a specific, pre-identified problem, thereby evaluating its practical effectiveness and relevance.
- **Evaluation:** During this phase, the artifact is evaluated to determine its effectiveness and efficiency. Feedback is gathered from various sources, including experts in the relevant field, as well as by analyzing outcomes from the demonstration phase. This assessment provides valuable insights that can guide further refinement or redesign of the artifact. If necessary, the process can be revisited, returning to the design and development stage to implement improvements and enhance the artifact's performance.
- **Communication:** In the final phase, the research findings are disseminated through publication, ensuring they contribute to the existing body of knowledge while offering an artifact suitable for practical application in real-world scenarios. Additionally, sharing these results



enables other researchers to review the work critically and build upon it. This collaborative effort can lead to further iterations, incorporating improved objectives or alternative design approaches to enhance the artifact's utility and impact.

The artifact created during a DSR process must address the problem identified in the initial phase, providing both a theoretical solution and practical applicability as an object or process deployable in real-world scenarios (Hevner et al., 2004). In this research, the implementation framework being developed serves as such an artifact. It allows companies to evaluate and enhance their current practices while contributing to the broader understanding of generative AI adoption in business models. This framework represents an initial instantiation intended to undergo further refinement and evolution through iterative contributions from other researchers.

3.2 METHODOLOGY IMPLEMENTATION

This research will incorporate the key components necessary to conduct a Design Science Research methodology effectively. These components, as mentioned before, include **1)** identifying a relevant problem, **2)** defining the objectives required to develop an effective solution to that problem, **3)** designing and creating an artifact that fulfills these objectives, **4)** presenting a fictional use case to illustrate the implementation of specific steps within the framework and demonstrate its intended functionality, **5)** evaluating the artifact to assess its usability and feasibility, and **6)** sharing the knowledge gained through publication, thereby highlighting its contribution to the GenAI and Business research field (Collatto et al., 2018).

Given this study's time constraints, conducting a comprehensive case study with a real-world company falls outside its scope. Consequently, the demonstration phase has been adapted to include a fictional use case in this research. The phases to be addressed are depicted in Figure 3.2.

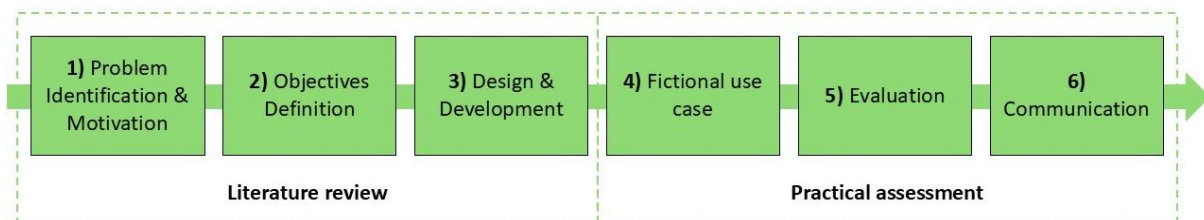


Figure 3.2 – Research process.
Adapted from Peffers et al. (2007)



Problem Identification & Motivation

Section 1.1 has demonstrated the need for a framework to assess the adoption of GenAI creativity and innovation into business models. Not only do multiple researchers highlight this research gap and call for more practical solutions, but companies are also increasingly required to be more accountable and transparent in their resource use. The increased use of information technology could undermine this goal, making it even more critical to provide practical guidance on using technology sustainably. This provides the context, demonstrates the need for this research, and is used as the basis for the definition of the objective and the development of the conceptual framework.

Objectives Definition

Section 1.2 describes the objectives and research questions for this study. The objectives include designing a framework to evaluate the use of GenAI in business models, conducting a comprehensive study on the role of Generative AI in enhancing creativity, and exploring case studies of businesses using it for creative innovation in their business models.

Design and development

The artifact will be created at this stage. An essential requirement for designing an effective and efficient assessment tool is a clear understanding of the desired solution outcome. Hence, a thorough examination of the state-of-the-art research on GenAI and Business models is needed. Therefore, a literature review will summarize the existing knowledge in this scientific area, as well as the standard assessment models and their intersection in the scientific literature. This means collecting characteristics instead of testing hypotheses, so that this research will be qualitative (Kohlegger et al., 2009).

Fictional Use Case

To demonstrate the validity and usability of the framework developed, a theoretical example is presented to illustrate how the steps are intended to be carried out when utilizing GenAI in business models. As a real case study is not within the scope of this work, it is not practicable to demonstrate the thorough development and use of the framework, which requires detailed adaptation to a specific company setting and strategy. Therefore, only examples are chosen to demonstrate the use of the framework in the context of a fictional use case, testing and validating its functionality.

Evaluation

After the initial testing in a fictional use case, the artifact will be challenged by talking to experts from relevant scientific and practical fields, such as Generative AI, IT Systems and Business. This evaluation is essential to ensure that the research output achieved the objectives developed in phase two (Collatto et al., 2018) and can be used



to make necessary improvements and draw limitations. Conducting interviews as an evaluation method is a standard tool to validate the artifact design and collect feedback on its efficiency and effectiveness (Cleven et al., 2009). Given that this artifact should also apply to non-expert people, the interviewee selection will focus on participants from expert fields and potential company users. This will help validate the artifact better in terms of its accuracy and usability (Sari et al., 2021). If feasible within the context of this work, feedback from the interviews will be considered to present a revised second version of the artifact. The final artifact will then fulfill all the conditions necessary to be tested in actual companies, thereby making its contribution to practice and society. However, as mentioned previously, an exact case application of the framework remains outside the scope of this work.

Communication

In conclusion, the findings and contributions of this research will be made publicly accessible through publication and presentation to an academic committee for evaluation. Sharing the research with the broader academic community is essential to achieving its intended theoretical contribution. Making the outcomes of this study available aims to provide a foundation for other researchers to build upon and advance future studies, leveraging the insights and results presented here.





4 PROPOSAL

4.1 ASSUMPTIONS

The systematic literature review and the analysis of the collected information provided key insights for developing the framework. Building on the findings from Chapter 2, which examined the use of Generative AI in Business Models, the following assumptions will serve as the foundation for constructing the framework.

As GenAI continues to transform industries, its integration into business models reshapes how companies create, deliver, and capture value. The BMC framework (Osterwalder & Pigneur, 2010) provides a structured approach to analyzing these changes.

Customer Segmentation

Generative AI redefines customer segmentation by enabling businesses to create hyper-personalized experiences based on AI-driven insights. With its ability to analyze vast customer behavior data, AI tailors offerings to specific demographic, geographic, and psychographic profiles (Holmström & Carroll, 2024; Yudhistyra & Srinuan, 2024).

Furthermore, AI-powered tools enable predictive modeling, allowing businesses to anticipate customer needs and identify emerging trends in real-time (Marshall et al., 2024). This proactive approach helps organizations tap into new market opportunities and develop niche products that cater to previously underserved customer segments (Kanbach et al., 2024).

Value Proposition

The integration of GenAI significantly enhances the value proposition by automating ideation, facilitating product development, and enabling continuous innovation (M. Mariani & Dwivedi, 2024). AI-driven tools, such as large language models (LLMs) and generative adversarial networks (GANs), enable businesses to rapidly prototype, refine, and launch new products (Holmström & Carroll, 2024).

In the creative industries, GenAI transforms content creation by allowing businesses to generate text, images, music, and video that align with customer preferences (Carayannis et al., 2024). Similarly, AI's predictive analytics capabilities help organizations refine their value propositions based on real-time consumer insights (Singh et al., 2024).



Channels

GenAI enhances how businesses interact with customers by automating communication channels and optimizing outreach strategies (Joosten et al., 2024). AI-driven chatbots and voice assistants provide real-time, personalized customer support, significantly improving engagement efficiency (Roberts & Candi, 2024).

Furthermore, AI-powered content generation allows businesses to dynamically create marketing materials, social media posts, and promotional campaigns tailored to specific audiences (M. Mariani & Dwivedi, 2024). Advanced multimodal models enhance digital experiences by integrating text, image, audio, and video content into marketing efforts (A & A, 2024).

Customer Relationships

AI-powered tools facilitate intelligent, personalized customer interactions, enhancing relationships through real-time sentiment analysis and AI-driven customer insights (Holmström & Carroll, 2024).

GenAI enables businesses to predict customer sentiment, identify pain points, and provide proactive solutions, fostering deeper engagement (Kostis et al., 2024). Conversational AI tools further support relationship-building by engaging users in dynamic, adaptive dialogues and refining services based on ongoing feedback (Joosten et al., 2024).

Revenue Streams

GenAI diversifies revenue streams by enabling businesses to monetize AI-driven capabilities such as subscription-based AI tools, personalized AI-driven services, and synthetic data licensing (Marshall et al., 2024).

For example, AI-generated content, including automated design solutions, digital artwork, and AI-curated reports, has created new revenue opportunities for businesses across various industries (Carayannis et al., 2024). Additionally, AI-enhanced dynamic pricing models allow businesses to optimize their pricing strategies in response to real-time demand fluctuations (Singh et al., 2024).

Key Resources

Businesses increasingly rely on AI infrastructure, large datasets, and domain-specific AI models as key resources (Holmström & Carroll, 2024). The demand for specialized AI talent, such as data scientists and AI ethics specialists, has surged as companies invest in AI integration (Kanbach et al., 2024).

Additionally, proprietary AI models trained on industry-specific data sets are becoming strategic assets, giving businesses a competitive edge (M. Mariani & Dwivedi, 2024).



Key Activities

GenAI is reshaping business activities by automating product development, content generation, and business analysis (Paliwal et al., 2024). AI facilitates automated brainstorming sessions, generating innovative ideas based on historical data and emerging trends (Joosten et al., 2024).

Additionally, AI-powered prototyping accelerates the development cycle, thereby reducing time-to-market (Holmström & Carroll, 2024).

Key Partnerships

Businesses are increasingly relying on strategic AI partnerships to access cutting-edge AI tools, datasets, and cloud-based AI solutions (Roberts & Candi, 2014). Partnerships with AI research institutions and technology firms are essential for staying ahead in AI-driven innovation (Paliwal et al., 2024).

Cost Structure

While AI adoption brings high upfront costs, it reduces operational expenses through automation (Joosten et al., 2024). Businesses must invest in AI infrastructure, data acquisition, compliance, and workforce training to harness AI's full potential (Paliwal et al., 2024).

According to the systematic literature review, the following table (Table 4.1) highlights GenAI's roles across the various blocks of the Business Model Canvas. It is possible to identify patterns in the roles mentioned across the studies included in the review, demonstrating the significant impact that GenAI can have on the different components of the BMC.

In summary, integrating GenAI into business models is transforming the way companies operate, innovate, and interact with customers. This discussion connects the key roles of GenAI to each BMC block, drawing on insights from recent studies identified through a systematic literature review, as reflected in the table below.



Table 4.1 – Role of GenAI Identified in the Systematic Literature Review

The Role of Generative Artificial Intelligence						
Blocks / Roles	Creativity (Ideation)	Decision-making	Planning	Automation/Optimization	Governance	
Business Model Canvas	Key partners	-	X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Holmström & Carroll, 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Sundberg & Holmström, 2024)	X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Holmström & Carroll, 2024; Kostis et al., 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Sundberg & Holmström, 2024)	X (Paliwal et al., 2024)	-
	Key activities	X (AL-Khatib, 2024; Carayannis et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Roberts & Candi, 2024; Singh et al., 2024; Sundberg & Holmström, 2024)	X (A & A, 2024; Hao et al., 2024)	-	X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Hao et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Roberts & Candi, 2024; Singh et al., 2024; Sundberg & Holmström, 2024)	-
	Key resources	-	-	-	X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Hao et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Roberts & Candi, 2024; Singh et al., 2024; Sundberg & Holmström, 2024)	X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Carayannis et al., 2024; Hao et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Roberts & Candi, 2024; Singh et al., 2024; Sundberg & Holmström, 2024)



The Role of Generative Artificial Intelligence					
Blocks / Roles	Creativity (Ideation)	Decision-making	Planning	Automation/Optimization	Governance
					Roberts & Candi, 2024; Singh et al., 2024; Sundberg & Holmström, 2024)
Value propositions	X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Roberts & Candi, 2024; Singh et al., 2024; Sundberg & Holmström, 2024)	X (Hao et al., 2024; Holmström & Carroll, 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Piller et al., 2024; Sundberg & Holmström, 2024)	X (Hao et al., 2024)	X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Joosten et al., 2024; Kanbach et al., 2024; Paliwal et al., 2024; Roberts & Candi, 2024; Singh et al., 2024)	-
Customer relationship	X (Paliwal et al., 2024)	X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Hao et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Piller et al., 2024; Singh et al., 2024; Sundberg & Holmström, 2024)	X (Piller et al., 2024)	X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Hao et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Singh et al., 2024; Sundberg & Holmström, 2024)	-
Customer segments		X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Holmström & Carroll, 2024; Kanbach et al., 2024; Kostis et al., 2024; Paliwal et al., 2024; Roberts & Candi, 2024; Sundberg & Holmström, 2024)	X (A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Holmström & Carroll, 2024; Kanbach et al., 2024; Kostis et al., 2024; Paliwal et al., 2024; Sundberg & Holmström, 2024)	X (Roberts & Candi, 2024)	



The Role of Generative Artificial Intelligence						
Blocks / Roles	Creativity (Ideation)	Decision-making	Planning	Automation/Optimization	Governance	
	Channels	-	-	-	<p>X</p> <p>(A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Holmström & Carroll, 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Roberts & Candi, 2024; Sundberg & Holmström, 2024)</p>	-
	Cost structure	-	-	-	<p>X</p> <p>(A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Hao et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Roberts & Candi, 2024; Singh et al., 2024)</p>	<p>X</p> <p>(A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Hao et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Roberts & Candi, 2024; Singh et al., 2024)</p>
	Revenue streams	-	<p>X</p> <p>(A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Hao et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Paliwal et al., 2024; Piller et al., 2024; Roberts & Candi, 2024; Singh et al., 2024; Sundberg & Holmström, 2024)</p>	<p>X</p> <p>(A & A, 2024; AL-Khatib, 2024; Carayannis et al., 2024; Hao et al., 2024; Holmström & Carroll, 2024; Joosten et al., 2024; Kanbach et al., 2024; Kostis et al., 2024; M. Mariani & Dwivedi, 2024; Marshall et al., 2024; Piller et al., 2024; Roberts & Candi, 2024; Singh et al., 2024; Sundberg & Holmström, 2024)</p>	-	-



4.2 FRAMEWORK FOR USING GENERATIVE AI TO DEVELOP BUSINESS MODELS

The conditions are now in place to propose a framework that supports the use of GenAI in business models. This framework will serve as a guide for managers to integrate GenAI effectively and strategically into their business models. It is designed to apply to both new (represented within the dashed line) and existing (delimited by the solid line) business models. It is developed based on assumptions derived from the literature review.

4.2.1 OVERVIEW

The framework is composed of 4 phases: “Context Definition”, “Requirements identification”, “GenAI integration design”, and “Validate and Iterate”, which are reflected in Figure 4.1.

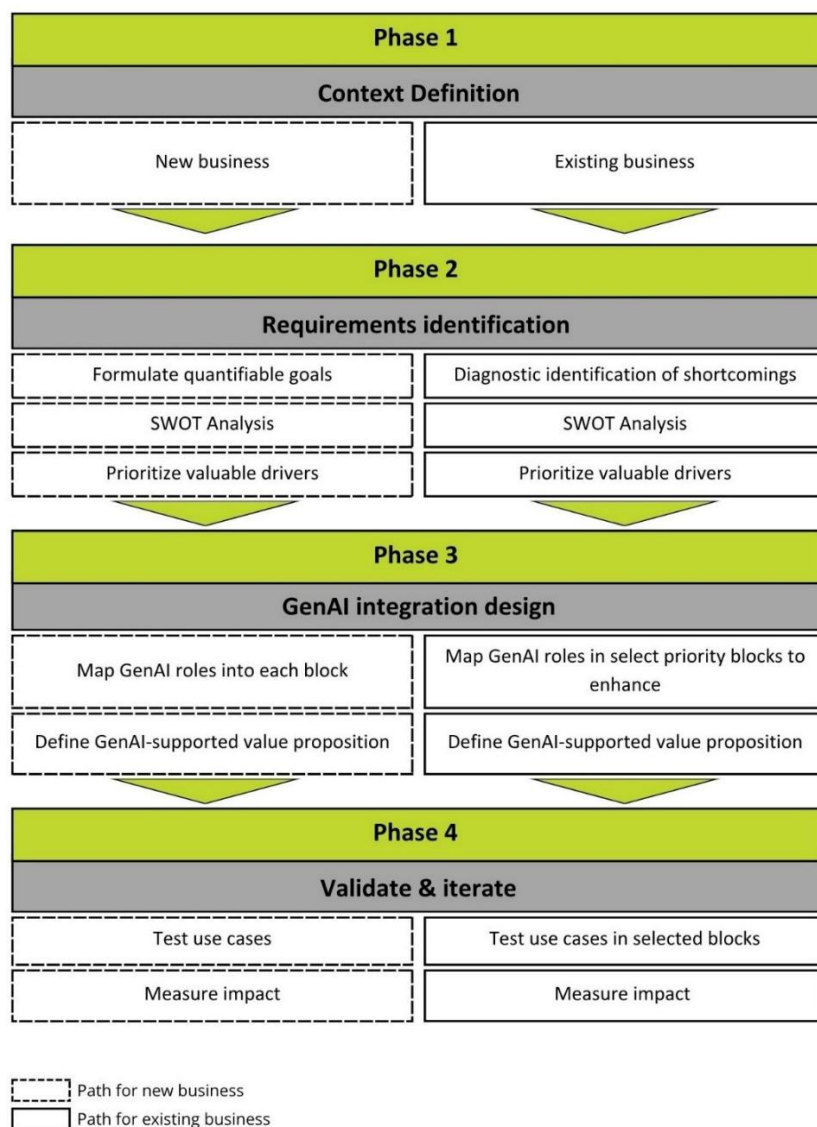


Figure 4.1 – Framework Phases.



4.2.1.1 PHASE 1 – CONTEXT DEFINITION

The first phase focuses on precisely defining the context in which the framework will be applied, as the approach differs depending on whether it is introduced into a new or an existing business model.

In the case of a new business model, the process begins with exploratory research, which involves conducting a comprehensive market analysis to identify current trends, customer pain points, and unmet needs. Based on these insights, clear hypotheses are formulated for the design of the framework's components, including value propositions, revenue streams, and cost structures. The process then advances to iterative prototyping, where low-fidelity pilots or mockups are developed to validate these hypotheses at minimal cost and efficiently. Throughout this phase, regular feedback loops are embedded, incorporating input from potential customers, partners, and internal teams at predefined checkpoints, ensuring that each refinement round contributes to developing a more viable offering.

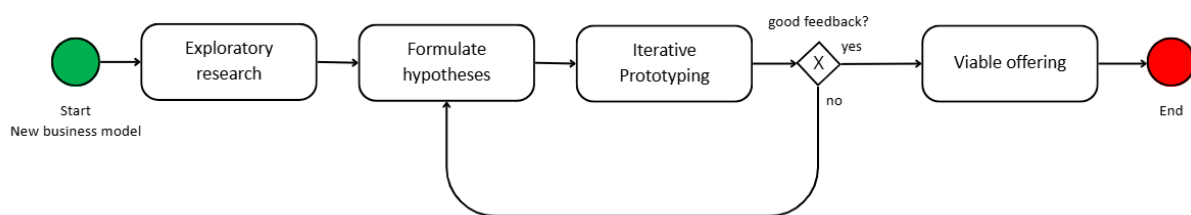


Figure 4.2 – Phase 1 for new business workflow.

In contrast, when the framework is applied to an existing business model, the process begins with a baseline assessment that maps the model's key components – customer segments, channels, relationships, resources, activities, partnerships, revenues, and costs – and evaluates their current performance. This is followed by a comprehensive gap analysis to identify areas where the existing model aligns with or diverges from the framework's best practices, and to diagnose pain points, inefficiencies, and growth bottlenecks that require intervention. At this stage, a change management plan is also developed to introduce new processes, tools, and organizational structures while minimizing operational disruption. This plan typically encompasses stakeholder training, a phased implementation schedule, and revised key performance indicators (KPIs).



Finally, the framework's interventions are piloted within a representative business unit or region, with outcomes measured against predefined success metrics. Once the impact is validated, the framework is scaled incrementally across the broader organization.

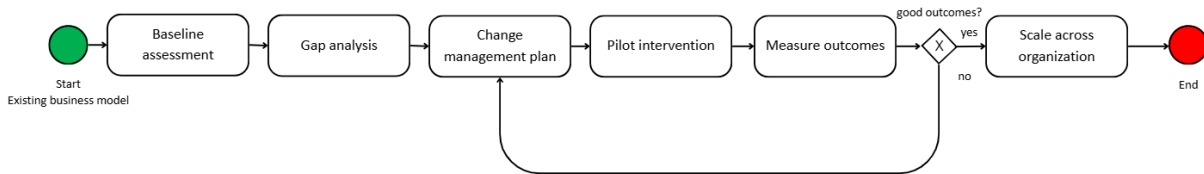


Figure 4.3 – Phase 1 for existing business workflow.

4.2.1.2 PHASE 2 – REQUIREMENTS IDENTIFICATION

In Phase 2, the framework concentrates on the systematic definition of requirements, with specific emphases determined by whether it is applied to a nascent or an established business model.

When implemented within a new business model, this phase begins with the formulation of clear, quantifiable objectives that translate the organization's strategic vision into measurable outcomes, such as target-market penetration and revenue milestones. Simultaneously, a structured opportunity analysis, utilizing methodologies such as SWOT analysis, is conducted to identify high-value areas where innovative products, services, or partnerships can address unmet needs or leverage emerging market opportunities. The outcome of this process is a prioritized set of value drivers that guide the design specifications of the proposed solution.

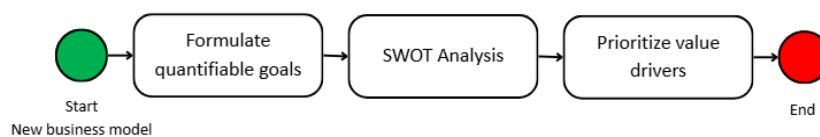


Figure 4.4 – Phase 2 for new business workflow.

In contrast, when the framework is applied within an existing operation, Phase 2 emphasizes the diagnostic identification of deficiencies and inefficiencies. A comprehensive gap analysis is conducted to map current capabilities, resources, and processes against the framework's best-practice benchmarks, thereby revealing underdeveloped or missing components, whether technological, organizational, or market-oriented. Concurrently, a process-level assessment examines end-to-end workflows to identify bottlenecks, redundant handoffs, and non-value-adding activities that hinder profitability and operational agility. The outcome of these analyses is a detailed requirements dossier that differentiates between essential capability enhancements and secondary streamlining initiatives.

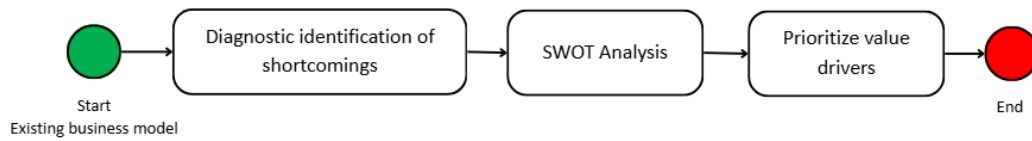


Figure 4.5 – Phase 2 for existing business workflow.

4.2.1.3 PHASE 3 – GENAI INTEGRATION DESIGN

In this phase, the BMC Framework was adapted, incorporating various generative AI roles into each block. Specifically, these roles include **creativity** (focusing on ideation and brainstorming), marked in blue; **decision-making**, represented in green; **planning**, in red; **automation and optimization**, marked in orange; and **Governance**, highlighted in yellow.

In the case of a new business model, the process begins by mapping GenAI functions within each BMC block and defining a GenAI-supported value proposition.

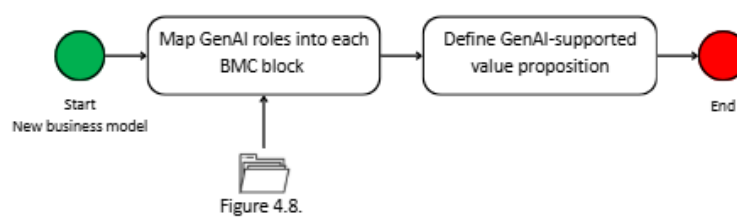


Figure 4.6 – Phase 3 for new business models workflow.

On the other hand, for existing business models, this phase involves selecting priority BMC blocks to enhance and defining a GenAI-supported value proposition.

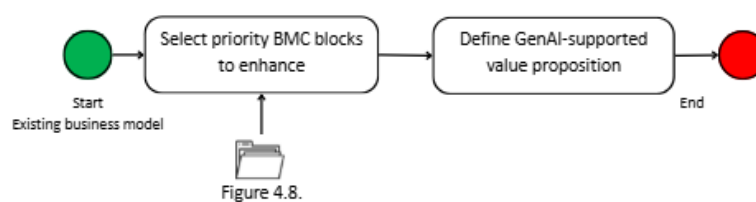


Figure 4.7 – Phase 3 for existing business models workflow.

Figure 4.8 illustrates the steps for implementing the BMC blocks in the order described in the literature and maps the GenAI roles across the BMC.

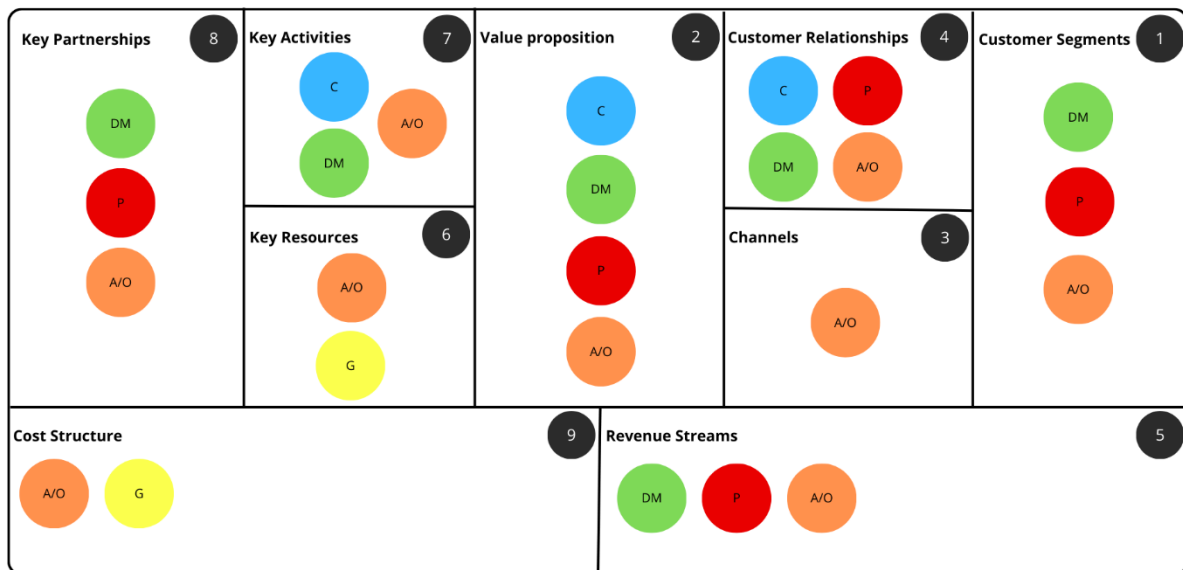


Figure 4.8 – AI-Enhanced Business Model Canvas Framework.
Adapted by Osterwalder A. & Pigneur Y. (2010)

This section presents the phases of the BMC and explains how GenAI can intervene in each phase. It also provides examples of prompts that may be used; however, these are only illustrative. In practical applications, they will likely require a more robust contextual framework to ensure high-quality outputs.

1st step – Customer Segments

Decision-Making:

- Generate detailed customer personas by analyzing purchase history, browsing behavior, and social media interactions.
- Simulate different customer types (e.g., budget-conscious vs. luxury buyers) to predict responses to marketing campaigns.
- Provide AI-generated customer insights that help businesses decide which segments to prioritize.

Example prompts:

Prompt 1: “Analyze our customers’ purchase history, browsing behavior, and social media interactions, then generate detailed personas that capture their demographics, preferences, motivations, and pain points.”

Prompt 2: “Simulate how two archetypal customer types, budget-conscious buyers vs. luxury-focused buyers, would respond to our upcoming email marketing campaign, predicting open rates, click-through rates, and conversion likelihood.”



Prompt 3: “Based on the insights you have generated, recommend which customer segments we should prioritize to maximize long-term revenue and lifetime value.”

Planning

- Generates a predictive customer journey for each segment, mapping how they interact with ads, websites, or emails.
- Generates content and ad variations tailored to each customer segment.
- Identifies future trends in each segment and suggests business opportunities.

Example prompts:

Prompt 1: “Map out a predictive customer journey for each segment, detailing every interaction they are likely to have with our ads, website touchpoints, and email sequences, and identify potential drop-off or re-engagement moments.”

Prompt 2: “Create three variations of ad copy and email content tailored to each customer segment, aligning tone, messaging, and value propositions with their unique preferences.”

Prompt 3: “Identify emerging micro-trends within each segment, based on social listening and market data, and suggest new business opportunities or product features we could develop.”

Automation/optimization

- Can automatically group customers in real time based on new behaviors.
- Continuously refine ad targeting, adjusting offers for different segments.
- Generates personalized emails, promotions, and web pages tailored to customer preferences.

Example prompts:

Prompt 1: “Automatically group incoming website visitors into dynamic segments based on real-time behavior signals and describe how you would update those segments as new data arrives.”

Prompt 2: “Continuously optimize our ad targeting strategy for each segment by analyzing campaign performance metrics and recommending adjustments in bids, creatives, and audiences.”

Prompt 3: “Generate personalized email subject lines, promotional offers, and landing-page content at scale, customized to each customer’s browsing and purchase history.”



2nd step – Value Proposition

Creativity

- Generates new product ideas by analyzing market trends, customer preferences, and competitor offerings.
- Creates unique branding, ad campaigns, and marketing content tailored to different audiences.
- Develop AI-generated designs, art, and product customizations to enhance the appeal of offerings.

Example prompts:

Prompt 1: “Analyze current market trends, customer preferences, and competitor offerings to generate three innovative product ideas that could differentiate our brand.”

Prompt 2: “Create a unique branding concept and ad campaign outline tailored to our target audience’s emotional triggers and cultural touchpoints.”

Prompt 3: “Design three AI-generated visual prototypes or art concepts that enhance the appeal of our core offerings (e.g., packaging mockups, digital customizations).”

Decision-Making

- Analyzes customer sentiment (from social media, reviews, and surveys) to refine product messaging.
- Predicts customer needs based on real-time data, guiding companies toward better value propositions.
- Tests multiple value proposition variations using AI-driven A/B testing.

Example prompts:

Prompt 1: “Perform sentiment analysis on recent social media posts, customer reviews, and survey responses, then recommend how to refine our product messaging to address key pain points.”

Prompt 2: “Using real-time data, predict the top three unmet customer needs in our market and advise which features we should prioritize in our next release.”

Prompt 3: “Set up an AI-driven A/B test for two different value-proposition statements and forecast which version is likely to outperform based on historical benchmarks.”



Planning

- Generates product descriptions, ad copy, and brand messaging aligned with customer expectations.
- Simulates different scenarios for market expansion and new feature development.
- Help businesses create storytelling-driven marketing materials that effectively convey their value proposition.

Example prompts:

Prompt 1: “Generate detailed product descriptions, ad copy, and brand-story messaging that resonate with our primary customer segments.”

Prompt 2: “Simulate three scenarios for expanding into adjacent markets or adding new features, including estimated costs, potential revenue, and key risks.”

Prompt 3: “Draft a storytelling-driven marketing outline (headlines, hooks, narrative arc) that effectively conveys our unique value proposition.”

Automation/optimization

- Automates content generation for ads, product listings, and social media marketing.
- Optimize pricing strategies based on real-time demand fluctuations.
- Generates hyper-personalized customer experiences, ensuring each user's value proposition is relevant.

Example prompts:

Prompt 1: “Automate bulk generation of ad creatives, product listing descriptions, and social posts, ensuring each output is optimized for platform-specific best practices.”

Prompt 2: “Optimize our pricing strategy in real time by analyzing demand fluctuations, competitor pricing, and historical sales data.”

Prompt 3: “Craft hyper-personalized user experiences—landing pages, in-app messages, and email content—that dynamically adapt to each visitor’s profile.”



3rd step – Channels

Automation/optimization

- Can auto-generate email campaigns, social media posts, ad copy, landing pages, and videos in bulk and personalized formats.
- Saves marketing teams hours of manual work and allows content to be quickly adapted for different platforms (e.g., Instagram, LinkedIn, TikTok, etc.).
- Customize messaging for different customer segments to optimize email open rates, ad performance, and click-through rates.
- Can adapt tone, language, visuals, and calls to action depending on the customer profile.
- Assist businesses in testing and generating multiple ad creatives for various platforms.
- Analyze which versions perform better and automatically recommend the best-performing formats, designs, and messages.

Example prompts:

Prompt 1: “Auto-generate a week’s worth of email campaigns, social-media posts, ad copy, landing pages, and short videos, each personalized for our key customer segments.”

Prompt 2: “Outline how to save our marketing team hours by automatically adapting core content for Instagram, LinkedIn, TikTok, and email while preserving brand consistency.”

Prompt 3: “Customize messaging variants for each segment to maximize email open rates, ad engagement, and click-through rates, then prioritize top performers.”

Prompt 4: “Adapt tone, language style, visuals, and calls-to-action based on each customer persona’s preferences, and provide examples.”

Prompt 5: “Assist in generating five alternative ad creatives for Facebook and Google Ads, then predict which format will perform best for each platform.”

Prompt 6: “Analyze performance data from recent campaigns and automatically recommend the highest-performing formats, designs, and messages to scale up.”



4th step – Customer Relationship

Creativity

- AI can create custom stories, messages, and content to build emotional connections with customers.
- Enables hyper-personalized greetings, onboarding content, loyalty messages, or birthday promotions.
- Enhances brand voice through personalized, dynamic, and human-like messaging.

Example prompts:

Prompt 1: “Create three custom brand stories or narratives that forge emotional connections with our customers across different segments.”

Prompt 2: “Draft hyper-personalized onboarding flows—emails, in-app messages, loyalty reminders, birthday promotions—tailored to individual customer profiles.”

Prompt 3: “Enhance our brand voice by generating dynamic, human-like chatbot scripts and social posts that feel authentic to each audience.”

Decision-Making

- Analyzes customer sentiment and behavior to identify relationship risks (e.g., churn) or growth opportunities.
- Generates insightful summaries of customer feedback, reviews, and support chats for decision-making.
- Suggest loyalty strategies or content styles that emotionally connect with each customer segment.

Example prompts:

Prompt 1: “Analyze sentiment trends and behavioral data to flag customers at risk of churn and recommend targeted retention strategies.”

Prompt 2: “Summarize key themes from customer feedback, reviews, and support chats to inform strategic decisions about relationship programs.”

Prompt 3: “Based on segment-specific emotional drivers, suggest three loyalty or engagement tactics that will deepen connections.”



Planning

- Generates customer journey maps, communication flows, and loyalty program content tailored to specific segments.
- Suggests personalized upselling and cross-selling interaction plans tailored to each customer group.
- Helps create automated nurturing sequences (email, SMS, chatbot) aligned with relationship goals.

Example prompts:

Prompt 1: “Generate detailed customer-journey maps and communication flowcharts for our loyalty program across email, SMS, and chatbot channels.”

Prompt 2: “Propose personalized upsell and cross-sell interaction plans—complete with timing, channel, and messaging, for each customer segment.”

Prompt 3: “Design an automated nurturing sequence (email, SMS, chatbot) aligned to our relationship goals, including sample copy and triggers.”

Automation/optimization

- AI-powered chatbots handle customer service, onboarding, product recommendations, and emotional tone.
- Automates follow-up messages, loyalty offers, support ticket summaries, and feedback collection.
- Continuously optimizes messages based on open rates, click-through rates, or satisfaction scores.

Example prompts:

Prompt 1: “Build AI-powered chatbot scripts that handle onboarding, support, and personalized product recommendations with the right emotional tone.”

Prompt 2: “Automate follow-up messages for abandoned carts, loyalty offers, and support ticket summaries, ensuring timely delivery based on user actions.”

Prompt 3: “Continuously optimize message timing, content, and channel mix based on open rates, click-through rates, and customer satisfaction scores.”



5th step – Revenue Streams

Decision-Making

- Analyzes customer purchasing behavior to suggest the most profitable pricing/revenue models (subscription vs. one-time vs. upsell).
- Creates AI-generated revenue scenario simulations to compare outcomes of pricing strategies.
- Utilizes sentiment and sales data to inform pricing decisions and packaging strategies.

Example prompts:

Prompt 1: “Analyze historical purchasing data to recommend the most profitable pricing and revenue models, subscription vs. one-time purchase vs. upsell.”

Prompt 2: “Simulate revenue scenarios for three different pricing strategies and compare their projected outcomes in terms of net margin and churn risk.”

Prompt 3: “Use sentiment and sales metrics to advise on pricing adjustments or packaging changes that could boost average order value.”

Planning

- Generates ideas for new revenue-generating digital products, including eBooks, mini-courses, templates, and AI-generated content packs.
- Suggests value-added upsell or cross-sell ideas tailored to different customer segments.
- Helps businesses design tiered subscription models, freemium strategies, and promotional packages.

Example prompts:

Prompt 1: “Generate ideas for three new digital revenue products – eBooks, mini-courses, templates, or AI-generated content packs – tailored to our audience.”

Prompt 2: “Suggest value-added upsell and cross-sell packages for each segment, detailing product combinations, pricing, and positioning.”

Prompt 3: “Outline a tiered subscription model or freemium strategy, including feature breakdowns, pricing tiers, and promotional launch plan.”

Automation/optimization



- Automates A/B testing for pricing pages, offers, and sales copy to optimize for conversion.
- Creates personalized promotional content at scale (emails, landing pages, ad copy) that drives sales growth.
- Supports automated revenue forecasting through generative models that predict future cash flows based on various scenarios.

Example prompts:

Prompt 1: “Automate A/B testing of pricing pages, promotional offers, and sales copy, then summarize which variant drives the highest conversion.”

Prompt 2: “Generate personalized promotional emails, landing-page layouts, and ad copy at scale, each optimized to drive revenue growth.”

Prompt 3: “Forecast future cash flows under different scenarios using generative models and present a dashboard of key financial projections.”

6th step – Key Resources

Automation/optimization

- Automates internal content creation and management, including training manuals, Standard Operating Procedures (SOPs), product documentation, and technical reports.
- Optimizes internal resource utilization by streamlining workflows and automating repetitive tasks, including coding, writing, and reporting.
- Helps generate synthetic data, speeding up development cycles and testing environments.

Example prompts:

Prompt 1: “Automate the creation and upkeep of training manuals, SOPs, product documentation, and technical reports based on our internal data.”

Prompt 2: “Optimize resource utilization by streamlining workflows, identify bottlenecks and suggest automation opportunities in coding, writing, and reporting.”

Prompt 3: “Generate synthetic datasets for testing and development, ensuring they reflect real-world variability while preserving privacy.”

Governance



- AI can assist in drafting internal policies, compliance documents, risk reports, and regulatory guidelines.
- Assists in monitoring and governing AI and other knowledge assets across teams and departments.
- Enables companies to maintain consistent quality, brand standards, and ethical compliance across all AI-generated outputs.

Example prompts:

Prompt 1: “Draft internal AI-governance policies, compliance guidelines, and risk-management documentation to ensure ethical use of generative models.”

Prompt 2: “Create a monitoring plan and dashboard for overseeing AI-generated outputs across teams, with quality and bias-control checkpoints.”

Prompt 3: “Standardize templates for regulatory reports, audit logs, and knowledge-asset inventories to maintain consistency and traceability.”

7th step – Key Activities

Creativity

- Generates new product ideas, prototypes, design concepts, branding assets, and marketing materials.
- Enhances innovation through AI-assisted brainstorming tools, design variations, or 3D modeling.
- Enables rapid creation of visuals, scripts, social content, and promotional assets.

Example prompts:

Prompt 1: “Generate three new product concepts, design prototypes, or marketing asset ideas using AI-assisted brainstorming methods.”

Prompt 2: “Produce multiple visual variations and scripts for a campaign concept to accelerate creative iteration.”

Prompt 3: “Outline a rapid 3D-modeling or animation workflow driven by AI tools to prototype product demos.”



Decision-Making

- Generates summaries of complex data, helping managers make informed decisions faster.
- Simulates "what-if" business scenarios, enabling predictive planning and business forecasting.
- Supports content and campaign A/B testing by generating variations and predicting performance.

Example prompts:

Prompt 1: "Summarize complex datasets (sales, web analytics, market research) into concise, actionable insights for our management team."

Prompt 2: "Simulate 'what-if' scenarios, such as changing ad spend or product features, and forecast their impact on KPIs."

Prompt 3: "Generate A/B test variants for landing pages and predict performance differentials based on historical data."

Automation/optimization

- Automates routine content generation (emails, product listings, manuals, reports).
- Optimizes workflows in marketing, documentation, training, and product updates.
- Assists in software development, knowledge management, and internal communication.

Example prompts:

Prompt 1: "Automate routine content creation tasks (emails, product listings, manuals, reports) and set up workflows for seamless handoffs."

Prompt 2: "Optimize internal processes in marketing, documentation, and training, identify redundancies, and propose AI-driven solutions."

Prompt 3: "Assist in automating parts of our software development pipeline, knowledge-base updates, and team communications."



8th step – Key Partnerships

Decision-Making

- Analyzes partner data (performance, financials, reviews) and summarizes partnership value and risks.
- Simulates the ROI of different partnership models, helping businesses decide between strategic alliances and short-term contracts.
- Assists in benchmarking potential partners against industry trends or competitors.

Example prompts:

Prompt 1: “Analyze potential partners’ performance data, financial health, and reputation, then summarize their strategic fit and risks.”

Prompt 2: “Simulate the ROI of various partnership models, joint ventures, reseller agreements, co-marketing deals, and compare outcomes.”

Prompt 3: “Benchmark prospective partners against industry standards and competitors, then rank them by potential strategic value.”

Planning

- Helps draft partnership proposals, co-marketing plans, or joint product ideas tailored to potential collaborators.
- Simulates win-win scenarios for shared revenue, resource pooling, or tech integration.
- Generates strategic content like co-branded landing pages, event invitations, and press releases.

Example prompts:

Prompt 1: “Draft partnership proposals, co-marketing plans, or joint product concepts tailored to each target collaborator.”

Prompt 2: “Simulate win-win scenarios, shared revenue splits, resource pooling, tech integrations, for potential alliances.”

Prompt 3: “Generate co-branded landing-page copy, event invitation drafts, and press-release templates for a new partnership launch.”



Automation/optimization

- Automates contract drafting, negotiation scripts, and partnership documentation.
- Generates real-time reports on partnership performance metrics.
- Standardizes communication with multiple partners, maintaining consistency and responsiveness.

Example prompts:

Prompt 1: “Automate contract drafting, including standard clauses, negotiation playbooks, and version control for partner agreements.”

Prompt 2: “Set up real-time reporting on partnership performance metrics (leads generated, revenue share, engagement).”

Prompt 3: “Standardize partner communications, emails, status updates, and dashboards to ensure consistency and timeliness.”

9th step – Cost structure

Automation/optimization

- It automates labor-intensive tasks, such as content creation, customer support, documentation, training materials, and coding, reducing labor costs.
- Optimizes marketing and sales operations, cutting agency costs, content production time, and campaign testing expenses.
- Accelerates product development with AI-generated prototypes, reducing R&D and time-to-market costs.
- Reduces dependency on third-party service providers (e.g., freelancers, creative agencies, manual data analysts).

Example prompts:

Prompt 1: “Identify and automate high-effort, low-value tasks, such as repetitive content creation and basic support, to reduce labor costs.”

Prompt 2: “Optimize our marketing and sales workflows to cut agency fees, shorten content-production cycles, and streamline campaign testing.”



Prompt 3: “Leverage AI to accelerate product R&D by generating rapid prototypes and simulations, thereby reducing development time and costs.”

Prompt 4: “Evaluate opportunities to replace third-party service providers with in-house AI solutions and estimate the cost savings.”

Governance

- Assists in drafting cost-control policies, procurement guidelines, and budgetary governance documentation.
- Helps in automated compliance monitoring to prevent costly regulatory breaches or inefficiencies.
- Generates audit reports, cost-variance summaries, and financial compliance docs, saving the financial team hours.
- Standardizes internal documents to reduce costs related to inconsistencies, errors, and communication misalignment.

Example prompts:

Prompt 1: “Draft cost-control policies and procurement guidelines that integrate automated oversight of budgets and spending thresholds.”

Prompt 2: “Design an automated compliance-monitoring workflow to detect and flag regulatory or budgetary inefficiencies.”

Prompt 3: “Generate audit-ready cost-variance summaries and financial compliance reports to save the finance team hours of manual work.”

Prompt 4: “Standardize internal templates for budget plans, procurement forms, and governance checklists to reduce errors and misalignment.”

4.2.1.4 PHASE 4 – VALIDATE AND ITERATE

In Phase 4, the framework advances to the validation and iteration stage, following distinct pathways depending on whether it is applied to a new or an existing business model.

When implemented within a new business model, this phase begins with the rapid development of a low-fidelity prototype that encapsulates the core value proposition and architectural assumptions established in previous phases. The prototype is subsequently tested with a cohort of early adopters through pilot deployments, usability workshops, or controlled field experiments to collect both qualitative and quantitative



feedback regarding functionality, user experience, and perceived value. The insights obtained at this stage inform targeted refinements to the prototype's features, user interface, and underlying processes, thereby reducing uncertainty prior to large-scale implementation.

Conversely, when applied to an existing business model, the emphasis shifts toward empirical validation within live or near-live operational environments. Representative use cases are identified across key process areas, such as order fulfillment, customer onboarding, or data analytics, and the proposed solution components are integrated on a trial basis. Performance is then assessed using predefined success metrics, including cost reduction, throughput improvement, cycle time compression, and customer satisfaction indices. Statistical analyses of these performance indicators quantify return on investment and identify any remaining gaps or unintended outcomes. Based on this empirical evidence, the framework recommends an iterative adjustment cycle that involves modifications to process flows, recalibration of algorithms, or retraining of personnel, ensuring the solution consistently meets or exceeds the established performance benchmarks.

4.2.2 IMPLEMENTATION

This section presents a fictional case study that demonstrates the application of the proposed framework. Given its hypothetical nature, only a limited number of illustrative examples are provided, and these are not intended to serve as comprehensive or fully representative input or output. Not every framework stage is documented with the level of detail required for real-world implementation.

Nevertheless, consistent with the DSR methodology, this fictional scenario represents an initial iteration to evaluate the framework's practical applicability. Future research can further assess its effectiveness through real-world case studies. Additionally, upcoming expert interviews are expected to help validate the framework.

Due to the business model's fictional and early-stage nature, only the left side of the framework was applied.



4.2.2.1 FICTIONAL USE CASE

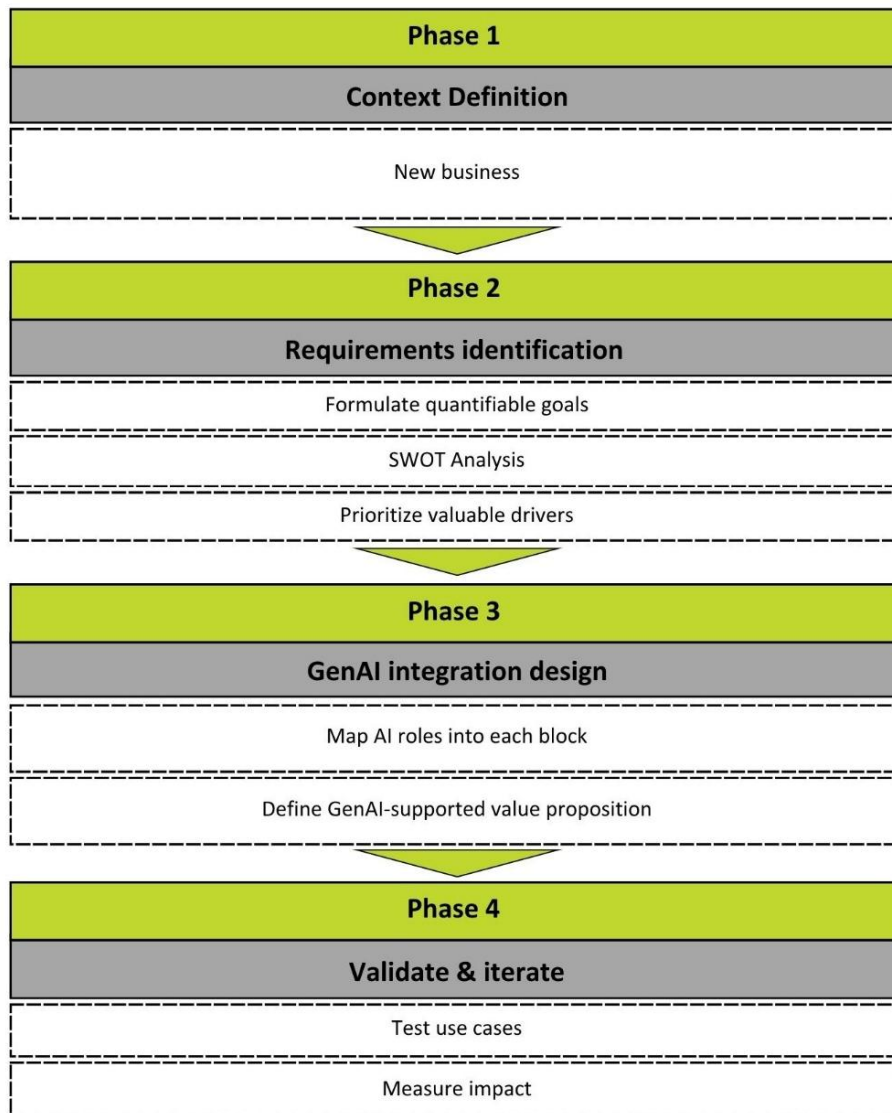


Figure 4.9 – Proposal Framework workflow for a fictional use case.

Phase 1 – Context definition

EcoWave is a newly founded B-Corp in the early stage of its lifecycle, having launched just six months ago. Its core offering comprises fully compostable mailers made from mushroom mycelium, specifically designed for small and medium-sized e-commerce businesses. Guided by the mission to replace single-use plastics and significantly reduce landfill waste, *EcoWave* seeks to mainstream mycelium-based packaging solutions across the industry. The company's key stakeholders include its B-Corp-certified founders, a strategic R&D and manufacturing partner, its initial pilot customers among SMBs, and a group of impact-focused investors. In the broader market, *EcoWave* positions itself as an early-stage disruptor in sustainable packaging, directly



competing with traditional plastic mailers and paper alternatives. At the same time, the business faces several constraints and risks: its current production capacity is limited; its per-unit costs remain higher than those of low-cost plastics; and a robust customer-education effort will be required to shift buyers away from incumbent packaging materials.

Phase 2 – Requirements identification

Over the next year, *EcoWave* has set three ambitious goals: to triple its monthly order volume within 12 months, to achieve price parity with low-cost plastic alternatives by the end of its second year, and to secure ASTM certification for industrial compostability within 9 months. These targets align closely with a set of compelling market opportunities. As major e-commerce platforms such as Etsy and Shopify tighten their ESG requirements, more merchants will demand truly sustainable packaging, and *EcoWave*'s B-Corp status can serve as a valuable credential for press coverage, grant funding, and partnerships. Additionally, collaborating with eco-focused third-party logistics providers offers a path to faster, broader distribution.

Despite these upsides, several gaps and inefficiencies stand in the way of rapid scale. Currently, *EcoWave* lacks a dedicated direct-to-SMB sales channel or an e-commerce storefront optimized for conversions, resulting in much of its early customer acquisition being driven through ad hoc or B2B outreach. Likewise, it has not yet integrated any logistics partners to support a nationwide roll-out, leaving fulfillment fragmented and slow. Internally, the quoting process for custom mailer sizes remains manual and time-consuming, and inventory tracking continues to rely on error-prone spreadsheets. Production lead times fluctuate significantly, from substrate preparation through to finished packaging, and onboarding a new customer often requires multiple synchronous calls. Addressing these issues will be critical before *EcoWave* can fully capitalize on its market potential.

Phase 3 – GenAI integration design

In this phase, practical examples demonstrate how GenAI can be integrated into key BMC blocks, aligning with the roles identified in the literature.

In the *Customer Segmentation block*, GenAI supports decision-making by analyzing *EcoWave*'s purchase data, browsing behavior, and social media interactions.

A sample prompt – **“Analyze our customers’ purchase history, browsing behavior, and social media interactions, then generate detailed personas”**—produced insights such as 800 orders (60% from urban SMEs, 40% from direct-to-



consumer subscribers), an average order value of € 45, and 30% of referrals from Instagram.

Based on this, two personas were generated: “Green Gaby”, a 28-year-old sustainable-lifestyle blogger ordering three times monthly (€35 avg.), and “Startup Sam”, a 35-year-old e-commerce owner ordering 50 mailers weekly (€50 avg.).

In the *Value Proposition block*, GenAI can enhance creativity by analyzing market trends, customer preferences, and competitor offerings.

Using the prompt **“Analyze current market trends, customer preferences, and competitor offerings to generate three innovative product ideas that could differentiate our brand”** the model, based on *EcoWave*’s context (e.g., 20% increase in bioplastic alternatives, 12% growth in vegan consumers), proposed:

- Seaweed-infused, water-soluble mailers
- Mailers embedded with wildflower seed strips
- Augmented-reality labels displaying carbon offset metrics.

In the *Revenue Streams block*, GenAI aids decision-making by analyzing historical purchasing data to optimize pricing strategies.

Using the prompt **“Analyze historical purchasing data to recommend the most profitable pricing and revenue models – subscription vs. one-time purchase vs. upsell”** the AI compared *EcoWave*’s €5/month subscription (20 users, 8% churn) with a €2/unit one-time pack (200 packs/month). It recommended a hybrid model: €7/month for 15 mailers plus a 10% discount on additional purchases.

In the *Cost Structure block*, GenAI contributes to governance by drafting cost-control policies and procurement guidelines.

Using the prompt **“Draft cost-control policies and procurement guidelines that integrate automated oversight of budgets and spending thresholds”** the model generated a policy for *EcoWave* that includes AI-produced monthly budget variance reports, automated alerts when spending exceeds 80% of the allocated budget, and quarterly financial reviews.

Phase 4 – Validate and iterate

In this phase, the focus is on validating and refining the new business model components that emerged from the GenAI integration in the previous stage. These components, particularly those related to AI-assisted customer segmentation, creative product ideation, and adaptive pricing strategies, represent *EcoWave*’s effort to leverage data-driven insights and computational creativity to strengthen its competitive



positioning and operational agility. The purpose of this validation process is to empirically assess the functionality, usability, and perceived value of these GenAI-enabled innovations, ensuring that they contribute meaningfully to *EcoWave*'s mission and market performance before broader implementation.

The process begins with the development of a low-fidelity prototype that embodies the main GenAI capabilities identified in earlier phases. This prototype features an enhanced e-commerce platform that automates the creation of customer personas, personalizes product recommendations, and dynamically optimizes pricing models based on behavioral and transactional data. For example, the prototype operationalizes the AI-generated personas "Green Gaby" and "Startup Sam," which reflect distinct purchasing patterns and sustainability motivations. These personas guide the customization of marketing messages and pricing structures, enabling a more personalized user experience. The platform also integrates the hybrid subscription model previously proposed by the AI system, combining monthly mailer bundles with discounted one-time purchases, to balance customer retention with profit optimization.

To evaluate the effectiveness of this prototype, a pilot study is conducted with a representative group of approximately thirty small and medium-sized business clients, including both existing and prospective customers. The pilot combines controlled usability sessions with real-world testing scenarios, allowing participants to interact with the system and provide structured feedback on its functionality, intuitiveness, and perceived credibility. During the pilot phase, both quantitative and qualitative data are systematically collected. Key performance indicators include conversion rate, average order value, subscription uptake, and churn rate. Qualitative input is obtained through post-interaction interviews and satisfaction surveys to assess user trust and perceived innovation.

The data analysis employs a mixed-methods approach, combining quantitative statistical testing with qualitative interpretation. Quantitative analyses, such as A/B testing of pricing models and interface variations, provide evidence of behavioral shifts and performance gains, whereas thematic analysis of qualitative feedback reveals insights into customer perception, engagement, and emotional responses to AI-driven interactions. Insights from both analytical strands guide successive iterations of the prototype. Modifications may involve refining GenAI prompt structures, improving interface usability, or recalibrating pricing parameters to better align with user expectations and market dynamics. Iterations continue until pre-established validation thresholds are met, such as achieving a minimum 15% increase in conversion rate, reducing subscription churn below 5%, and obtaining at least 80% customer satisfaction.

Through this iterative process of empirical validation, *EcoWave* transforms its GenAI-enabled concepts from theoretical design artifacts into validated, market-ready



business model components. The methodological emphasis on rapid prototyping, user-centered evaluation, and evidence-based iteration reflects the principles of design science research, which advocate for the creation and systematic refinement of practical solutions grounded in real-world feedback. As a result, the validated model not only enhances *EcoWave*'s capacity for data-informed decision-making but also consolidates its position as an innovation leader in sustainable packaging, providing a scalable, scientifically grounded foundation for future growth.

4.3 EVALUATION

In accordance with the Design Science Research (DSR) methodology outlined by Peffers et al. (2006), the evaluation of the proposed framework was conducted through an expert review. Three domain specialists, whose qualifications are summarized in Table 4.2, participated in this evaluation process. The assessment involved semi-structured interviews during which the framework, its underlying rationale, and its application procedures were systematically presented and discussed.

Table 4.2 – Expert's background.

Expert	Background	Domain
Expert 1	IT and AI Consultant with a background in Mathematics and Engineering.	Public Sector
Expert 2	IT Consultant, doing a PhD in Computer Engineering, with a background in Economics.	Academia
Expert 3	IT Consultant with a background in Computer Engineering	Private Sector

Individual interviews were conducted in Portuguese via Teams between May and September 2025. All participants provided informed consent for the sessions to be recorded. The resulting transcripts form part of this thesis and are included in Appendix A.

At the start of each interview, a brief overview of the research objectives, methodology, and the models developed was provided. To conclude, the following four questions were posed:

Question 1 – Do you consider the proposed framework useful and why? If not, why do you believe it is not?

Question 2 – Do you have any criticism towards the proposed framework? Please explain.

Question 3 – Would you consider implementing the proposed framework? Please clarify why/why not.



Question 4 – Do you have any recommendations or suggestions for further improvements of the proposed framework?

All the experts interviewed agreed that the proposed framework has strong practical potential. They recognized a clear link between Generative AI and the different blocks of the Business Model Canvas. This connection makes it easier to identify specific areas where GenAI can be applied, such as creativity, decision-making, automation, and planning, and to understand how these roles can add value within a business model.

Expert 2 added that the framework could be compelling if developed as an interactive tool that helps entrepreneurs structure and refine their business models using GenAI.

Expert 3 shared this view, noting that the framework provides a structured, well-organized approach to understanding how Generative AI can be integrated across the components of the Business Model Canvas. By segmenting each block and mapping the potential AI roles, the framework helps businesses see more clearly where AI can create value, drive productivity, and stimulate innovation.

When asked about possible limitations, Expert 1 suggested making the framework's visual distinction between new and existing business models more explicit. The expert also proposed strengthening Phase 2 so that it could apply equally to both types of businesses, for example, by including a SWOT analysis. In addition, they recommended providing a more precise explanation of the framework's phases, especially Phase 3, which concerns the integration of GenAI.

Expert 2 also saw great potential but felt that the framework is still too theoretical. They emphasized the need to make it more practical and interactive so that it becomes not just understandable, but truly actionable in real-world contexts.

Expert 3 echoed this point, recognizing that while the framework is conceptually strong, it would benefit from empirical validation to demonstrate its practical performance. Expert 3 also mentioned that automation naturally occurs across several blocks, not as a weakness but as an expected outcome of AI's cross-cutting nature within business operations.

Regarding implementation, all the experts indicated that they would consider using the framework in practice. One expert explained that the framework provides a solid foundation for real-world application, as long as it is supported by concrete case studies and empirical testing. Another expert suggested turning it into a digital tool, for example, an AI agent, that could help entrepreneurs and businesses apply the framework more easily and effectively.

Expert 3 agreed, saying they would definitely implement it because it helps define the main strategic guidelines for integrating GenAI into business models. In the same way that the Business Model Canvas helps companies understand and structure their key



components, this framework can guide them in identifying where and how AI contributes to value creation, productivity gains, and innovation.

For future improvements, the experts recommended focusing on how the framework could become a more practical tool for entrepreneurs. One idea was to create a “master prompt” that could serve as a decision-support agent, guided by the framework’s logic. Expert 3 also suggested taking the framework further by adding a more applied dimension, for example, through case studies, real-world testing, or step-by-step methodologies that show how it can be used in practice. Such developments would turn the framework into a hands-on strategic tool that organizations can use to integrate Generative AI more effectively into their business models.



5 DISCUSSION

Several interrelated factors influence an organization's ability to integrate GenAI into its business model successfully.

Organizational readiness is a crucial component encompassing both the presence of qualified professionals, such as data scientists, AI specialists, and ethics experts, and the availability of technical infrastructure, including computing resources and reliable data management systems. An organizational culture that encourages experimentation and learning, along with managerial support, is equally crucial because it lays the groundwork for the meaningful adoption of new ideas.

Since GenAI models rely on vast and varied datasets, data quality is also crucial. Without access to high-quality inputs, outputs risk being biased, erroneous, or irrelevant, potentially eroding systemic trust and confidence. Another important consideration is integration with current business procedures. To ensure that ideation, prototyping, and decision-making processes are improved rather than disrupted, organizations must match GenAI applications with strategic frameworks, such as the Business Model Canvas. Human-AI cooperation is also crucial because, although GenAI can produce original concepts and expedite creative processes, human supervision is still necessary to verify, refine, and contextualize the results.

Lastly, to mitigate the risks of bias, hallucinations, and misuse while ensuring compliance with the regulatory framework, it is essential to address governance, ethics, and transparency concerns. Costs and resource demand also influence adoption, as Small and Medium-sized Enterprises (SMEs) may find GenAI's high computational requirements prohibitive, necessitating a careful cost-benefit analysis.

GenAI offers a wide range of advantages for business model development when appropriately applied. Its capacity to foster creativity and ideation is among its most important contributions. GenAI can inspire new ideas that extend beyond conventional human thinking by producing unusual outputs; occasionally, it can even utilize its so-called "hallucinations" as unexpected inspiration.

Additionally, GenAI accelerates innovation processes by automating product development, testing, and prototyping, thereby reducing time-to-market and enhancing organizational agility. In addition to accelerating creativity, it enhances operational efficiency by automating knowledge-intensive or repetitive tasks, freeing staff members to focus on more strategic, high-value work. GenAI enables hyper-personalization in customer-facing contexts, offering customized goods, services, and communications that boost client loyalty, engagement, and satisfaction. By enabling the development of new value propositions, innovative revenue streams (such as subscription-based AI services or synthetic data licensing), and cost-effective business models, these developments can also promote business model innovation. Crucially, by reducing



entry barriers, GenAI democratizes innovation by providing smaller businesses with access to powerful analytical and creative tools previously available only to large corporations.

However, several obstacles must be overcome when incorporating GenAI-driven creativity into business models. Given that generative models have the potential to inadvertently reinforce biases, generate false information, or be exploited for immoral purposes, such as deepfakes, ethical and regulatory risks rank among the most urgent. This problem is closely linked to the reliability of the outputs: GenAI models frequently generate hallucinations or inconsistent results that require human supervision, raising questions about their autonomous application in critical decision-making.

Organizational resistance to change is another obstacle, as managers and staff accustomed to traditional procedures may be hesitant to adopt or trust AI-driven methods. The viability of AI-generated concepts can be problematic even after adoption, as many outputs lack practicality and require extensive human refinement to be viable. Another difficulty is resource intensity. The high costs of energy, infrastructure, and training present significant challenges, especially for SMEs, which may struggle to scale up adoption.

Lastly, it is impossible to overlook the impact on the workforce. Fears of job displacement arise as GenAI automates parts of creative and operational work, underscoring the need for reskilling programs and role redefinition to ensure smooth transitions.



6 CONCLUSIONS AND FUTURE RESEARCH

The final chapter of this dissertation is organized into three key sections. First, it offers a comprehensive summary of the research undertaken and evaluates how effectively the initial objectives were met. Next, it discusses the primary limitations encountered during the study. The chapter concludes by proposing directions for future research in this area.

6.1 SYNTHESIS OF DEVELOPED WORK

The primary goal of this study was to provide a framework for incorporating GenAI into business model development, thereby supporting more inventive, flexible, and creative organizational practices.

To achieve this and in line with the first and second intermediate goals, a comprehensive literature review was conducted to explore the concepts of GenAI, business models, and business model innovation. There are notable gaps in the integration of GenAI into business model development, particularly the lack of practical frameworks to help organizations embrace AI-driven creativity and innovation, according to a structured analysis of the current state of research conducted using the PRISMA protocol.

A structured framework based on the BMC was developed using the gathered evidence. The framework was divided into four stages: (1) defining the context; (2) identifying the requirements; (3) designing the GenAI integration; and (4) validating and iterating. These stages provide businesses with a methodical approach to incorporating GenAI into their operations, thereby enhancing their overall ability to innovate, improve customer engagement, design value propositions, and generate ideas.

A fictitious use case was presented to demonstrate the framework's practical application. Despite being speculative, the use case demonstrated how GenAI could enhance creativity, facilitate decision-making, and foster the ongoing development of business models. Expert input was then used to assess the framework, confirming its applicability and relevance. Its potential as a decision-support tool for managers and entrepreneurs looking to incorporate AI technologies into strategic processes was also highlighted by experts.

It is feasible to conclude that the initial research questions "How to develop business models using GenAI?" and "What are the best guidelines for implementing GenAI in business models?" were addressed by the completed work. The suggested framework offers a structured and transparent approach to help businesses effectively adopt



GenAI while navigating implementation challenges and exploring innovation opportunities.

This thesis also met its initial goals by developing a specific proposal supported by the literature and validated by experts. This study reinforces AI's role as a catalyst for creativity and innovation within organizations by providing practical guidance on methodically integrating GenAI into business model development.

6.2 LIMITATIONS

This study has made several important contributions, but it also has some limitations that need to be acknowledged. These limitations stem from methodological constraints and the research's delineated scope.

The systematic literature review only examined studies published between 2020 and 2025 and articles written in English. While this ensured an emphasis on contemporary and relevant research, it may have omitted significant contributions published previously or in other languages, thereby limiting the diversity of perspectives integrated into the analysis.

The framework was demonstrated through a hypothetical use case rather than applied in a real business setting. Although this method demonstrated how the framework could be applied, it does not provide the same level of validation as a case study conducted in a real business setting. As a result, the framework's effectiveness remains theoretical until it is tested with real organizational data and practices.

Additionally, the evaluation process relied on expert feedback gathered through a small number of semi-structured interviews. The experts' insights were invaluable in confirming the framework's relevance and usefulness. However, the small sample size and the experts' diverse backgrounds may not fully reflect the wide range of industry views needed to apply the findings to other sectors.

The rapid pace of technological change in generative AI is another built-in limit. The models, tools, and applications available today are likely to undergo significant changes in the near future. This could impact the long-term usefulness and validity of the proposed framework. So, the study is a snapshot of what was known and what technology was like at the time it was written.

6.3 FUTURE WORK

Building on the research's conclusions and limitations, several directions for further study can be identified to improve and broaden the proposed framework.



The framework should be empirically validated in actual organizational settings, which is the primary goal of future research. Implementing the framework across businesses of varying sizes and industries would provide valuable insights into its overall efficacy, scalability, and adaptability. Its effects over time could be further evaluated by longitudinal studies, especially concerning the evolution of business models and the sustainability of innovation.

The results would be more robust if the evaluation process were extended to include larger and more varied samples of practitioners and experts. Industry-wide comparisons may highlight sector-specific needs and enable the framework to be improved into versions tailored to specific fields, such as manufacturing, healthcare, or finance.

Future studies should incorporate governance, ethics, and legal considerations into the framework. The framework's practical value for organizations would be significantly enhanced if it were expanded to include explicit guidelines for responsible AI adoption, particularly given the challenges of bias, accountability, and transparency in GenAI.

There is an opportunity to investigate creating digital platforms or interactive tools to operationalize the framework. By facilitating decision-making, automating evaluations, and providing scenario simulations, these tools may help managers and entrepreneurs implement the framework more successfully. This would turn the framework into a workable, broadly applicable solution rather than a conceptual artifact.





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APPENDIX A

Interview 1 transcript. Date: July 1, 2025

Interviewer: Based on the presentation, do you consider the proposed framework useful? Why?

Expert 1: Yes, I consider it very useful and well-designed. The way you connected the roles of Generative AI – the "dots" like creativity and decision-making – to the Business Model Canvas blocks is very clever and practical. This visualization immediately allows you to identify where and how AI can act. For example, someone who wants to work on the creative side of the business, by looking at the framework, immediately understands they need to focus on customer segments, the value proposition, and the channels. This provides clear and intuitive guidance, which is the framework's main value.

Interviewer: Excellent. And do you have any criticism of the proposed framework?

Expert 1: My criticism isn't about the core concept, which is solid, but about two aspects of its presentation and structure. First, the flow of the main framework, with the division between new businesses and existing businesses, could be visually clearer. The difference between the solid and dashed lines is subtle; I suggest more space or another visual element to more clearly separate the two paths. Second, and more conceptual, is Phase 2 of requirement identification. Currently, for a new business you consider "goals and opportunities," and for an existing one you consider "gaps and inefficiencies." This might give the impression that for an existing business, you only look at what's negative. A business analysis, whether for a new or old business, should always consider what's good and what's bad.

Interviewer: That makes perfect sense. Considering that usefulness and those criticisms, would you consider implementing the proposed framework?

Expert 1: I would consider it, without a doubt. The framework serves as an excellent base and a structured starting point for anyone who wants to seriously think about integrating Generative AI into their business model. It's very valuable foundational work. However, for a complete and robust implementation, it would be beneficial to address the points I raised, especially the one about unifying the initial requirement analysis with a tool like SWOT analysis, which considers strengths, weaknesses, opportunities, and threats, regardless of whether the business is new or already existing.

Interviewer: Perfect. To wrap up, do you have any recommendations or suggestions for future improvements to the framework?

Expert 1: I have three main recommendations. The first, as I mentioned, is to unify and strengthen Phase 2 with a SWOT analysis. This would make the initial analysis



more complete and well-founded. The second is to enrich the theoretical foundation with preprint repositories, like arXiv. Given that AI advances much faster than the academic review process, these platforms are the best source for practical case studies and recent evidence from top professionals. The third suggestion is to explore, based on your literature review, a deeper distinction between AI-native businesses and AI-powered businesses. This could help further refine the implementation path in the framework. And, of course, a practical case study will be the definitive way to demonstrate its value.

Interviewer: These are extremely valuable and concrete suggestions. Thank you very much for your time and constructive feedback.

Expert 1: You're welcome. Congratulations on the work. It wasn't easy, and it's an excellent foundation for what's to come in this Generative AI universe. It's really cool

Interview 2 transcript. Date: July 9, 2025

Interviewer: Based on the explanation of the framework I developed, do you consider it useful? Why?

Expert 2: Yes, I clearly consider it useful. Its primary utility lies in addressing a very current gap, which is the lack of a clear strategy for adopting Generative AI. By anchoring itself in a well-established and well-known business model, the Business Model Canvas, your framework offers a familiar structure that reduces the learning curve. The mapping you did of AI roles, such as creativity, automation, and optimization, to each block operationalizes the theory, turning abstract concepts into practical applications. For example, the suggestion to use AI to generate detailed customer personas in the Customer Segments block is a tangible and valuable use case.

Interviewer: Perfect, thank you very much for your answer. Do you have any criticism or did you identify any weaknesses in the proposed framework?

Expert 2: My main criticism has to do with its inherent complexity. Having nine blocks and six "dots" or AI roles creates a matrix with many possible combinations. This can be intimidating for an entrepreneur who wants to get started quickly. Furthermore, in its current form, the framework is a bit theoretical. It lacks an immediate action component, a way for the user, after understanding the concept, to move into practice in a guided and effortless way. It runs the risk of being an excellent conceptual map that ends up in a drawer, rather than a tool used in day-to-day operations.

Interviewer: Those are very pertinent observations. Considering that usefulness and those criticisms, would you consider implementing this framework?



Expert 2: My answer is: yes, but with one fundamental condition. I would consider implementing it if it were accompanied by a practical tool that makes it easily actionable. The strategic value and the common language it offers are undeniable. However, the time and effort cost for a manager to manually implement this analysis across all blocks would likely be prohibitive. Implementation becomes viable and highly desirable if there is, for example, an AI assistant that automates a large part of that process.

Interviewer: I see, and that makes perfect sense. So, to wrap up, what recommendations or suggestions would you have for improving the framework in the future?

Expert 2: My suggestions focus on transforming the framework from conceptual to practical. First and foremost, develop a "master prompt" or an AI agent. Create a system prompt for a model like GPT-4 that contains the entire explanation of your framework and is instructed to, upon receiving a business description, automatically map the needs to the relevant blocks and roles and, what is crucial, generate specific, ready-to-use prompts for the entrepreneur. This materializes the framework instantly.

Secondly, create an applied case study. Instead of a theoretical example, use your own framework – preferably with the help of the "master prompt" – to solve a real business problem, such as improving the recovery rate of failed payments, and document the process and the results. This serves as irrefutable proof of concept.

Finally, make it accessible. Following the idea we discussed, create a GitHub repository with a web page (GitHub Pages) to host the framework, the prompts, and the case studies. This promotes adoption and feedback. At the same time, simplify the entry point for users, perhaps by creating an initial questionnaire that helps them focus on the 2 or 3 blocks most critical to their business, rather than having to analyze all of them at once.

Interviewer: Excellent. These suggestions are extremely concrete and actionable. Thank you very much for your time and valuable feedback.

Expert 2: You're welcome. It was a pleasure. You have a very solid and promising academic foundation; the key now will be to add the layer of practicality that will make all the difference in the real world.

Interview 3 transcript. Date: October 9, 2025

Interviewer: Do you consider the proposed framework useful? Why or why not?

Expert: Yes, I consider the framework useful. Its main value lies in the structure it provides. By mapping the different roles of Generative Artificial Intelligence, such as creativity enhancement, decision-making support, planning and optimization,



automation, and governance, to each block of the Business Model Canvas, it becomes much clearer where AI can generate value. Since AI is developing so quickly and often lacks clear regulation, having a structured way to identify where it can be applied reduces uncertainty and helps guide strategic thinking. The integration of a SWOT analysis is also helpful, because it situates the adoption of AI within the specific context of an organization.

Interviewer: Do you have any criticism of the proposed framework?

Expert: I do, although these criticisms are constructive. First, the framework remains very theoretical. It successfully establishes conceptual links between AI roles and the Business Model Canvas, but it does not yet explain how these links can be operationalized in practice. It shows that AI is relevant, but it does not show how an organization would actually implement AI in each block. Second, some AI roles, like automation, naturally appear across multiple blocks. This is not a flaw, but it makes the framework feel somewhat repetitive and suggests the need for clearer distinctions between transversal roles and block-specific applications.

Interviewer: Would you consider implementing this framework? Why or why not?

Expert: Yes, I would implement it. Its segmentation is beneficial because the more clearly elements are defined, the easier they are to develop. In the same way that the Business Model Canvas helps structure a business model, this framework helps structure the strategic use of AI. It provides a high-level overview of how AI can support value creation in each block. However, I would implement it as an exploratory tool rather than as an operational guide, since it still needs practical validation and more concrete methodologies for application.

Interviewer: Do you have any recommendations or suggestions to improve the framework in the future?

Expert: My main suggestion is to strengthen the practical dimension. It would be valuable to develop a second phase of work that demonstrates how AI can actually be applied in each block of the Business Model Canvas, whether through tools, processes, prompts, or specific use cases. Including concrete examples or case studies would significantly enhance its applicability. Another recommendation is to expand the set of prompts you mentioned, transforming them into a structured guide aligned with each block. This would help bridge the gap between the conceptual level and the operational level. Finally, clarifying which AI roles are transversal and which are block-specific would reduce redundancy and improve analytical precision.

Interviewer: Excellent. These suggestions are extremely concrete and actionable. Thank you very much for your time and valuable feedback.



APPENDIX B



This is to certify that

Project No.: **INFSYS2025-11-132362**

Project Title: **Use of Generative Artificial Intelligence in Business Models**

Principal Researcher: **Ricardo Alexandre Dias Menor**

according to the regulations of the Ethics Committee of NOVA IMS and MagIC Research Center this project was considered to meet the requirements of the NOVA IMS Internal Review Board, being considered **APPROVED** on 11/13/2025.

It is the Principal Researcher's responsibility to ensure that all researchers and stakeholders associated with this project are aware of the conditions of approval and which documents have been approved.

The Principal Researcher is required to notify the Ethics Committee, via amendment or progress report, of

- Any significant change to the project and the reason for that change;
- Any unforeseen events or unexpected developments that merit notification;
- The inability of the Principal Researcher to continue in that role or any other change in research personnel involved in the project.

Lisbon, 11/13/2025

NOVA IMS Ethics Committee
ethicscommittee@novaims.unl.pt

Data with Purpose.

