Integrating Generative AI into Business Operations: A Comprehensive Analysis of Use Cases as Lighthouse Projects

Benedikt Bluemelhuber
TUM School of Management
benedikt.bluemelhuber@tum.de

Leon Thomandl
TUM School of Management
leon.thomandl@tum.de

Benedict Langer
TUM School of Management
benedict.langer@tum.de

Abstract

As Generative AI (GenAI) applications evolve, organizations face the challenge to decide which applications to adopt. This study supports organizations by mapping 63 GenAI use cases across a company's value chain. Through a systematic literature review complemented by a multiple case study with 33 semi-structured interviews with industry experts, it seeks to provide companies with actionable insights for integrating GenAI technologies, thereby enhancing efficiency and productivity. To provide a starting point for GenAI adoption, five applications were identified as particularly high-potential lighthouse projects: Enterprise GPT/Copilot Systems, which serve as company-internal assistants for knowledge management and content generation; Customer Service Chatbots utilizing uncritical, openly accessible data to enhance customer satisfaction; Coding Assistance Tools that automate routine coding tasks, increasing developer productivity; Input Management Systems for processing and classifying incoming information like customer complaints and emails; and Marketing Copy Generators for creating personalized marketing materials efficiently.

Keywords: generative ai, genai, use cases, lighthouse projects

1. Introduction

GenAI technologies, particularly those leveraging large language models (LLMs), have demonstrated abilities that parallel human cognition in tasks such as language processing, image generation, and data analysis (Chui et al., 2023). By revolutionizing user interaction, learning, and content creation, GenAI promises to spawn novel applications and to augment and automate existing business processes. Organizations are increasingly recognizing the potential to integrate GenAI-based applications to enhance the value of their offerings, reduce costs, increase efficiencies (Samuel Fosso Wamba & Minner, 2024).

According to a survey of 1,400 executive leaders conducted in the third quarter of 2023, 55% of organizations are reporting increased investments into GenAI (Gartner, 2023). These are primarily concentrated in IT and customer-facing functions such as sales, marketing, and customer service. Despite the rapid adoption of GenAI technologies, organizations face challenges in effectively leveraging it beyond initial experiments with only 4% being in production (Bant et al., 2023). This raises critical questions about the strategic implementation of GenAI in business contexts and makes evident that there is a lack of comprehensive understanding how to integrate GenAI technologies successfully (Kanbach et al., 2024; Prasad Agrawal, 2024). Current research exhibits two primary limitations in answering those challenges. First, few studies provide a holistic overview of how GenAI can be utilized across all aspects of a company's value chain (Ooi et al., 2023). Second, despite the myriad potential application areas for GenAI in business, there is insufficient guidance for companies to realize tangible business value (Feuerriegel et al., 2024). In response to these gaps, we aim to explore use cases and identify suitable projects for initial implementation of GenAI. Specifically, we formulate our research questions as follows:

RQ1: *What are GenAI use cases and applications across a company's value chain?*

RQ2: *Which applications are the most promising lighthouse projects for companies starting with GenAI?*

URI: https://hdl.handle.net/10125/111916
978-0-9981331-9-5

To achieve the objective, we conducted a systematic literature review (SLR) following established methodologies (Webster & Watson, 2002), analyzing existing research on GenAI applications within organizational contexts. Additionally, we performed 33 semi-structured interviews with experts across various industries to gain empirical insights into real-world GenAI implementations and challenges faced.

2. Background

To establish the theoretical foundation of our study, we first outline concepts of business functions in industrial companies, emphasizing their structure, processes, and strategic importance. We then provide foundations about the recent developments and concepts around GenAI.

2.1. Business Functions in Industrial Companies

Understanding the activities within industrial companies is essential for identifying where GenAI can enhance performance. Various frameworks exist to analyze and categorize business activities, such as the *McKinsey 7S Framework* (Peters & Waterman Jr, 1982), the *Balanced Scorecard* (Kaplan, 2009), and *Porter's Value Chain* (Porter, 1985). Each of these models offers a different perspective on how organizational functions contribute to overall performance. Porter's model for example categorizes activities into primary functions such as inbound logistics, operations, outbound logistics, marketing and sales, and service and support functions like firm infrastructure, human resource management, technology development, and procurement (Porter, 1985). We chose Porter's framework because it provides a clear illustration of how value is added at each stage of the business processes and directly links organizational activities to competitive advantage. This focus aligns well with our objective to systematically classify GenAI applications across business functions that critically impact organizational performance.

To tailor the model for our study on GenAI applications, we adapt Porter's framework to reflect contemporary business practices. We combine inbound and outbound logistics into one *Logistics* category, acknowledging the integrated nature of modern supply chains. For support activities, we subdivide firm infrastructure into *General Management*, *Finance and Accounting*, and *Legal* to capture distinct corporate roles more precisely. We separate *Technology Development* into *Product Development* and *Information Technology (IT) and Software Development*. Additionally, we introduce a *Firm-wide Activities* category for applications impacting multiple areas across the organization.

2.2. Recent Developments in GenAI

Recent advancements in GenAI have significantly expanded its capabilities and applications across domains. GenAI models can generate diverse content including text, images, audio, code, and synthetic data by learning patterns from vast datasets (Feuerriegel et al., 2024). These models leverage sophisticated architectures and training techniques that have rapidly progressed, enabling multiple modalities such as text-to-text, text-to-image, image-to-text, and audio-to-text transformations.

Integrating GenAI into day-to-day business operations still presents challenges (Gartner, 2023). Existing literature has explored various applications of GenAI in specific domains such as customer service, marketing, and product development (Cooper, 2024; Ray, 2023). However, a comprehensive framework that provides a holistic overview of GenAI applications across the entire value chain is lacking (Ooi et al., 2023). Within this study, a **use case** refers to a specific idea where GenAI technology can be employed to achieve a particular objective (Maghazei et al., 2022). The **application** refer to the practical use cases and implementations of these (Feuerriegel et al., 2024). This absence of an integrative perspective makes it difficult for organizations to identify applications that effectively address their specific business problems and to select appropriate GenAI solutions to realize tangible benefits (Feuerriegel et al., 2024). Furthermore, new levels of expertise are required to interact with such models like expertise in *prompt engineering* to guide models in generating relevant, high-quality outputs without extensive retraining (Feuerriegel et al., 2024).

3. Research Design

Our research design, shown in Figure 1, comprises three sequential steps: data collection, data analysis, and data synthesis. In the data collection phase, we conducted a systematic literature review to gather relevant studies, resulting in a comprehensive concept list categorizing papers by key aspects such as use cases and requirements. During the data analysis phase, we applied qualitative methods from Gioia et al. (2013) to assign items from the collected data into applications and assigned them to the respective Porter category. To evaluate the gathered applications, we conducted a multiple case study with semi-structured interviews and content analysis applied as proposed by Mayring (2000).

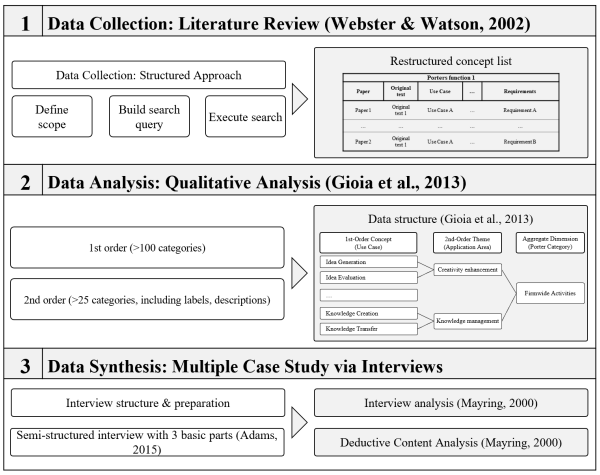

Figure 1. Structure of research design

3.1. Data collection

The conceptualization of the topic was performed based on existing literature and the modified structure of Porter's value chain (Porter, 1985). For the literature search, the interdisciplinary databases Scopus and Web of Science were queried to obtain a comprehensive selection of literature and to ensure consistency of results. To ensure systematic and comprehensive coverage, we structured the literature search into three components, covering the contemporary terms for each and ensuring precise results:

1. **GenAI Technology Terms** with the keywords "Gen.AI", "Generative AI", "Generative Artificial Intelligence", "Gen AI", "GenAI", "LLM", "LLMs", "Large Language Model*", "ChatGPT", and "Chat GPT"

2. **Application Terminology** with the keywords "Use Case", "Usage", "Application", "Implementation", and "Utilization"

3. **Organizational Context** with the keywords "Company", "Enterprise", "Business", "Corporate", "Corporation", "Organization", "Firm", "Venture", "Management", and functional areas like "Finance", "Accounting", "Human Resource Management", "Information Technology", "Product Development", "Operations", "Marketing", "Sales", and "Customer Service"

These components with their keywords were combined into a search query applied to the title, abstract, and keywords categories in both databases. In July 2024, a total of 1,926 articles from Scopus and 671 articles from Web of Science matched the search terms. A filtration was performed to ensure that only relevant articles were included in the analysis. In the first step, the search results were reduced to include only studies published between 2017 and 2024 and only papers written in English. Only relevant subject areas were considered, including Computer Science, Engineering, Social Sciences, Business, Management and Accounting, Economics, Econometrics and Finance, and Multidisciplinary studies. Duplicates were identified and excluded, resulting in 886 unique sources. In the second phase, a title and subsequent abstract screening of the remaining articles was performed. Most of the excluded articles either covered peripheral areas or were focused on unrelated topics. After this screening, 97 articles remained for a full-text assessment. Two inclusion criteria were evaluated: (i) the research focuses on GenAI applications in companies, or (ii) the research is directly related to the implementation of GenAI technologies within organizational contexts. In this analysis step, each article was examined to identify the core themes and objectives. All papers that covered GenAI or organizational applications only as a secondary topic were eliminated. Final inclusion and backward and forward searches led to inclusion of a total of 78 research papers for the analysis.

3.2. Data Analysis

To analyze the collected data, a qualitative content analysis was conducted, following the systematic approach suggested by Mayring, 2000. Utilizing the three-step coding process proposed by Gioia et al., 2013, we derived categories from the raw data extracted from the literature. In the first step, open coding was performed to identify all relevant concepts, resulting in a substantial number of first-order concepts. In the second step, axial coding was used to examine these concepts for similarities and differences, grouping them into second-order themes to connect related ideas and categories. Finally, the second-order themes were further abstracted into aggregate dimensions, completing the data structure (Gioia et al., 2013).

This procedure was applied to the extracted data from 78 literature sources on identified GenAI use cases, as illustrated in Figure 1. The analysis identified 172 GenAI use cases as first-order concepts, which were grouped into 63 application areas representing the second-order themes. These were further summarized into one of the different business functions from the modified Porter's value chain structure (Porter, 1985). This data structure forms the foundation for a comprehensive overview of GenAI applications in companies, detailed in the results section.

For the interviews, participants were recruited via purposive sampling (Campbell et al., 2020), to span industries, firm sizes, and roles relevant to GenAI deployment, summarized in Table 1. The semi-structured interview format was chosen to allow flexibility in exploring topics while ensuring that key areas of interest were addressed. An interview guide was developed based on the results of the

Table 1. Summary of Interview Participants

Case	Company info	Interview participants	Avg. duration
1	Size: 125,000 employees Revenue: € 155 billion Sector: Automotive	Software Development (1), Logistics (1), Human Resource Management (1), Marketing & Sales (2), General Management (2), Product Development (2), Operations (1), Service (1)	48 min
2	Size: 320,000 employees Revenue: € 78 billion Sector: Financial Services	Software Development (1), Finance & Accounting (4), Human Resource Management (1), General Management (1), Product Development (2), Operations (1), Service (1)	50 min
3	Size: 50 employees Revenue: € 40 million Sector: Renewable Energy	Software Development (2), Legal (1), Finance & Accounting (1), Human Resource Management (1), Marketing & Sales (2), General Management, Product Development (2), Operations (1), Service (1)	42 min

literature review, incorporating open-ended questions to encourage detailed and insightful responses.

The data from the interviews was analyzed using a deductive content analysis as proposed by Mayring (2000). Initially, the analysis was guided by the concepts and categories identified in the SLR. However, the nature of semi-structured interviews allowed for the emergence of unexpected insights, which were integrated into the analysis. This process involved coding the transcribed interviews, grouping similar responses, and refining categories to enhance the overall depth and practicality of the results. Some categories derived from the literature were refined or adapted based on the interview findings. For instance, new themes emerged regarding best practices in team composition for GenAI projects and considerations for avoiding certain applications during initial implementation phases. Finally, to provide practical insights in form of lighthouse projects, applications were evaluated according to the decision matrix, proposed by Bodendorf (2025). Hereby, each use case was prioritized based on their business value and implementation complexity. The five use cases with highest business value to implementation complexity ratio resulting from this analysis are included in this study. This iterative process ensured that the final framework accurately reflects both theoretical perspectives and practical experiences.

4. Findings

This chapter presents the findings from the SLR and the multiple case study, aimed at answering our two research questions. The results are structured into two main sections: First, we provide a generic overview of identified GenAI applications. Second, insights from the expert interviews regarding lighthouse projects and implementation considerations are presented.

4.1. Generative AI Applications

The results reveal a comprehensive overview of current GenAI applications classified according to modified version of Porter's value chain. The derived classification with 63 different applications are explained in the following text section.

The identified GenAI applications are detailed in Table 2, which includes a classification aligned with Porter's value chain, providing a comprehensive view of each application along with its specific use cases, descriptions, and relevant sources. These use cases are categorized based on a SLR, reflecting how GenAI is applied across different business functions. The applications are arranged in descending order of frequency, highlighting the most commonly cited use cases first, offering insights into their practical manifestations in organizational settings.

4.2. Prioritization of Lighthouse Projects

Based on empirical data from expert interviews, we identify several lighthouse projects for initial GenAI implementation. Based on the conducted interviews, we derive five key applications: Enterprise-wide AI assistants, customer service chatbots, coding assistance tools, input management systems, and marketing content generators. These applications deliver substantial business value yet entail only moderate implementation complexity, rendering them suitable entry points for organizations adopting GenAI.

4.2.1. Enterprise GPT/Copilot System The primary lighthouse project is described by Interviewee I2C1 as "a company-internal GPT that serves as a copiloting system and can be used in various areas within the company." By enabling employees to familiarize themselves with GenAI, it becomes embedded in corporate culture and provides a foundation for further applications (Interviewee I10C2). Regarding business value, this system significantly impacts processes by saving time, ensuring information quality and consistency (Interviewee I4C2). Implementation complexity depends on company prerequisites and application scope, ranging from simple use of existing algorithms to more advanced integrations with multiple data sources (Interviewee I5C3).

Table 2: GenAI Applications identified in the literature

Business function	**Application**, *use case* and description	Source(s)
Firmwide Activities	A **Communication and Collaboration Tool**, is enhancing efficiency by offering *AI-assisted writing* for drafting messages and provides *editing and proofreading* to improve clarity in communications. In **Creativity Enhancement**, GenAI stimulates innovation by enabling content creation including text, images, music, and video thus aiding in *developing innovative ideas* and fostering an inventive culture. GenAI improves **Data Accessibility** by allowing non-experts to interact with data through *intuitive data handling*, promoting broader data adoption and informed decision-making. The **Document Generation** application streamlines workflows by *auto-generating documents* like presentations and meeting summaries, enhancing efficiency by reducing manual effort. Serving as a **Personal Assistant**, GenAI aids employees in *personal time management* by generating task lists and offers *reminder prompts* about past actions and team interactions, fostering collaboration. As a **Research Tool**, GenAI facilitates *search and question answering*, providing quick insights and enhancing research capabilities.	Isgüzar et al., 2024, Mondal et al., 2023, Raj et al., 2023, Filippo et al., 2024, Bapat et al., 2023, Feng et al., 2024, Srivastava et al., 2024, Alavi et al., 2024, Kalota, 2024, Brynjolfsson et al., 2023, Haddud, 2024
General Management	In **Strategic Management**, GenAI optimizes processes by automating the generation of *financial reports*, *market summaries*, and *business documents*. It can assist in *creating business proposals* and *generating business names*. In **Operational Change Management**, GenAI supports managers throughout the change process. It aids in the *planning stage* by generating content to conduct and communicate change initiatives and drafting roll-out plans. It helps *mobilize stakeholders* by creating customized communication materials, assists in *training managers* to improve leadership skills, and after implementation, it can *analyze feedback*, perform *sentiment analysis*, and suggest appropriate *metrics to measure progress*, enhancing the effectiveness of change initiatives.	Kanitz et al., 2023, Zhuang and Wu, 2023
Finance & Accounting	As **Accounting Assistance**, GenAI helps by *advising on data entry tasks* and *automating manual tasks* like data entry, invoice and expense categorization, bank statement reconciliation, and report generation. For **Data Extraction and Decision Support**, it aids in *on-demand data extraction*, *detecting accounting irregularities*, and *analyzing reporting data*. Through **Co-piloted Auditing**, GenAI enhances auditing through *financial ratio analysis*, *text mining*, *journal entry testing*, enabling *continuous monitoring*, *auto-detection of risks*, and providing *timely alerts*. For **Compliance Checking**, it automates *checking financial reporting compliance* and *detecting contradictions between standards*. In **Taxation Assistance**, GenAI supports *tax research*, *bookkeeping*, *tax return preparation*, offers *real-time assistance*, provides *personalized tax recommendations*, and *notes imminent tax deadlines*. In **Financial and Managerial Reporting**, it facilitates the *creation and analysis of financial documents*, *improves accuracy*, and *mitigates reporting errors*. In **Financial Planning and Budgeting**, GenAI assists with *cost budgeting*, *risk management*, *investment analysis*, *generating personalized financial plans*, and *performing financial modeling* for new products and services.	Kanbach et al., 2024, Ray, 2023, Bochkay et al., 2023, Zhao and Wang, 2024, Gu et al., 2023, Cao and Zhai, 2023
Legal	**Contract Management**, where AI tools assist in *analyzing legal data*, *automatically generating contract drafts*, *reviewing documents for potential legal issues*, and *summarizing and synthesizing contracts*. Another application is the **Legal Consultation Tool**, providing *legal advice chatbots* that *address legal inquiries*, *respond based on relevant statutes*, and *assist users with legal uncertainties*, offering *possible legal options* and considering *potential legal outcomes*. In **Legal Research and Analysis**, GenAI aids by *analyzing case laws and regulations*, *classifying legal documents*, *summarizing large volumes of text*, *extracting relevant information*, employing *coreference resolution*, and *identifying relevant documents during litigation*. It also helps to *research relevant standards and regulations*, and *analyze existing patents and intellectual property rights*. For **Mergers and Acquisitions Assistance**, GenAI assists in *due diligence* by *reviewing legal documents*, *handling background checks*, and *assessing potential risks* to inform decision-making. **Risk Management and Compliance** is supported by GenAI by *conceptualizing and drafting risk guidelines*, *summarizing regulatory changes*, *answering questions about risk documents*, and *reviewing and analyzing risk reports*.	Ray, 2023, Quevedo et al., 2023, Srivastava et al., 2024, Mondal et al., 2023
Human Resource Management	GenAI can enhance **Employee Relations and Wellbeing**, *personalized appraisals* by analyzing real-time performance data and considering factors like team collaboration and intangible contributions. It facilitates *mentoring and support pairing* by connecting employees needing assistance with suitable colleagues, provides *mental health support* through empathetic responses, and synthesizes *employee feedback* for organizational improvements. In **Human Resource Information Systems**, GenAI can *draft workplace communications and policies* and serve as a *chatbot interface* providing employees with on-demand access to information on policies, benefits, and services. Under **Learning and Development**, GenAI creates *customized learning and training plans* tailored to individual needs and enables *peer-to-peer learning platforms* by connecting employees based on their queries and skills. For **Performance Management**, it assists with *data-driven evaluations* by analyzing qualitative and quantitative performance data and helps improve *compensation structures*. In **Recruitment**, GenAI automates tasks by *generating job descriptions*, establishing *skill patterns*, assisting with *resume screening*, providing *candidate assessments*, and enhancing *onboarding* processes.	Kar et al., 2023, Mondal et al., 2023, Alavi et al., 2024, Ooi et al., 2023
Product Development	In **Market Research**, it analyzes consumer behavior and market trends by collecting data on *customer reviews and stories* and performing analyses like *PESTEL* to provide insights, including *pricing strategies*. For **Idea Generation**, GenAI assists with *inspiration and understanding the market*, offering *ideas for brainstorming* or automatically generating *new product ideas* for predefined markets. During **Prototype Development**, it aids in *exploration, research, and ideation*, helps answer questions about *product features*, and can automate *virtual prototypes and mockups*. As a **Design Assistant**, GenAI supports decision-making by analyzing public data, performing sentiment analysis on customer reviews, suggesting *design alterations*, and generating *3D renderings*. Serving as a **Knowledge Retrieval Platform**, it offers a centralized resource for diverse knowledge, improving collaboration and facilitating an *iterative learning process*. Through **Generative Design**, GenAI automates the generation of design alternatives within constraints, enabling creation of *3D models and technical drawings*, and achieving *structural optimization* to enhance product efficacy and aesthetics.	Isgüzar et al., 2024, Cooper, 2024, Bartlett and Camba, 2024, Sai et al., 2024, Mondal et al., 2023, Chandrasekera et al., 2024, Preuss et al., 2024

Continued on next page

Table 2: GenAI Applications identified in the literature

Continued from previous page

Business function	**Application**, *use case* and description	Source(s)
IT and Software Development	**Software Development**, GenAI significantly aids in *code generation* by producing code snippets based on prompts, assisting with *code optimization*, and recommending fixes for *bug resolution*. It helps in *code documentation* and enables *code translation between programming languages*, facilitating legacy migration. In **Ideation and Prototyping**, GenAI supports *brainstorming*, *requirements elicitation*, and accelerates *prototype development* by assisting with system design and creating visual sketches. For **Software Testing**, GenAI automates *unit test generation* and synthesizes artificial data for testing, enhancing quality assurance. In **Agile Software Development**, GenAI acts as a virtual member, assisting in *iterative development* and collaboration. In **UI/UX Design**, it offers *design suggestions*, aids in *UX modernization* by converting UX representations into modern designs, and generates *predesigned code* for implementation. In **IT Systems**, GenAI creates *semi-automated IT support systems* by automating ticket assignment, improving efficiency. In **Database Management**, GenAI assists with *data preparation*, *data integration*, *database tuning*, and *translating natural language to SQL*, enhancing accessibility and streamlining workflows.	Sohail et al., 2023, Ray, 2023, Filippo et al., 2024, Kanbach et al., 2024, Charfeddine et al., 2024, Sai et al., 2024, Ooi et al., 2023, Mondal et al., 2023
Procurement	The application of **Supplier Management** is enabled through *Supplier Evaluation*, it analyzes various data sources to provide sustainability reports, aiding in supplier selection and reducing supply chain risks. In *Supplier Negotiations*, GenAI processes vast amounts of supplier data to generate creative and personalized content; for example, a negotiation chatbot can enhance negotiations by creating individual conversations with suppliers and adjusting strategies based on their responses. GenAI also improves *Supplier Communication* by resolving supply issues through more effective communication. The second area is **Sustainable Procurement**, where GenAI supports companies by evaluating and comparing data regarding the environmental footprint of products, such as carbon emissions and energy and material usage.	Srivastava et al., 2024, Haddud, 2024, Ooi et al., 2023
Logistics	In **Logistics and Transportation**, GenAI helps by *optimizing logistics routes* through data analysis, leading to efficiency and cost reduction, and supports the *selection of carriers*. For **Inventory Management and Demand Forecasting**, GenAI assists in *improving demand forecasting* by analyzing real-time data and market trends, aids in *optimizing inventory levels* to reduce stock-outs, and enhances *production planning*. In **Supply Chain Analytics**, GenAI is used to *automatically construct and validate supply chain maps*, providing specialists with a *holistic view* of the supply chain. It enables *smart supply chains* by optimizing processes and enhancing accuracy and efficiency. GenAI also contributes to *performance optimization and cost reduction* through reinforcement learning tools, offers *insights into end-of-life product forecasting*, and supports *risk management* by flagging potential risks and recommending mitigation strategies. Within **Supply Chain Communication**, GenAI enhances communication by *delivering real-time information access* to all stakeholders, reducing misconceptions, and improving overall communication efficiency.	Srivastava et al., 2024, Sai et al., 2024, Kmiecik, 2023, Haddud, 2024, Jackson et al., 2024, Ooi et al., 2023, Kar et al., 2023, Wichmann et al., 2020
Operations	**Advanced Production Management**, where LLMs and NLP techniques assist with *product lifecycle management* by retrieving and understanding customer sentiment about product quality. Another application is **Facility Management**, where generative design algorithms examine possible layout concepts, reconciling them with objectives like costs or size, thus aiding in *factory planning projects*. In **Maintenance Assistance**, GenAI enhances *knowledge and decision-making* for maintenance professionals, with GPT-4 demonstrating potential in maintenance assessments. More complex use cases include **Prognostics and Health Monitoring**, where GenAI automates *predictive maintenance scheduling* using deep digital twins built from generative models to detect faults and track assets. Additionally, GenAI can *produce synthetic data* using GANs to train models for machine fault diagnosis, enhancing maintenance capabilities.	Ooi et al., 2023, Rane, 2023, Sai et al., 2024, Kiangala and Wang, 2024, Mondal et al., 2023
Marketing & Sales	**Customer Relationship Management (CRM)** uses GenAI to *perform sentiment analysis* on customer feedback, informing strategies and enhancing touchpoints with *personalized post-sale interactions*, improving relationships. In **Marketing Research and Analysis**, GenAI *evaluates marketing data* to identify trends, aiding in *creating tailored launch plans* to engage target markets. For **Content Marketing**, GenAI *assists content creators*, *automates content generation* for blogs, emails, social media, and ads, analyzes *target audience* to create engaging content, and can *generate images and videos*. A transformative application is **Personalized Content at Scale**, enabling *customized content* and *personalized campaigns* based on customer data, allowing for *hyper-personalization* by analyzing browsing history and purchases. In **Digital Marketing**, GenAI creates *personalized product recommendations*, aiding lead generation and conversions. It embeds *expert systems* into websites, assists customer decision-making, and helps in *conceptualizing strategies* with real-time adjustments. For **Sales Strategy and Operations**, GenAI aids in *developing data-driven pitches* and *personalized offers* at scale. It offers *tailored recommendations*, handles objections, and provides insights by *analyzing sales data*. In **Sales Training**, GenAI assists by *generating training materials* and *analyzing customer interactions* to personalize learning and improve performance.	Bansal et al., 2024, Raj et al., 2023, Kumar et al., 2023, Mondal et al., 2023, Sai et al., 2024, Zhuang and Wu, 2023, Ooi et al., 2023, Ray, 2023, Li et al., 2024, Kar et al., 2023
Service	**Customer Service Training** with GenAI creates *simulated environments* for support staff to practice customer interactions, enhancing training effectiveness. Another application is the **Customer Service Support Tool**, where GenAI assists staff by providing *quick, precise, and contextually relevant answers* to customer inquiries, improving efficiency and response times. Companies also employ **Customer Service Chatbots**, fully autonomous systems that *deliver tailored customer support*, including *targeted product recommendations* and assistance with *process transactions*. These chatbots handle inquiries with minimal intervention, enhancing productivity and customer experience. Expanding on this, **Customer Service Expert Systems** integrate GenAI with enterprise information systems to autonomously manage *a broad spectrum of customer inquiries* in any language. They provide *real-time order tracking*, *empathetic complaint handling*, and can *alert human agents* when necessary. Additionally, these systems *collect and analyze customer feedback* to gain insights, which are funneled into other departments to refine products and services, thereby improving overall customer satisfaction.	Bapat et al., 2023, Raj et al., 2023, Sohail et al., 2023, Bansal et al., 2024, Alavi et al., 2024, Kumar et al., 2023, Haddud, 2024, Kar et al., 2023, Mondal et al., 2023

Its main applications are knowledge management, information retrieval and analysis, and content generation. When connected to internal data such as documents and databases, it enables employees to access information through a chatbot (Interviewee I5C3). For information retrieval and analysis, the system processes and synthesizes diverse sources to produce summaries or recommendations, including e.g. tenders, manuals, and financial documents (Interviewees I6C1, I1C2, I4C2).

4.2.2. External Customer Service Chatbot The next lighthouse project is the development of "a simple customer service chatbot with uncritical data", identified by Interviewee I5C2 as an effective entry point. Example applications include providing recipe suggestions or guiding users through manuals (Interviewees I5C2, I6C3). The main business value lies in increasing customer satisfaction and enhancing the company's external image (Interviewee I5C1), while also enabling feedback loops to identify areas for improvement. Implementation is relatively straightforward, as it relies on pre-trained language models and openly accessible, non-sensitive data (Interviewee I8C3).

4.2.3. Coding Assistance Using GenAI for coding tasks is another suitable lighthouse project identified in the interviews. Interviewee I1C3 emphasized that "the first and most important use case in this regard is coding", which GenAI can generate and developers can verify and refine. For example, interviewee I1C1 mentioned "programming of production robots", while Interviewee I2C3 referred to "programming of webpages." The business value centers on time efficiency, as developers can shift their focus from writing basic code to optimizing and improving it. This also leads to cost savings by reducing the need for internal or external developer capacities. In terms of ease of implementation, it is often easy to execute as companies can utilize existing models and tools (Interviewee I2C2).

4.2.4. Input Management A further lighthouse project concerns input management in knowledge work. Companies can use GenAI to process, classify, and analyze incoming information, enabling further internal processing (Interviewee I4C3). Examples include "customer complaints processing" mentioned by Interviewee I9C2, while I4C3 referred to "email communication classification". The business value lies in time efficiency, since "it mainly results in overall time efficiency, as the relevant information can be selected and structured in advance" (Interviewee I4C3). Regarding the ease of implementation, "this application is relatively simple to implement, as it usually connects to other measures and existing automation technologies" (Interviewee I9C3).

4.2.5. Marketing Ad Copy Generation The generation of marketing ad copies is another suitable lighthouse project. "Companies can use GenAI to create individual marketing materials based on stock image databases and company slogans" as Interviewee I5C3 explained. Regarding the business value, this approach "saves the company time and costs associated with external agencies while improving personalization and brand identity" (Interviewee I6C1). Interviewee I5C3 noted that "it is easy to implement by using available LLMs or existing tools."

5. Discussion

GenAI technologies enhance workflow efficiency and effectiveness across business functions. This study identified 63 GenAI applications across the value chain, classified using Porter's adjusted framework. The mapping reveals GenAI's transformative potential throughout organizational processes. Previous research emphasized technical capabilities without addressing practical business applications. This study explored organizational prioritization through lighthouse projects. Expert interviews identified five key projects: Enterprise GPT/Copilot systems, customer service chatbots, coding assistance tools, input management systems, and marketing content generators. These applications balance business value with implementation complexity. Organizations benefit from incremental adoption approaches. Starting with simpler applications enables capability development before addressing complex implementations (Weber et al., 2022). This strategy builds internal expertise and demonstrates value, securing organizational support for expanded initiatives. Implementation complexity depends on data accessibility, sensitivity, and infrastructure requirements. High-quality data availability proves fundamental for successful AI implementation (Wamba et al., 2017). Prior research indicates limited comprehensive understanding of successful GenAI integration within companies (Kanbach et al., 2024; Prasad Agrawal, 2024). Current research exhibits two primary limitations: absence of holistic GenAI utilization overview across company value chains (Ooi et al., 2023), and insufficient guidance for realizing promised business value (Feuerriegel et al., 2024; Langer & Pütterich,

2024). The empirical mapping across Porter's value chain creates a structured implementation framework (Porter, 1985). It demonstrates that established strategic frameworks remain applicable for organizing emerging technology applications. This validation supports continued use of Porter's framework in studying digital transformation. The identification of Lighthouse projects contributes to technology adoption strategies, demonstrating how organizations balance value with complexity. This aligns with Diffusion of Innovations theory (Rogers, 2003), emphasizing that innovation adoption depends on perceived attributes including relative advantage and complexity. Practical implications include actionable implementation guidance. The application classification enables systematic opportunity identification. Organizations can develop phased roadmaps prioritizing projects based on strategic objectives. This methodology builds confidence through early successes while establishing foundations for advanced applications. However, the study's empirical basis rests on a limited set of interviews across three case companies, which constrains the generalizability of the findings and may reflect sector-specific dynamics rather than broader industry patterns. In addition, the reliance on self-reported interview data, combined with the use of literature-derived categories to guide questioning, potentially introduces biases in how use cases were articulated and classified.

6. Conclusion

Organizations leverage GenAI for efficiency and productivity gains. Addressing the need for comprehensive value chain guidance, this study conducted a systematic literature review complemented by real world data from expert interviews. The first research question examined GenAI applications across organizational functions. Applications demonstrate capabilities in task automation, process enhancement, innovation support, and customer engagement. Marketing applications generate personalized content; operations applications optimize production planning. This mapping establishes GenAI's transformative impact on business processes. The second research question identified lighthouse projects for initial adoption. Five projects emerged: Enterprise GPT/Copilot systems, customer service chatbots, coding assistance tools, input management systems, and marketing content generators. Selection criteria emphasized business value and implementation feasibility. These projects deliver productivity gains, cost reductions, and satisfaction improvements while building organizational capabilities. Theoretical contributions include a structured framework for GenAI application classification. Practical contributions provide implementation roadmaps for organizations. Lighthouse projects offer proven starting points balancing immediate returns with manageable complexity. The phased approach enables systematic capability development supporting future advanced implementations.

References

Alavi, M., Leidner, & Mousavi, R. (2024). A knowledge management perspective of generative artificial intelligence. *Journal of the Assossiation for Information Systems*, *25*(1), 1–12.

Bansal, G., Chamola, V., Hussain, A., Guizani, M., & Niyato, D. (2024). Transforming conversations with ai—a comprehensive study of chatgpt. *Cognitive Computation*.

Bant, A., Poitevin, H., Greene, N., & Brethenoux, E. (2023). 5 forces that will drive the adoption of genai. *Harvard Business Review*. https://hbr.org/2023/12/5-forces-that-will-drive-the-adoption-of-genai

Bapat, G., Mahindru, R., Kumar, A., Rroy, A. D., Bhoyar, S., & Vaz, S. (2023). Leveraging chatgpt for empowering msmes: A paradigm shift in problem solving. *Engineering Proceedings*, *59*(1).

Bartlett, K. A., & Camba, J. D. (2024). Generative artificial intelligence in product design education: Navigating concerns of originality and ethics. *International Journal of Interactive Multimedia and Artificial Intelligence*, *8*(5), 55–64.

Bochkay, K., Brown, S. V., Leone, A. J., & Tucker, J. W. (2023). Textual analysis in accounting: What's next?*. *Contemporary Accounting Research*, *40*(2), 765–805.

Bodendorf, F. (2025). A data-driven use case planning and assessment approach for AI portfolio management. *Electronic Markets*, *35*(1), 22.

Brynjolfsson, E., Li, D., & Raymond, L. (2023). Generative AI at Work. *National Bureau of Economic Research*.

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: Complex or simple? research case examples. *Journal of Research in Nursing*, *25*, 652–661.

Cao, Y., & Zhai, J. (2023). Bridging the gap–the impact of chatgpt on financial research. *Journal*

of Chinese Economic and Business Studies, *21*(2), 177–191.

Chandrasekera, T., Hosseini, Z., & Perera, U. (2024). Can artificial intelligence support creativity in early design processes? *International Journal of Architectural Computing*.

Charfeddine, M., Kammoun, H. M., Hamdaoui, B., & Guizani, M. (2024). Chatgpt's security risks and benefits: Offensive and defensive use-cases, mitigation measures, and future implications. *IEEE Access*, *12*, 30263–30310.

Chui, M., Hazan, E., Roberts, R., Singla, A., & Smaje, K. (2023). The economic potential of generative ai.

Cooper, R. G. (2024). The artificial intelligence revolution in new-product development. *IEEE Engineering Management Review*, *52*(1), 195–211.

Feng, C. M., Botha, E., & Pitt, L. (2024). From hal to genai: Optimizing chatbot impacts with care. *Business Horizons*.

Feuerriegel, S., Hartmann, J., Janiesch, C., & Zschech, P. (2024). Generative AI. *Business & Information Systems Engineering*, *66*(1), 111–126.

Filippo, C., Vito, G., Irene, S., Simone, B., & Gualtiero, F. (2024). Future applications of generative large language models: A data-driven case study on chatgpt. *Technovation*, *133*.

Gartner. (2023). Gartner Poll Finds 55% of Organizations are in Piloting or Production Mode with Generative AI. Retrieved September 22, 2024, from https://www.gartner.com/en/newsroom/press-releases/2023-10-03-gartner-poll-finds-55-percent-of-organizations-are-in-piloting-or-production-mode-with-generative-ai

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods*, *16*(1), 15–31.

Gu, H., Schreyer, M., Moffitt, K., & Vasarhelyi, M. A. (2023). *Artificial intelligence co-piloted auditing*.

Haddud, A. (2024). Chatgpt in supply chains: Exploring potential applications, benefits and challenges. *Journal of Manufacturing Technology Management*.

Isgüzar, S., Fendoglu, E., & Simsek, A. I. (2024). Innovative applications in businesses: An evaluation on generative artificial intelligence. *Amfiteatru Economic*, *26*(66).

Jackson, I., Ivanov, D., Dolgui, A., & Namdar, J. (2024). Generative artificial intelligence in supply chain and operations management: A capability-based framework for analysis and implementation. *International Journal of Production Research*.

Kalota, F. (2024). A primer on generative artificial intelligence. *Education Sciences*, *14*(2).

Kanbach, D. K., Heiduk, L., Blueher, G., Schreiter, M., & Lahmann, A. (2024). The genai is out of the bottle: Generative artificial intelligence from a business model innovation perspective. *Review of Managerial Science*, *18*(4), 1189–1220.

Kanitz, R., Gonzalez, K., Briker, R., & Straatmann, T. (2023). Augmenting organizational change and strategy activities: Leveraging generative artificial intelligence. *JOURNAL OF APPLIED BEHAVIORAL SCIENCE*, *59*(3), 345–363.

Kaplan, R. S. (2009). Conceptual foundations of the balanced scorecard. *Handbooks of management accounting research*, *3*, 1253–1269.

Kar, A. K., Varsha, P. S., & Rajan, S. (2023). Unravelling the impact of generative artificial intelligence (gai) in industrial applications: A review of scientific and grey literature. *Global Journal of Flexible Systems Management*, *24*(4), 659–689.

Kiangala, K. S., & Wang, Z. (2024). An experimental hybrid customized ai and generative ai chatbot human machine interface to improve a factory troubleshooting downtime in the context of industry 5.0. *International Journal of Advanced Manufacturing Technology*, *132*(5-6), 2715–2733.

Kmiecik, M. (2023). Chatgpt in third-party logistics – the game-changer or a step into the unknown? *Journal of Open Innovation: Technology, Market, and Complexity*, *9*(4).

Kumar, A., Bapat, G., Hota, S. L., Abishek, G. D., & Vaz, S. (2023). Unlocking brand excellence: Harnessing ai tools for enhanced customer engagement and innovation†. *Engineering Proceedings*, *59*(1).

Langer, B., & Pütterich, F. (2024). Assessing value creation of analytics projects in smes. *19th International Conference on Wirtschaftsinformatik*, *19*.

Li, P. Y., Castelo, N., Katona, Z., & Sarvary, M. (2024). Frontiers: Determining the validity of large language models for automated perceptual analysis. *MARKETING SCIENCE*, *43*(2).

Maghazei, O., Lewis, M. A., & Netland, T. H. (2022). Emerging technologies and the use case: A multi-year study of drone adoption. *Journal of Operations Management*, *68*, 560–591.

Mayring, P. (2000). Qualitative inhaltsanalyse. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *1*(2).

Mondal, S., Das, S., & Vrana, V. G. (2023). How to bell the cat? a theoretical review of generative artificial intelligence towards digital disruption in all walks of life. *Technologies*, *11*(2).

Ooi, K.-B., Tan, G.-H., Al-Emran, M., Al-Sharafi, M. A., Capatina, A., Chakraborty, A., Dwivedi, Y. K., Huang, T.-L., Kar, A. K., Lee, V.-H., Loh, X.-M., Micu, A., Mikalef, P., Mogaji, E., Pandey, N., Raman, R., Rana, N. P., Sarker, P., Sharma, A., … Wong, L.-W. (2023). The potential of generative artificial intelligence across disciplines: Perspectives and future directions. *Journal of Computer Information Systems*.

Peters, T. J., & Waterman Jr, R. H. (1982). In search of. *Of Excellence, New York: Harper and Row*.

Porter, M. E. (1985). Competitive advantage creating and sustaining superior performance with a new introduction.

Prasad Agrawal, K. (2024). Towards Adoption of Generative AI in Organizational Settings. *Journal of Computer Information Systems*, *64*(5), 636–651.

Preuss, N., Alshehri, A. S., & You, F. (2024). Large language models for life cycle assessments: Opportunities, challenges, and risks. *Journal of Cleaner Production*, *466*.

Quevedo, E., Cerny, T., Rodriguez, A., Rivas, P., Yero, J., Sooksatra, K., Zhakubayev, A., & Taibi, D. (2023). Legal natural language processing from 2015-2022: A comprehensive systematic mapping study of advances and applications. *IEEE Access*, 1.

Raj, R., Singh, A., Kumar, V., & Verma, P. (2023). Analyzing the potential benefits and use cases of chatgpt as a tool for improving the efficiency and effectiveness of business operations. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*, *3*(3).

Rane, N. (2023). *Chatgpt and similar generative artificial intelligence (ai) for smart industry: Role, challenges and opportunities for industry 4.0, industry 5.0 and society 5.0*.

Ray, P. P. (2023). Chatgpt: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope. *Internet of Things and Cyber-Physical Systems*, *3*, 121–154.

Rogers, E. M. (2003, August). *Diffusion of innovations* (5th). Free Press.

Sai, S., Sai, R., & Chamola, V. (2024). Generative ai for industry 5.0: Analyzing the impact of chatgpt, dalle, and other models. *IEEE Open Journal of the Communications Society*, 1.

Samuel Fosso Wamba, M. M. Q., Cameron Guthrie, & Minner, S. (2024). Chatgpt and generative artificial intelligence: An exploratory study of key benefits and challenges in operations and supply chain management. *International Journal of Production Research*, *62*(16), 5676–5696.

Sohail, S. S., Farhat, F., Himeur, Y., Nadeem, M., Madsen, D., Singh, Y., Atalla, S., & Mansoor, W. (2023). Decoding chatgpt: A taxonomy of existing research, current challenges, and possible future directions. *Journal of King Saud University - Computer and Information Sciences*, *35*(8).

Srivastava, S. K., Routray, S., Bag, S., Gupta, S., & Zhang, J. Z. (2024). Exploring the potential of large language models in supply chain management: A study using big data. *Journal of Global Information Management*, *32*(1).

Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J.-f., Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research*, *70*, 356–365.

Weber, M., Limmer, N., & Weking, J. (2022). Where to start with ai?—identifying and prioritizing use cases for health insurance.

Webster, J., & Watson, R. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*, *26*(2), 13–23.

Wichmann, P., Brintrup, A., Baker, S., Woodall, P., & McFarlane, D. (2020). Extracting supply chain maps from news articles using deep neural networks. *International Journal of Production Research*, *58*(17), 5320–5336.

Zhao, J., & Wang, X. (2024). Unleashing efficiency and insights: Exploring the potential applications and challenges of chatgpt in accounting. *Journal of Corporate Accounting and Finance*, *35*(1), 269–276.

Zhuang, X., & Wu, Y. (2023). Chatgpt: How it can support corporate social responsibility. *Journal of Business Strategy*.