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Managing Gen AI Innovation Projects in Industrial Companies

Framework for organising around Gen AI innovation projects

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Abstract

Generative AI (Gen AI) has been disrupting the world since the launch of Chat GPT. Since then, different Gen AI tools have become significant parts of our daily lives. Businesses worldwide have also recognised the potential of Gen AI and begun to integrate it into their solutions to remain competitive. However, the significant interest in Gen AI solutions strains these companies' innovation management.

The purpose of this study is to develop innovation management practices for Gen AI innovation projects. For this, the study designs a framework for managing Gen AI innovation projects. To achieve this, the study investigates the characteristics of Gen AI innovation projects to find an efficient way to manage them. Additionally, it studies different methods for accelerating the innovation process to help companies adapt to the high demand for Gen AI innovations.

The framework leverages the characteristics of Gen AI innovation projects and aims to accelerate the early phases of the innovation process. Although it was developed for the needs of a case company, its elements can be adapted to the needs of other organisations with similar challenges. The framework's theoretical foundation illustrates its potential for enhancing the innovation process. However, further research is required to evaluate the framework's practical application and generalisability.

Keywords Innovation management, Generative artificial intelligence, Gen AI, Innovation process

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Tiivistelmä

Generatiivinen tekoäly (Gen AI) on mullistanut maailmaa aina Chat GPT:n julkaisusta lähtien. Viime aikoina erilaiset Gen AI ratkaisut ovat muodostuneet merkittäväksi osaksi ihmisten arkea. Myös yritysmaalima on havainnut Gen AI:n tarjoamat mahdollisuudet ja aloittanut sen integroinnin osaksi tuotteita säilyttääkseen kilpailuetunsa. Samaan aikaan laaja kiinnostus Gen AI ratkaisuja kohtaan on kuitenkin alkanut kuormittamaan yritysten innovaatioiden hallintaa.

Tämän tutkimuksen tavoitteena on kehittää innovaatioidenhallintaa Gen AI -innovaatioprojekteja varten. Tätä varten tutkimuksessa suunnitellaan viitekehys Gen AI -innovaatioprojektien hallintaan. Saavuttaakseen tämän tutkimus tarkastelee Gen AI -innovaatioprojektien tunnuspiirteitä ja pyrkii löytämään tehokkaan tavan hallita näitä projekteja. Lisäksi tutkimuksessa tarkastellaan erilaisia tapoja innovaatioprosessin kiihdyttämiseksi, jotta yritykset pystyisivät mukautumaan Gen AI -innovaatioiden korkeaan kysyntään.

Viitekehys hyödyntää tunnistettuja Gen AI -innovaatioprojektien tunnuspiirteitä ja pyrkii kiihdyttämään innovaatioprosessin alkua. Vaikka malli on luotiin vastaamaan kohdeyrityksen tarpeita, muut yritykset samankaltaisten haasteiden äärellä voivat hyödyntää sen elementtejä. Viitekehyksen potentiaali tehostaa innovaatioprosessia on pohjattu sen teoreettiseen perustaan. Tutkimus kuitenkin ehdottaa laajempaa tutkimusta viitekehyksen käytännön vaikutusten ja yleistettävyyden syvempään arviointiin.

Avainsanat Innovaatioiden hallinta, Generatiivinen tekoäly, Gen AI, Innovaatioprosessi

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Preface and acknowledgements

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Espoo, September 29th, 2024
Joonas Räikkönen

Abbreviations

AI	Artificial Intelligence
API	Application Programmable Interface
DL	Deep Learning
FEI	Front End of Innovation
GDPR	General Data Protection Regulation
Gen AI	Generative Artificial Intelligence
GTM	Go-To-Market
HR	Human Resources
IPM	Innovation Portfolio Management
KPI	Key Performance Indicator
LCNC	Low-Code/No-Code
LLM	Large Language Model
ML	Machine Learning
MVP	Minimum Viable Product
NPD	New Product Development
PoC	Proof-of-Concept
RAG	Retrieval Augmented Generation

1 Introduction

During the past few years, artificial intelligence (AI) and, specifically, generative artificial intelligence (Gen AI) have disrupted the world. Since the launch of GPT-3 in 2021 and ChatGPT in 2022, different Gen AI tools have become a significant part of people's lives, and the world has seen many new companies built on top of the AI models. Even though the adoption of the Gen AI tools was comparatively slow in the beginning (Agrawal, 2023; Solita, 2023), businesses have begun experimenting with and developing Gen AI solutions. To sustain competitive advantage, companies must adapt to technological disruption and seize the opportunities it presents.

While businesses have recognised the benefits of Gen AI, they have begun to study the best ways of incorporating the technology into their products and internal tools. From an innovation management perspective, this has brought a significant demand for Gen AI innovations and an increasing number of new ideas. However, the resources of innovation units are limited, and answering the growing demand has become challenging. This has introduced a need to make innovation management more efficient.

In the past, research about innovation management has focused on new product development (NPD) processes such as the Stage-Gate system (Cooper, 1990) and on managing innovation projects as a portfolio (Andrén and Meddeb, 2021; Si, Kavadias and Loch, 2022). However, responding to the increasing demand requires more efficiency, especially in the early phases of the innovation process. There is also a limited amount of existing literature about accelerating the innovation process. Additionally, Gen AI's effects on the innovation process are still understudied.

This study aims to design a framework for managing Gen AI innovation projects. The framework aims to enable more efficient innovation management and to help companies answer the increasing demand for Gen AI solutions. It is first necessary to understand the characteristics of Gen AI innovation projects in order to design the framework. The existing literature covers the characteristics of Gen AI as a technology, but the research is still limited and does not consider the technology's effects on the project management level. These characteristics are studied through the first research question and can then be utilised while adapting the innovation practices to the needs of Gen AI.

Research Question 1: *"What are the characteristics of Gen AI innovation projects?"*

Since Gen AI changes the nature of innovation projects, there arises a question of how the projects should be managed. The demand for Gen AI innovations has also increased and put strain, especially on the early stages of the innovation process. It is necessary to understand the available methods for sustaining the efficiency of the innovation process and how they relate to the characteristics of Gen AI innovation projects. This is approached through this study's second research question.

Research Question 2: *"How can Gen AI innovation projects be managed to accelerate the innovation process?"*

It is important to note that Gen AI can have different roles in the innovation process. It has already been proven that Gen AI can be utilised for various tasks during the innovation process, including, for example, ideation, market research, and code generation (Skvortsova and Nurulin, 2018; Haefner *et al.*, 2021; Makowski and Kajikawa, 2021; Nägele *et al.*, 2021; Bilgram and Laarmann, 2023; Parikh, 2023). However, Gen AI can also be part of the innovation, which this study considers as a Gen AI innovation project. Utilising Gen AI as part of the innovation process is out of the scope of this study due to the amount of existing research around the topic and to make the study more focused and understandable.

The study is conducted through design science practices since the study aims to develop an artefact, a framework for managing Gen AI innovation projects. The framework is developed through an iterative process. Before designing the framework, the environment and theoretical base are studied through the research questions of this study. These are approached through literature review and interviews. This knowledge is utilised in the design process of the final framework. Even though the framework is designed for the needs of a case company, its elements can also be utilised by other companies.

The following section presents the key findings from the existing literature. After that, the section 3 describes the research methodology of this study in detail. Then section 4 presents the empirical findings from the interviews and section 5 describes and evaluates the framework designed during the study. Lastly, section 6 summarises the results of the study and discusses its implications and limitations, and section 7 provides a short conclusion.

2 Theory Basis

This section discusses the key findings from the existing literature, which are later utilised while developing the final framework. It first builds an understanding of Gen AI as a technology. Then, the section introduces basic innovation management practices, which have been developing for decades and discusses methods for evaluating innovations and accelerating the innovation process. Lastly, the section discusses Gen AI characteristics from the innovation project perspective and considers their effect on the innovation projects.

2.1 Generative Artificial Intelligence (Gen AI)

This section briefly introduces what Gen AI is and discusses how it has been adopted in the business world. It is necessary to understand what Gen AI is since the framework is designed for developing Gen AI innovations. However, the study considers the technical level only where necessary since the technical implementation is often not relevant from the perspective of the innovation process.

2.1.1 What are AI and Gen AI?

Artificial Intelligence (AI) is an umbrella term that encompasses multiple technologies such as Machine Learning (ML), Deep Learning (DL), and most recently, Gen AI (Banh and Strobel, 2023; DeCotis, 2023; Nicholes, Sidharth and Resmi, 2023; Feuerriegel *et al.*, 2024; Kalota, 2024). There have been various definitions for AI since John McCarthy coined the term for the first time in the 1950s (McCarthy *et al.*, 2006). The core idea of the different definitions is that AI refers to a machine capable of performing advanced human tasks (Dwivedi *et al.*, 2021; Janiesch, Zschech and Heinrich, 2021; Kalota, 2024; Poland, Sharad and Wigen-Toccalino, 2024). To differentiate between Gen AI and other technologies encompassed in AI, this study uses the term "traditional AI" while referring to the technologies preceding Gen AI, including ML and DL. This distinction is used especially while analysing the interviews in section 4.

Gen AI is most often defined as computational techniques capable of generating novel content such as text, images, video, audio, and code (e.g., Banh and Strobel, 2023; DeCotis, 2023; Satya, 2024; ...). In addition, some researchers emphasise that the generated content is very human-like or even superhuman (Huang and Grady, 2022; Longoni *et al.*, 2022; Ramdurai and Adhithya, 2023; Wang *et al.*, 2023). However, a challenge with Gen AI is that it lacks a widely recognised definition, which may cause misconceptions

(Yadav, 2023). This is illustrated by the fact that Gen AI became familiar to a vast population through the launch of Chat GPT, and therefore, many associate Gen AI with a chatbot. However, Gen AI as a technology is much older and was merely popularised by the new advances in the field (Goyal, Varshney and Rozsa, 2023).

Even though the technical aspects of Gen AI solutions are not the focus of this study, it is necessary to understand the most common ways of designing Gen AI solutions. First of all, the term "Gen AI solution" refers to a system that encompasses the whole infrastructure, including a generative model, data processing, and user interface components (Feuerriegel *et al.*, 2024). The model refers typically to so-called foundation models, which are generative models that are pre-trained with large quantities of data and which serve as base models (Leslie and Rossi, 2023). In the context of natural language processing, it is typical to use the term large language model (LLM), which refers to a foundation model specialised for natural language processing.

Model selection is a crucial design choice when developing Gen AI solutions. The three available options for the model are 1) using off-the-shelf models such as Generative Pre-trained Transformer (GPT) or DALL-E, 2) using open-source models such as LLaMA, or 3) developing and training the model from scratch. However, developing and training the models can be difficult, time-consuming, costly, and require significantly high-quality data. Therefore, it is more common to utilise either the off-the-shelf models or open-source models, which are pre-trained and can be deployed quickly (Goyal, Varshney and Rozsa, 2023).

In many situations, the developed solution needs to be customised, and the plain pre-trained models are not good enough since they only know what has been included in their training data. These situations in a business context could include, for example, the ability to answer questions based on company data. There are commonly two options for incorporating more information in the system: 1) fine-tuning the model or 2) using Retrieval-Augmented Generation (RAG). (Balaguer *et al.*, 2024; Jeong, 2024)

In practice, fine-tuning means that the model is further trained with the necessary data, and the knowledge is incorporated into the model (Balaguer *et al.*, 2024). On the contrary, RAG does not necessarily require additional training of the models, and with RAG, it is possible to use the off-the-shelf models. With RAG, the additional knowledge is brought to the solution by integrating the solution with available data sources and splitting the workflow so that the system first fetches the most relevant data and then uses the generative models to create a response based on the retrieved data (Jeong, 2024).

When comparing fine-tuning and RAG, there is no universally recognised best approach (Alghisi *et al.*, 2024; Balaguer *et al.*, 2024), but Jeong (2024) argues that RAG can produce more accurate responses. Also, RAG is often seen as a more flexible option since the data sources can be swapped effortlessly, and data access can be managed more granularly. With fine-tuning, incorporating new data requires extra training for the model, and limiting access to information can only be done through prompting. Lastly, it is essential to recognise that the two approaches can also be combined, which can introduce additional opportunities from the solution design perspective (Jeong, 2024).

2.1.2 Adoption of Gen AI

In 2022, the world was taken by a whirl when Open AI published Chat GPT and brought Gen AI to the use of a vast population. The speed with which people have adopted the new Gen AI tools has been unforeseen. For Chat GPT, it took only two months to reach 100 million users (Hu, 2023; Rao, 2023). Before that, the fastest time to reach the same milestone was nine months, which was achieved by TikTok (Hu, 2023; Rao, 2023). For example, for Instagram, it took over two and a half years (Hu, 2023; Rao, 2023).

Despite the stellar adoption speed of the consumers, the companies have been more cautious with the new technology. Still a year ago, Solita (2023) reported that of the top 500 Finnish companies, only 17% had adopted Gen AI in their operations. However, most of them were already preparing for the adoption (Solita, 2023) and since then, Gen AI has been able to demonstrate its potential to transform the way we work (DeCotis, 2023; Goyal, Varshney and Rozsa, 2023; Mohammed and Skibniewski, 2023; Krause, 2024). Even though companies have identified the benefits of Gen AI and begun to adopt it in their operations, it is good to note that complete advantages of Gen AI can only be seen through widespread adoption (Agrawal, 2023).

When adopting Gen AI, it is vital that the use cases are aligned with the business needs and that the technology is not used only for the interest around it (DeCotis, 2023). Now, companies have been assessing how they can apply Gen AI to their organisation needs, and the most advanced have already begun to reimagine critical workflows with Gen AI at the core instead of having it as a bolt-on (Goyal, Varshney and Rozsa, 2023). However, some managers do not entirely understand Gen AI's nature, resulting in missed opportunities and poorly designed systems (Krause, 2024). DeCotis (2023) also argues that the widespread adoption of Gen AI necessitates the adoption of best practices and ethical standards to minimise the potential harms that come with the many advantages.

2.2 Innovation Management Practices

Before studying different methods for accelerating the innovation process, it is first necessary to understand the basic concepts of innovation management. The innovation management practices are built around an innovation process and an innovation portfolio. This section discusses these practices and builds an understanding of the basic innovation management concepts. These are gathered into Figure 1 below, which illustrates how the innovation projects form a portfolio with different numbers of projects at each stage of the innovation process.

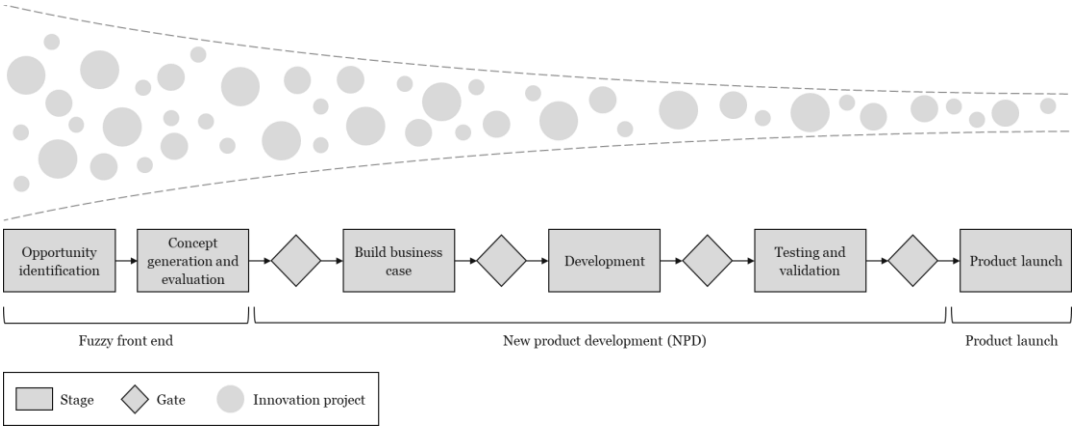

Figure 1: The innovation process is divided into three phases and creates a funnel shape in the innovation portfolio (inspired by Jou & Yuan (2016) and Cooper (1990))

2.2.1 Phases of Innovation Process

The innovation process can be divided into three different phases: 1) front end of innovation (FEI), 2) new product development (NPD), and 3) commercialisation (Hansen and Birkinshaw, 2007; Cooper, 2008; Jou and Yuan, 2016; Ucler, 2018; Aristodemou, Tietze and Shaw, 2020). The first phase of the innovation process has varying definitions in the existing literature. Jou and Yuan (2016) define it as the fuzzy front-end referring to innovations that are still seeking the right direction. The key concepts Jou and Yuan (2016) have included in the first phase of the process are opportunity identification and selection, concept generation, and concept evaluation. Therefore, they also describe the first phase as project planning, which prepares the innovations for the development phase (Jou and Yuan, 2016). On the other hand, Hansen and Birkinshaw (2007) define the first phase of the process as idea generation, emphasising finding new ideas that can be further developed in the second phase. Aristodemou et al. (2020) support this definition but

expand it to include the whole period between idea generation and the go/no-go decision, leading to a formalised NPD process.

When preparing the projects for the development phase, the necessary preparatory work comprises the initial evaluation of ideas, technical and market-oriented feasibility studies, and commercial evaluation of the project (Ernst, 2002). Ernst (2002) also proposes that including the end users already in the early stages of the process can be beneficial for the innovation project's success. Similarly, Khurana and Rosenthal (1998) emphasise that organisations taking a holistic approach to the front end are the ones that experience the most significant successes. They argue that a successful approach to the front end links together business strategy, product strategy, and product-specific decisions (Khurana and Rosenthal, 1998).

After the front end of innovation begins the more formalised NPD process (Hansen and Birkinshaw, 2007; Cooper, 2008; Jou and Yuan, 2016; Ucler, 2018; Aristodemou, Tietze and Shaw, 2020). This process often follows some form of Stage-Gate process, but the approach should be adapted from firm to firm and project to project for developing NPD capabilities and outperforming competitors in the long term (Smolnik and Bergmann, 2020). The NPD process, especially the Stage-Gate process, is discussed in detail in the next section.

After the NPD process becomes commercialisation or product launch (Cooper, 1990; Jou and Yuan, 2016). During this phase, the developed solution is brought to the market, and the focus is shifted from developing the solution to spreading the solution. The approach to this phase depends highly on the type of solution and the target audience. With new customer products, the phase requires heavy marketing and sales efforts, while with internal solutions, the focus is more on training and adapting the internal workflows. At this stage, the solution also graduates from the innovation process and must transfer under more stable development and maintenance practices, which aim to ensure the quality of the solution in the long term. However, this does not mean that the solution is necessarily “ready”, meaning that it would be perfect and not need any development. Instead, the development of the solutions needs to be more incremental and focus on maintaining the stability of the solution.

2.2.2 Roots of Innovation Management in Stage-Gate Process

In 1990, Robert Cooper introduced an innovation management approach called Stage-Gate system (Cooper, 1990). The system applies process-management methodologies to innovation management (Cooper, 1990). Even though the Stage-Gate system was introduced already in 1990, it is still

widely applied in NPD processes (Aristodemou, Tietze and Shaw, 2020; Smolnik and Bergmann, 2020; Andrén and Meddeb, 2021).

The core idea of the Stage-Gate system is to divide the innovation process into different phases, called stages, and between the stages, there is always an evaluation point called a gate (Cooper, 1990; Schilling, 2019; Andrén and Meddeb, 2021). Figure 1 illustrates a typical structure of this kind of Stage-Gate process. The stages in the system are designed so that each stage is more expensive than the predecessor, and therefore, having a go/no-go decision point before moving forward is necessary (Cooper, 1990).

Even though the Stage-Gate system is widely used, it is not perfect and can be seen as unsuitable for some projects. For example, Valeri and Rozenfeld (2004) view the Stage-Gate system as inflexible and as having caused delays in NPD projects. Cooper (2008) argues that many companies have benefited from the Stage-Gate system, but he sees that just as many have misused it and, therefore, missed the benefits.

During the past years, multiple different versions of the original Stage-Gate system have been developed (Smolnik and Bergmann, 2020). The original system can be used as a guide for building custom systems while ensuring the usage of best practices (Narayanan and O'Connor, 2010). Narayanan and O'Connor (2010) argue that many leading companies have taken the necessary steps and designed their own idea-to-launch system, which has resulted in better, faster, and more profitable NPD processes. Also Cooper (2008), has recognised that some companies have built the process further to make the system more flexible, adaptive and scalable. The newer versions have, for example, included better governance, integration with portfolio management, incorporated accountability and continuous improvement, and adapted to open innovation (Cooper, 2008).

The proposed solutions for improving the weaknesses of the Stage-Gate system have varied, but many of them have focused on improving the gates between the stages. Even though the gates are described as go/no-go decision points, they can lead to other decisions such as redirect, delay, and discontinue (but seek to licence) (Narayanan and O'Connor, 2010). Binneman and Steyn (2014) argue that it is necessary to use tailored evaluation criteria at each gate so that the decisions utilise the new information created during the preceding stages. Selecting proper evaluation criteria and assigning the most suitable people as the gatekeepers work as the link between the innovation project, company strategy and the market (Valeri and Rozenfeld, 2004).

In addition to improving the gates, new stages can be created, or the use of the stages can be improved. Valeri and Rosenfeld (2004) propose that stages

in the process can overlap, allowing tasks to be worked on from the next stage before the gate review. This would create more flexibility in the process, but limiting the overlap size is necessary as the next stage is always more expensive than the previous one. Cooper et al. (2002a) proposed adding a new stage, which would include building an "idea capture and handling system". The idea of the new stage is to do more customer research and work more closely with innovative users (Cooper, Edgett and Kleinschmidt, 2002a).

Cooper, Edgett and Kleinschmidt (2002b) have studied the success factors of companies implementing the Stage-Gate system. Their study found that companies have started implementing "tough gates", which aim to rate and prioritise projects at the gates with scorecard methods. In the original Stage-Gate system, the projects are evaluated at gates only against their own merits (Cooper, 1990). The idea of the tough gates is also to include a comparison against the other projects in the innovation portfolio. However, this requires integrating portfolio management into the gating process to maximise the portfolio's value and ensure it reflects the business's innovation strategy. (Cooper, Edgett and Kleinschmidt, 2002b)

2.2.3 Innovation Portfolio Management

Along with the innovation process, another critical component of innovation management is innovation portfolio management (IPM). As the term implies, in IPM, all the innovation projects of the company are considered as a portfolio, which is then managed (Cooper, Edgett and Kleinschmidt, 1999; Ernst and Lichtenthaler, 2009; Kock and Georg Gemünden, 2016; Meifort, 2016). As Ernst and Lichtenthaler (2009) explain, where NPD processes, such as the Stage-Gate process, focus on executing individual innovation projects, IPM focuses on selecting and managing the overall portfolio of all company innovation projects. Mathews (2013) supports this view and argues that portfolio management is required, especially in the early stages of innovation management, since project management processes cannot always accommodate its requirements.

Cooper et al. (1999) argue that effective portfolio management is vital for successful innovation management. They explain that portfolio management is about making strategic decisions and resource allocation, focusing on project selection and aiming for balance in the portfolio. With IPM, it is recognised that the companies have limited resources and, therefore, must decide which projects they should work on (Cooper, Edgett and Kleinschmidt, 1999). As Figure 1 illustrates, the portfolio of projects should form a funnel shape with the innovation process so that all projects are not in the same stage but rather divided between different phases. This funnel shape is achieved by involving

rather many projects in the early stages of the process but discarding them quickly if they prove to be invaluable (Andrén and Meddeb, 2021).

While selecting the projects for the portfolio, one approach is to aim to maximise the overall value of the portfolio (Filippov and Mooi, 2011; Lerch and Spieth, 2012). However, utilising purely financial metrics for the project selection can lead to minimising risks and also limit the potential of the portfolio (Mathews, 2013). Mathews (2013) argues that innovation portfolios often lack a balance between incremental innovations and more radical innovations, which have more risk but also more significant potential in terms of created value.

Even though portfolio management and project management are slightly different concepts, they are both needed, and they go hand in hand. Mathews (2010) argue that the IPM practices are mainly required for managing the early stage ideas, but the project management practices are required for developing them into products. It is, however, notable that if the IPM practices and Stage-Gate system are used in parallel, the portfolio re-evaluations should be separated from the gates of the Stage-Gate system (Valeri and Rozenfeld, 2004).

2.3 Innovation Evaluation and Acceleration

As a background, this section first discusses the sources of innovation ideas. After that, the section continues with different evaluation methods and ways of accelerating innovation management.

2.3.1 Idea Collection

A rough division can be made between internal and external innovation sources. Typically, the ideas are collected internally, but most of the breakthroughs happen when fragments of multiple ideas from multiple sources are combined (Hansen and Birkinshaw, 2007). Often, most of the initial ideas come from the employees of the company (Si, Kavadias and Loch, 2022). These internal sources can often include individual inventors, people building solutions for their own use, and R&D or innovation units (Schilling, 2019).

The external sources of innovation can be research entities such as universities and governmental institutions (Schilling, 2019). However, customer collaboration is the most important external source of innovation (Cooper, Edgett and Kleinschmidt, 2002a, 2004; Narayanan and O'Connor, 2010; Schilling, 2019). Cooper et al. (2004) argue that while innovations can occasionally result from inspiration or technological breakthroughs, they more

often require hard work, including customer research, identification of customer needs and problems, and building solid market information. However, Cooper et al. (2004) point out that this does not guarantee the success of the innovation, but it provides a solid foundation for the innovation process.

In 2003, Henry Chesbrough (2003) popularised the term "Open Innovation", which describes using external ideas as part of the innovation process. In addition to the open innovation paradigm, companies can benefit highly from external collaboration networks that leverage resources and capabilities across multiple organisations or individuals (Schilling, 2019). These networks are typically facilitated by geographical proximity (Schilling, 2019) and they can benefit especially idea-poor companies (Hansen and Birkinshaw, 2007).

2.3.2 Idea Evaluation

After collecting new ideas, the companies face the problem of selecting the best ideas to be included in the innovation portfolio. Most of the innovation management processes are depicted with a funnel shape where you frequently re-evaluate the projects and remove them if necessary (Cooper, 1990; Cooper, Edgett and Kleinschmidt, 2002b; Ernst, 2002; Thomke, 2003; Andrén and Meddeb, 2021). For example, in the Stage-Gate system, the projects are re-evaluated at the gates and either continued to the next stage or killed (Cooper, 1990). As Thomke (2003) puts it, it is better to fail early and often than make mistakes. The idea behind this is that it is hard to select a few ideas that will succeed, but it is easier to experiment on multiple ideas and re-evaluate them when new information is available (Thomke, 2003).

The evaluation of innovation projects often combines quantitative and qualitative methods (Schilling, 2019). Standard qualitative methods include calculating the net present value (NPV) and internal rate of return (IRR), whereas the most common quantitative method is to subject the project to a series of screening questions (Schilling, 2019). There exists a multitude of different criteria that can be used to evaluate the projects. It is also recognised that the same criteria do not necessarily apply to all types of projects (Narayanan and O'Connor, 2010). For example, projects supporting existing operations can be assessed through a business case, but creating a business case for projects involving radical innovation might not be possible (Narayanan and O'Connor, 2010). In addition to changing the criteria between projects, it can be beneficial to use tailored criteria at different evaluation points during the projects (Hart *et al.*, 2003; Tzokas, Hultink and Hart, 2004; Binneman and Steyn, 2014).

When considering the evaluation criteria proposed by the literature, the most often proposed one is a financial criterion (e.g., Wang, Lee and Kurniawan, 2012; Aristodemou, Tietze and Shaw, 2020; Si, Kavadias and Loch, 2022; ..). A common approach for measuring the financial potential is to build a business case around the idea (Andrén and Meddeb, 2021). Even though financial measures are commonly used, they are not always seen as the most important ones, especially when estimating a project's success (Van Eersel, 2011; Ucler, 2018). The financial criteria in the Stage-Gate system are critical during the business analysis gate and after the market launch (Hart *et al.*, 2003).

After the financial criteria, the next most commonly proposed evaluation dimension is alignment with the company strategy (e.g., Tzokas, Hultink and Hart, 2004; Binneman and Steyn, 2014; Si, Kavadias and Loch, 2022; ..). The strategic alignment can be measured as a separate evaluation criterion, but it can also be included by selecting evaluation dimensions which best reflect the company's strategy (Si, Kavadias and Loch, 2022).

2.3.3 Accelerating Innovation Process

To adapt to the high demand for Gen AI innovations, there is a need to identify ways to improve the efficiency of the innovation process. Two methods were identified for this: 1) increasing early experimentation on ideas and 2) taking advantage of citizen development.

Both Thomke (2003) and Liedtka et al. (2024) argue that the innovation process can be made more efficient by utilising early-stage experimentation on ideas. They also recognise the potential for limiting risks of the innovation process since the experimentation develops a better understanding of the ideas (Thomke, 2003; Liedtka, Magistretti and Chen, 2024). Bianchi et al. (2020) on the other hand, suggest that the whole innovation process can be made experimental compared to, for example, the Stage-Gate process. They argue that, especially in software-based innovation, the developers should focus on experimentation from the beginning rather than only while validating the final solutions (Bianchi, Di Minin and Pisano, 2020). Tuulenmäki and Välikangas (2011) agree with the approach of including experimentation for the duration of the whole innovation process. To make the experimentation more efficient, it is suggested to utilise new technologies that are constantly developing (Thomke, 2003). In addition, it is beneficial to leverage the learnings from earlier projects to make experimentation and the whole innovation process more efficient (Ellwood, Grimshaw and Pandza, 2017).

The development of low-code/no-code (LCNC) tools has introduced citizen development as a new paradigm that can also be utilised with innovation management (Binzer and Winkler, 2022, 2024; Nimje, 2024; Prinz *et al.*,

2024). With citizen development also, employees without programming skills can participate in the development of solutions (Binzer and Winkler, 2022, 2024; Hoogsteen and Borgman, 2022; Prinz *et al.*, 2024). Hoogsteen and Borgman (2022) argue that citizen development can solve resourcing challenges created by high demand. Enabling citizen developers to build basic applications can also foster an organisation's innovativeness and create more agility for adapting to changing needs (Nimje, 2024). However, citizen development does not come without challenges (Hoogsteen and Borgman, 2022). The most significant concern is that are the citizen developers able to build high-quality software which is also secure and maintainable (Binzer and Winkler, 2022; Nimje, 2024). Citizen development also introduces a need for governance, especially with data management, since it poses a risk to data integrity and security (Nimje, 2024). It is also notable that even though LCNC tools enable fast and easy development (Shridhar, 2021), they are also designed for building only moderate-complexity applications and, therefore, limiting the possible use cases implemented through citizen development (Nimje, 2024).

2.4 Characteristics of Gen AI Innovation Projects

To design an innovation process for Gen AI projects, it is necessary to understand how choosing Gen AI as the technology can affect the innovation projects and what requirements it sets for the innovation process. This is achieved by identifying the characteristics of the Gen AI innovation projects. The existing literature considers the characteristics of Gen AI mainly from a technological perspective. However, this section discusses these characteristics considering the innovation management practices discussed above.

The first characteristic of Gen AI is the ability to interact with humans. The foundation models have been trained with large amounts of text data, which makes them capable of processing and generating natural language for various tasks (Goyal, Varshney and Rozsa, 2023). This enables many new use cases from the user interface perspective, especially when considering how humans can interact with different systems. However, it also creates a need to focus on the user experience and design the solution workflows with a user-centric approach (Tankelevitch *et al.*, 2024). If the solution design is not carefully considered, in the worst case, the Gen AI systems can cause metacognitive strain on the users (Tankelevitch *et al.*, 2024). Fui-Hoon Nah et al. (2023) also recognise this and argue that for Gen AI solutions to be successful, they need to be human-centric and consider ethics, empathy, human needs, transparency, and explainability. In addition, Weisz et al. (2023) point out that Gen AI systems must always be designed to prevent potential harm from being caused by hazardous output or misuse.

The second characteristic of Gen AI is that the systems are non-deterministic (Engel, Ebel and van Giffen, 2021). In practice, this means that the systems can yield varying outputs, which are not possible to be predicted (Aleti, 2023). This non-determinism forces the development to be experimental since it is not possible to accurately predict the effects of the changes made to the system (Engel, Ebel and van Giffen, 2021). In addition to making the development experimental, the non-determinism and generative nature of the models make it challenging to test and assess the systems (Harshvardhan *et al.*, 2020; Aleti, 2023). Conventional testing methods rely on being able to know the expected output of the system (Aleti, 2023). However, in many Gen AI systems, there is no single truth with the responses the system provides and also different human evaluators may have differing opinions about the correctness of a response (Aleti, 2023; Voorneveld, 2024).

Another effect of Gen AI from the solution development perspective is that the pre-trained foundation models allow relatively fast and easy development (Goyal, Varshney and Rozsa, 2023; Roychowdhury, 2024). As described in section 2.1.1, the developers can use the pre-trained models off the shelf or incorporate additional information through fine-tuning or RAG architecture. However, this requires significantly fewer resources than building the models from scratch, which is the approach with traditional AI solutions.

Despite the high interest in Gen AI and its capabilities, the technology also has some limitations and introduces risks. The most often mentioned risk or limitation is the natural tendency of Gen AI to provide misinformation or, as many call it, hallucinate (e.g., Banh and Strobel, 2023; Fui-Hoon Nah *et al.*, 2023; Feuerriegel *et al.*, 2024; Ghimire, Kim and Acharya, 2024; ...). In this study, misinformation is the preferred term as it better describes the risk. Even though the risk of misinformation is recognised, it is not possible to eliminate misinformation from Gen AI systems since, at the core, the models are probabilistic (Engel, Ebel and van Giffen, 2021; Banh and Strobel, 2023), which causes them to make mistakes from time to time.

The amount of misinformation the models provide is closely related to the data they are trained with (Banh and Strobel, 2023; Kalota, 2024; Roychowdhury, 2024; Voorneveld, 2024). The tendency of the systems to provide misinformation poses challenges in system implementation and makes some use cases challenging or even impossible to implement (Cao *et al.*, 2023). The minimum requirement that misinformation sets is that systems' outputs must be checked and cannot be blindly trusted (Kalota, 2024). However, this can sometimes be challenging as the systems generally state the misinformation with a highly confident tone (Banh and Strobel, 2023).

In addition to pure misinformation, the limited quality of the model training data can introduce another closely related challenge, which is biases (Leslie and Rossi, 2023; Cheng *et al.*, 2024; Ferrara, 2024; Feuerriegel *et al.*, 2024; Manduchi *et al.*, 2024) In the training phase, the models learn the patterns in the dataset on which they are trained. If the dataset is not well curated and contains biased or discriminative material, the model may learn the same patterns, and these biases can affect the system's outputs. Biases are not a new concept in AI, and a core principle of AI development is fairness, which means developing systems which do not contain any biases or discrimination (Cheng *et al.*, 2024; Ferrara, 2024).

Even though it is known that Gen AI systems make mistakes, it can be challenging to identify them. One reason for this is the overconfidence of the models, as Banh and Strobel explain (2023). However, another reason for this is the so-called black box character, which refers to the limited explainability of the models (e.g., Engel, Ebel and van Giffen, 2021; Banh and Strobel, 2023; Leslie and Rossi, 2023; Kalota, 2024; ...). As Kalota (2024) discusses, poor explainability is not a new concept but something that has been part of AI for a long time. However, the importance of explainability has increased rapidly within a short time due to AI advancements (Kalota, 2024). In practice, explainability means that with Gen AI solutions, it is impossible to determine the logic behind the system's response. As Lesie and Rossi (2023) point out, this is a grave challenge, especially with systems designed for high-impact or safety-critical domains. Therefore, the black box character can limit the range of possible use cases since the systems are prone to making mistakes. Without the possibility of validating the outputs, some use cases become too risky.

Other risks that were brought up related to Gen AI are cybersecurity (Goyal, Varshney and Rozsa, 2023; Orchard and Tasiemski, 2023; Jeong, 2024), copyright issues (e.g., DeCotis, 2023; Yadav, 2023; Manduchi *et al.*, 2024; Wang *et al.*, 2024; ...), ethical challenges (e.g., Leslie and Rossi, 2023; Ramdurai and Adhithya, 2023; Ghimire, Kim and Acharya, 2024; Voorneveld, 2024; ...), and societal challenges (Cao *et al.*, 2023; Leslie and Rossi, 2023; Yadav, 2023; Feuerriegel *et al.*, 2024). From a cybersecurity perspective, the critical challenge to be considered is data leakages that can occur through the Gen AI systems (Jeong, 2024). Otherwise, the cybersecurity threats are like those of any other software system. The copyright issues of Gen AI primarily concern the acquisition of training data for the models (Wang *et al.*, 2024). However, from the innovation management point of view, the risk is somewhat limited since companies most often utilise their internal data to improve off-the-shelf models, and they already own the data. From an ethical point of view, Leslie and Rossi (2023) argue that there is potential for both intentional and unintentional harmful use of Gen AI. The unintentional

harmful use of Gen AI is closely related to misinformation and biases of the Gen AI systems (Leslie and Rossi, 2023).

Since Gen AI solutions can create risks on societal and personal levels, it is necessary to limit the risks through legislation and governance (DeCotis, 2023; Leslie and Rossi, 2023). European Union released in the summer of 2024 the so-called EU AI Act (2024), which aims to address these needs. The act takes a risk-based approach to limiting the potentially harmful use of Gen AI. Different risk levels are defined for use cases, and different actions are required for each risk level to mitigate the risks and to be allowed to develop solutions.

3 Research Design

This study is conducted using design science methodology. This section discusses how the design science method was applied, presents the case company, and explains how data collection was organised.

3.1 Design Science Method

Design science methodology is often recommended for research that aims to solve some problem by constructing a new artefact (Hevner *et al.*, 2004; Van Aken, 2004). Since this thesis aims to build a framework for innovation management of Gen AI projects, design science methodology has been selected for this study. The artefact of this thesis is an integrated process definition for handling innovation processes in their early stages, supported by a guideline for organising around the process.

The framework introduced by Hevner et al. (2004) has been selected as the basis of the research method. The methodology was initially developed for information systems research, but the core idea can also be applied to other research fields. The research method combines behavioural science and design science to achieve a unified approach to completing research that aims to develop a new artefact. (Hevner *et al.*, 2004)

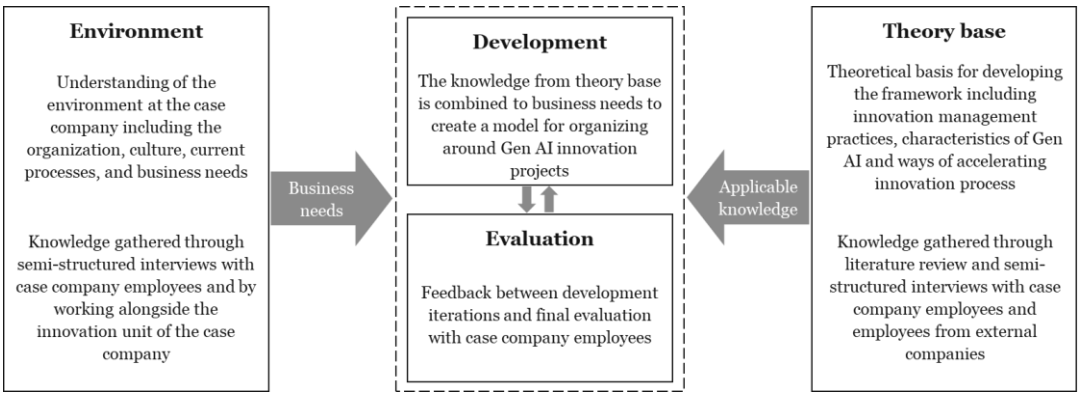

Figure 2: Design science-based research method inspired by Hevner et al. (2004)

As Figure 2 illustrates, the research method comprises four key elements. The first element is the environment where the study is conducted, and the artefact is developed. In this study, the environment is defined by the case company for which the framework is being developed. The environment is studied through interviews with the case company employees and by working alongside the innovation unit of the case company. The study of the

environment aims to understand the people, organisational structure, and technological requirements of the case company.

The second element of the research method is the theory base. The purpose of the theory base is to gather the existing knowledge that can be applied to building the artefact. In this study, the theory base is gathered through a literature review, of which key findings are presented in section 2. The theory base focuses on innovation management practices and the characteristics of Gen AI projects. However, the adoption of Gen AI in the business world is still in the early stages, and therefore, the existing research is still limited. Therefore, the literature is complemented by interviews with case company employees and a few external interviewees.

The third element of the research method is the development of the artefact. At this stage, the applicable knowledge from the theory base is combined with the business needs of the environment, and the artefact is developed. The interviews are coded and analysed using the Gioia methodology presented by Gioia et al. (2013) to utilise the knowledge gathered from the interviews. The key findings from this analysis are presented in section 4.

The development of the artefact is iterative, and it is modified based on external feedback. Gathering feedback is the fourth element of the research method. Hevner et al. (2004) propose five different approaches for evaluating the artefact. This study applies descriptive evaluation methods, which is done in two steps. During the development of the artefact, the artefact is presented to the person managing the Gen AI innovation projects at the case company after each iteration round. In addition, the artefact is presented to the whole innovation execution team in the middle of the study in the same manner. These sessions are utilised to gather feedback and develop the artefact further. The second step in the evaluation is a final evaluation, completed as four expert interviews with employees of the case company. During these interviews, the framework is presented thoroughly to the interviewees, after which the framework is discussed from different perspectives to build an understanding of its benefits and possible limitations. After the final evaluation, the framework goes through one final iteration, during which the limitations identified during the interviews are mitigated.

3.2 Case Company Introduction

This thesis is written in collaboration with a case company. However, the company is anonymised from the thesis so that its innovation practices can be discussed in more detail. The case company is an industrial manufacturing firm from Finland that operates globally. The research was conducted in collaboration with the innovation unit of the case company. The innovation unit

is responsible for managing the innovation portfolio of the case company and driving the innovation projects inside the organisation.

The case company has begun working on Gen AI innovation projects and developed two more extensive Gen AI solutions using RAG architecture. One solution is a chat interface for maintenance technicians, and the other is a solution for building tenders in the sales department. In addition, the case company has experimented extensively with the technology and is constantly searching for suitable use cases for it. The company structure and needs are introduced in more detail in section 4.1.

3.3 Data Collection and Analysis

The data for the study was collected through semi-structured interviews. The interviewees were selected from four companies introduced in Table 1. Fifteen interviews were conducted, 12 with the case company employees and the rest with external companies from varying industries. The main selection criterion for the interviewees was that they had been involved with Gen AI projects in their companies. The interview lengths varied between 24 and 65 minutes, with an average length of 50 minutes. The interviews were conducted in Finnish or English. The interviews were recorded with Microsoft Teams and later transcribed for thorough analysis, which was conducted using the methodology presented by Gioia et al. (2013).

Table 1, Company introductions

Company	Industry	Revenue (2023)
Case Company	Industrial Manufacturing	>5b€
Alpha	Food & Confectionery	1b€-5b€
Beta	Banking & Finance	1b€-5b€*
Gamma	Supply Chain Software	100m€-500m€

*Net income, since the banking industry does not report revenue

Table 2, Interviewee introductions

Company	*Role*	*Lan-guage*	*Length (min)*
Case company	Senior Innovation Expert	English	61
Case company	Senior Innovation Expert	Finnish	65
Case company	Analytics Manager	English	56
Case company	Senior Strategic Designer	English	56
Case company	Business Development Manager	Finnish	50
Case company	Senior Data Scientist	English	53
Case company	Head of Enterprise Architecture	Finnish	42
Case company	Control System Expert	Finnish	59
Case company	Legal Counsel	Finnish	24
Case company	Head of Data and Analytics	Finnish	59
Case company	Digital Innovation Expert	Finnish	57
Case company	SVP, Chief Innovation Officer	English	50
Alpha	Senior ICT Architecture Manager	Finnish	30
Beta	Director of Data Science	Finnish	44
Gamma	Director of Data Science	Finnish	41

The main findings of the interviews are presented in section 4. The quotes used in the section are taken straight from the interviews as they were and only translated into English where needed. Only modifications to the quotes are done to maintain the companies' anonymity. Modifications are made carefully so that the content of the quotes is not changed.

In addition to conducting interviews, I worked as part of the case company's Innovation Execution team while conducting the study. During that time, I participated in meetings and discussions and gained a more thorough understanding of the case company's innovation management practices. This gathered knowledge is also presented as part of the section 4.

4 Empirical Findings

This section presents the study's key empirical findings. As discussed in the section 3, the empirical data is collected through a set of semi-structured interviews. The interviews were examined through a thematic analysis (Gioia, Corley and Hamilton, 2013). The main findings are summarised in the code-aggregation diagram below (Figure 3). Along Gioia et al. (2013) the diagram illustrates the first-level codes, second-level themes and aggregate dimensions constructed during the analysis.

This section is divided into four sub-sections based on the aggregate dimensions: 1) Business needs and organisation, 2) Nature of Gen AI development, 3) Challenges of Gen AI projects, and 4) Accelerating innovation process. Each sub-section introduces the corresponding aggregate dimension and its second-level and first-level concepts. The first aggregate dimension describes the case company's environment and business needs. The second and third aggregate dimensions answer the first research question by describing the characteristics of Gen AI innovation projects. The fourth aggregate dimension answers the second research question by describing methods of accelerating Gen AI innovation projects.

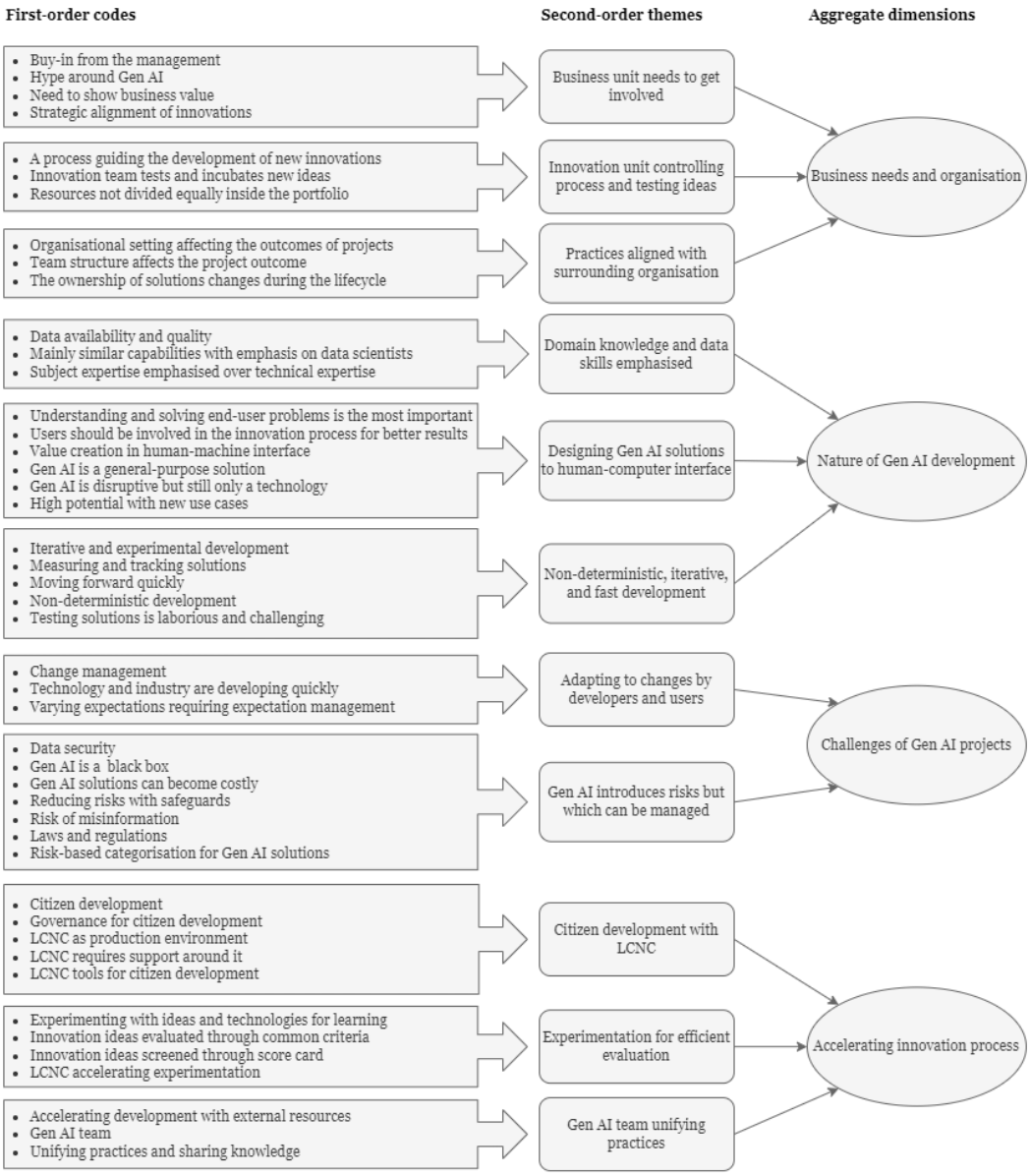

Figure 3: Code-aggregation diagram of the main findings

4.1 Business Needs and Organisation

Understanding the case company's current innovation management practices and business needs is crucial for building a usable framework and work as the context of this study. The current practices are used as the basis while developing the new framework, and the framework's purpose is to match the business needs. Therefore, this section introduces the current innovation management practices of the case company, and the specific business needs that they have related to innovation management.

4.1.1 Case Company as an Innovation Organisation

To align the innovation practices with the surrounding organisation, it is first necessary to understand how the organisation is structured. The case company as an organisation is divided into five core units. Four of these are regional business units, and the fifth is global functions, which govern the work of the regional units and provide companywide services for the business units. The innovation unit, for which the framework is developed, is located under the global functions and, therefore, serves the whole company.

> *"We have four [geographical] areas that are for profit and loss, and on top of that, we have global functions. Inside the areas are the people who are really implementing something. They are the ones spending the money and also bringing in the resources, so we need to have a buy-in from them."*
>
> *-Senior Innovation Expert, Case Company*

While the innovation unit is responsible for managing the innovation process and working on new ideas, they have limited resources for their use. Therefore, they need support from the business units to develop the innovations. As the interviewees explain, the business units are the ones that have more significant resources, and they are needed, especially in the later stages of the innovation process. Their buy-in is also required as the business units work in the customer interface; therefore, they implement and scale the solutions.

In addition to the business units, other teams must also be considered during the innovation management process. During the solution lifecycle, the solutions' ownership changes quite often. In the early phases of the innovation process, the solutions are owned by the innovation unit. However, during the development of the final solution, an assigned project team owns and builds the solutions. In the later stages of the process, the business ownership transfers to the business unit as they begin to implement and scale the solutions. At the same time, the technological ownership is transferred to R&D or IT, depending on who the end user of the solutions is. They are ultimately responsible for maintaining and incrementally developing the solutions after implementation.

4.1.2 Current Innovation Management Practices of the Case Company

In addition to the organisation setting, it is necessary to understand the current innovation management practices used at the case company as they work as the basis for the framework developed in this study. Figure 4 describes the key elements of the current innovation process utilised at the case company.

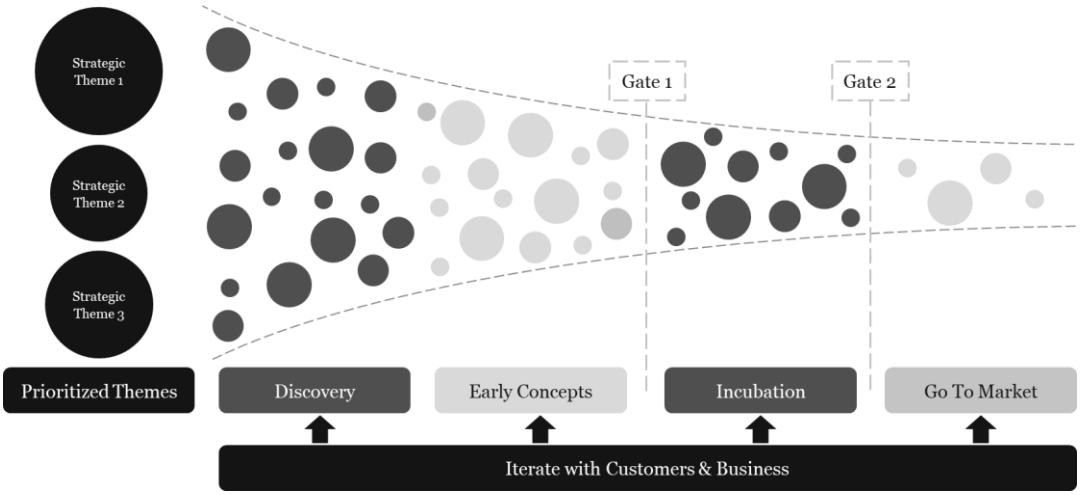

Figure 4: Current innovation process of the case company

As the figure above illustrates, the case company's current innovation process is primarily well-defined but somewhat fuzzy, especially in the early stages. The approach begins with defining strategic themes under which they aim to create innovations. These themes are updated periodically as the business goals evolve. With the themes, the case company tries to create an evenly distributed innovation portfolio. However, the resources are not divided evenly but rather based on priorities and the requirements set by the stage in which there are projects.

The current innovation management process can be divided into four different phases: 1) Discovery, 2) Early Concepts, 3) Incubation, and 4) Go-to-Market (GTM). The innovation unit aims to create a funnel shape from this process so that they can constantly bring out something new. All of the innovations are not necessarily massive disruptions, but it is vital to keep the process moving and be able to prove that the unit can implement new ideas:

> *"Our aim is to bring out something all the time. Not big things, but at least something small."*
>
> *-Senior Innovation Expert, Case Company*

During the first two phases of the process, the project's responsibility lies heavily with the case company's innovation unit. These phases aim to understand and define the innovations and begin the development of the solution. In addition, the second phase aims to build a proof-of-concept (PoC) that can then be developed towards a minimum viable product (MVP) and a fully scaled solution during the subsequent phases. However, building the final solution is not the responsibility of the innovation unit but instead of a separate project team. The role of the innovation team is instead to test different ideas and, with the help of the PoC, to build the confidence that the innovation can bring value and should be scaled:

"The role of the innovation team is to bring evidence and confidence that this [new idea] is worth scaling."

-Senior Innovation Expert, Case Company

Even though the beginning of the process is somewhat fuzzy, the last phases of the innovation process are already well-defined. The case company has included two decision points in their process, which are before (Gate 1) and after (Gate 2) the incubation phase. Gate 1 works as the starting point of incubation, during which an MVP is developed, and proof of scalability is searched. The phase is more strictly controlled than the first two phases. This is primarily due to the uptake in the number of required resources. However, Gate 1 is not strictly controlled and entering incubation requires only a recommendation from the business lead and R&D lead. This is because the business and R&D units provide the required resources to develop the solution.

Gate 2 is, however, more strictly governed, and a steering committee makes the final decision if the project can exit incubation and enter GTM. The committee comprises high-ranking employees who have visibility and understanding of the whole organisation. The solution is implemented and scaled during GTM, which is a significant investment and needs to be controlled more carefully. In addition to controlling Gate 2, the steering committee oversees the development during the incubation phase and can discard projects if they are not advancing despite efforts put into them.

4.1.3 Business Needs for a Revised Innovation Process

From the innovation management perspective, the case company has three core business needs: 1) Answering the high demand for Gen AI innovations, 2) Understanding how Gen AI innovation projects should be managed, and 3) How can a Gen AI team be utilised to accelerate the innovation process. From the innovation process perspective, these needs are focused on the steps at the beginning of the innovation process. As described above, the later stages of the current innovation process are well-defined and work well. However, the steps leading to Gate 1 are crucial while answering the high demand for Gen AI applications, but currently, they are slightly fuzzy.

The interviewees explain that the case company is currently facing high demand for Gen AI innovations since many people are interested in the technology's capabilities. However, the resources of the innovation unit are limited and it is not possible to act on all ideas generated by the organisation. Therefore, there is a need to identify the most promising ideas more efficiently. The case company has also considered utilising citizen development to meet the high demand. In practice, citizen development means enabling employees to build Gen AI solutions by themselves, which can decrease the

workload of the innovation unit. However, enabling citizen development is not as simple as providing employees access to some development tools. There is a need to find a way to align citizen development with innovation management practices so that it works efficiently.

Since Gen AI is a new technology, the innovation unit of the case company is challenged with understanding it from the innovation management perspective. They want to understand both the requirements that Gen AI sets for the innovation process but also the opportunities that it enables. They want to be able to adapt their innovation management practices to these limitations and opportunities to manage the projects more effectively. It is also questioned whether the technology brings such disruptive effects that it should have its own process that the projects follow or if it is possible to modify the current process to accommodate the needs of Gen AI.

Lastly, the case company is currently developing their Gen AI capabilities by building a Gen AI team. The Gen AI team is planned to help manage the Gen AI projects more efficiently. However, there is a need to define an optimal operating model for the team so that it can accelerate the innovation process. Due to the limited resources available, the Gen AI team needs to be able to prioritise their work, which requires help from the innovation management practices.

4.2 Nature of Gen AI Development

During the interviews, a key theme arising from the answers was that the development of Gen AI solutions is similar to other technologies but, simultaneously, unique, requiring different focus areas and skill sets. Section 2 discussed what Gen AI is and the characteristics of Gen AI presented in the existing literature. This section builds on those findings and discusses the nature of Gen AI development based on the interviewees' perceptions. The key findings from this section complement the characteristics presented by the literature and approach the characteristics more from the innovation project perspective.

4.2.1 Designing Gen AI Solutions to Human-Computer Interface

In innovation management, an essential requirement is that the users desire the developed solutions. This sounds very simple but, most often, can be challenging to remember while focusing on building a good solution. However, focusing on the solution instead of the problem can lead to building solutions that do not solve any user problems and, therefore, are not wanted by the end users:

"[...] We had already fallen in love with our solution as we did not have a problem to fall in love with. The issue was that we somewhat skipped the problem definition. We were given an order to build this kind of solution."

-Senior Innovation Expert, Case Company

With the high hype around Gen AI, there has arisen a question of what can be achieved with the new technology. Discussing with the interviewees, they recognised Gen AI's high potential, especially concerning enabling new ways for humans to interact with computers. As the technology becomes more and more multimodal, it can handle multiple different input and output formats, including text, images, videos, and audio. The interviewees argue that this creates new opportunities, especially from the perspective of how humans interact with software systems and can disrupt it in the coming years.

However, for creating innovations, it is often required that the innovations can provide clear business value. The interviewees agree that most of the business value created with Gen AI will be created by helping humans make better decisions. This has often been implemented using chatbots or similar implementations where users can ask questions from Gen AI models. However, as one of the interviewees points out, the most significant business value will likely be created by solutions that do not look like chatbots, even though they aim to help humans make better decisions.

"I believe that because Chat GPT disrupted the world so strongly, people associate that Gen AI equals to a chatbot. However, most probably, the most significant business benefits can be achieved through something that does not look like a chatbot. [...] In any case, it will somehow be tied to interacting with humans, for example, by taking natural language or some image as an input or generating output in natural language."

-Director of Data Science, Gamma

The tendency of Gen AI to be utilised in the human-computer interface is due to the nature of the technology. The interviewees argue that compared, for example, to traditional machine learning, Gen AI is more of a general-purpose solution. In practice, the technology can be applied to multiple use cases and provide reasonably good results without significant development commitments. However, its costs can sometimes be relatively high, and it can lose performance to more specialised solutions developed for the exact use case at hand.

"I personally like the division between specialised AI and general-purpose AI because that is what the LLMs are actually about. It is about creating a system that can do multiple different things. Most often, they cannot do them perfectly, but they can do thousands of

different things slightly more slowly and more costly than what the specialised systems can do."

-Director of Data Science, Gamma

While it can be expected that Gen AI solutions will be operating in the human-computer interface, understanding what the users need becomes highly critical. Finding out the users' needs is easiest by conducting careful user research. Well-conducted user research can also help in designing the solutions as you understand the current situation and available resources better:

"In the early stages, I think user research is very important for us, and the team has done great work on this part. Understanding what the current workflow of the end users is, what kind of data sources they use and how, and what kind of answers they want from the data sources is important so that we have a clear idea about how we can utilise the existing data sources and create the expected answers for them."

-Senior Data Scientist, Case Company

In addition to simply conducting user research, the interviewees point out the benefits of involving the end users in the innovation process for the whole duration of it. According to them, this can help to get timely feedback on different ideas and speed up the process significantly. Most of the speeding up can be achieved by making the right decisions already in the beginning, which limits the number of iterations required to achieve a working solution:

"We got, in my opinion, much speed from having end users involved in the process. We were able to make the right decisions immediately and not so that we test something and learn afterwards that it was not the right thing after all."

-Business Development Manager, Case Company

The interviewees revealed that, in many cases, there is unnecessary caution related to showing solutions to users. They note that there is a difference between solutions designed for internal use and customers, but the companies are often too slow to discuss them with the users. The interviewees argue that, especially with internal solutions, there should be constant discussion between the project team and end users from the beginning of the projects. With customer-focused solutions, it is understandable to be more cautious. However, companies should still have the courage to show incomplete solutions to them, as the feedback can help you focus on the right things. This feedback can be used already in the very early stages of the innovation management process and not only while building the final solution. Of course, the more abstract the solution is, the more you need to interpret the answers of the users instead of mindlessly following them:

"[...] In my opinion, we have been very slow and cautious when bringing the solution for testing. We could have found out already half a year ago that does this really help someone and will someone use it. Yes, we have now been asking for feedback from the users for a while, but in my opinion, this has been quite a cautious approach. [...] Once again, I could say that if you can build in a day or week something that you dare to show to the end user, you will learn so much more compared to you looking at the responses by yourself and pondering: 'This is what it gives, and this is probably good enough'. [...]"

-Digital Innovation Expert, Case Company

4.2.2 Non-deterministic, Iterative and Fast Development

When considering the characteristics of Gen AI projects, one characteristic stands out from the interviewees' answers. The interviewees often mention that the most apparent difference between developing Gen AI solutions and other software solutions is that developing with Gen AI is non-deterministic. In a nutshell, this means that you cannot be sure how your changes will affect the system. In traditional programming, you typically can always know how the system changes when you modify the code. However, with Gen AI, you can only have a good guess about the effects, but you need to test it to find out:

"The development is not deterministic and definite. Could I even say that you move a bit to the HR domain. I mean that when you develop something like that [Gen AI system], it is like you would describe a job. You cannot know if this works, meaning that you can get someone hired and have a good idea about what the person can do, but the reality can be the complete opposite."

-Control Systems Expert, Case Company

This non-determinism makes the development quite iterative and experimental. When you do not know the effects of your changes, you need to try different prompts and workflows and iterate the solution based on what you learn. Otherwise, the development is very similar to other technologies, and the interviewees emphasise that Gen AI is simply a technology among others. Also, for the users, it does not matter if it is Gen AI or some other technology that creates the outputs of the system:

"I have tried to communicate to the users that it [Gen AI] is only a technology, and the important thing is that the solution helps them and the system actually works. It is not a big difference for them if it is Gen AI or something else working in the background. [...]"

-Business Development Manager, Case Company

In addition to making the development of solutions iterative, non-determinism, along with other characteristics of Gen AI, makes testing solutions rather challenging. The interviewees point out that it is already challenging for the developer to evaluate what is a good and bad response since determining this requires a deep understanding of the use case you are working on. Evaluating outputs that would be easy for a user to evaluate can take considerable time for the developer since they need to familiarise themselves with the use case. Also, the generative nature of Gen AI makes it so that the system does not provide similar outputs for the same prompt. This creates a challenge from the testing perspective as the current automated testing systems rely on knowing what the expected output of the system:

> *"For example, even though I have been working now for three years alongside maintenance, I have no idea if the responses are good or complete trash. I always have to go to the source materials and check if everything matches. […] For the end user, this would be immediately clear."*
>
> *-Digital Innovation Expert, Case Company*

The interviewees, however, point out that there are workarounds for the problem as they can, for example, let Gen AI evaluate the quality of the responses. It is possible to ask a Gen AI model to rate the response compared to some material or on a scale with pre-defined metrics. The interviewees also forecast that testing technologies and practices will develop quickly over the next few years and that there will be better approaches to this.

> *"Testing LLMs is very difficult compared to traditional software projects where you can utilise unit tests and similar. LLMs are, in the end, random processes which generate the outputs. […] Therefore, the output can be different even though you asked the same question in the same way. […] This has been compensated in many ways and often by letting humans evaluate the responses. […] I believe that in a couple of years, there will be a standardised method for doing the testing."*
>
> *-Director of Data Science, Beta*

To track the solutions, the interviewees have used different key performance indicators (KPIs), measured through software systems or questionnaires. The questionnaires are mainly used to evaluate human reactions towards the system, whereas the KPIs measured through software measure the usage of the systems more. Interviewees argue that the tracking systems are still developing, especially related to tracking the ethical aspects of AI. However, the tracking can also be as simple as having the possibility to give a thumbs up or down. This can provide enough information about the quality of the answers, which can then be investigated further by the developers:

"[...] We have a feedback system meaning that users can give a thumb up or down for the quality of the response. Otherwise, the use is completely anonymous. When we investigate the feedback, we can see what the users are frustrated with."

-Director of Data Science, Gamma

Lastly, from the development perspective, the interviewees argue that developing Gen AI solutions is faster than other AI technologies. As discussed before, there are multiple different technological options for building Gen AI solutions, which allow fast development cycles compared to traditional machine learning. In traditional machine learning, it took much time to build and train the models, but with Gen AI, it is swift to take the pre-trained models into use and create appropriate prompts. In addition to the generative models, there are also other standard components that most Gen AI solutions utilise and which can be reused to accelerate the development of new solutions:

"[...] Also, the development is limited to prompt tuning and bringing the correct data into the prompts. This makes the development very fast compared to e.g. traditional machine learning projects. There, one could have used months for building and testing the model. Now, you have an API, and, in many cases, you can very quickly test whether the use case is feasible. [...]"

-Digital Innovation Expert, Case Company

4.2.3 Domain Knowledge and Data Skills Emphasised

As discussed above, testing Gen AI solutions can become challenging since it requires deep domain understanding to evaluate if the solutions' outputs are good or bad. The interviewees argue that domain knowledge is also otherwise emphasised while developing Gen AI solutions. The interviewees explained that while building Gen AI solutions, one has the option to utilise off-the-shelf models. This means that the developers do not need to build and train the models by themselves but can focus on building a robust workflow and good prompts. When comparing this to traditional machine learning projects, they require that the developer also builds and maintains the machine learning model, which makes the process slower and requires more technical expertise, including mathematical and statistical capabilities:

"One thing that is good in the LLMs, compared to traditional ML projects, is that with LLMs, I am only a user, so I only need to learn how to call the API, prompt it and build the workflow. [...] For ML projects in the past, you trained your own model, so you needed to do a lot of data exploration, modelling and evaluation, which required statistical and mathematical capabilities for data scientists."

-Senior Data Scientist, Case Company

Even though the interviewees agree that the nature of development has changed, they have different perspectives on what kind of resources should be included in the projects. The interviewees agree that for building Gen AI solutions, it is necessary to have high-quality data available as most of the implementations require either RAG architecture or fine-tuning. It is, of course, possible to build Gen AI solutions without incorporating additional information into the models, but these seem to be a minority of the use cases. For this reason, some interviewees emphasise the role of data scientists in the projects. They argue that data scientists can ensure the availability of high-quality data, and they can build the required integrations into the data sources. However, not all the interviewees agree with this perspective. Some interviewees point out that building integrations does not require data scientists specialising in understanding and analysing data. They argue that regular backend developers could build the integrations. One of the interviewees has also noticed that data scientists might not be highly interested in building Gen AI solutions as they see it too mundane as their interests lie with solving complex mathematical problems:

> *" It [developing Gen AI solutions] requires less mathematical expertise. I was surprised that most of my team members were not inspired by working with LLMs, and it intrigued only the minority. Most of them love intensely the mathematical side of these problems so this was slightly different. [...] During the past ten years, I have learned that instead of the technological expertise, it is more important to understand the substance and what problem we are solving."*
>
> *-Director of Data Science, Gamma*

4.3 Challenges of Gen AI Innovation Projects

While Gen AI has taken the world by a whirl, it is sometimes difficult to remember that the technology is still immature. Even though Gen AI is maturing quickly, it still contains challenges that need to be addressed during the lifecycle of projects. This section describes the inherent risks and challenges of Gen AI projects recognised by the interviewees.

4.3.1 Risks Introduced by Gen AI and Managing Them

Misinformation and overconfidence

One must consider risks in innovation management, like in any other project-based work. With Gen AI, one critical risk needs to be addressed in all projects - misinformation. This is often referred to as hallucinations, but this study prefers the term misinformation as that is what the hallucinations are in the core, as one of my interviewees pointed out. Providing misinformation

is typical for generative models and somewhat expected behaviour as they are designed to guess the next token based on the context they have been provided with. Sometimes, providing users with misinformation is only irritating from the user's perspective and, therefore, can be accepted. However, in some situations, misinformation can cause more significant issues, such as safety risks:

> *"[...] Then also hallucinations, which means, of course, that the LLM would never give the same answer twice. So, how can we make sure it provides good information without inventing too much stuff? Especially in this domain, safety is, of course, a key priority so that the end users do not do anything unsafe."*
>
> *-Senior Strategic Designer, Case Company*

The risk of misinformation is widely recognised among the interviewees. However, they note that the use case affects the risk level and the measures that must be taken to address the issue. The interviewees emphasise two primary ways to address the risk. The first is to build safeguards to block the misinformation from getting through to the users. These can be built, for example, by prompting the LLM multiple times and building steps into the workflow, where the LLM is asked to evaluate, for example, the safety and consistency of the response.

> *"We have considered these safeguards in our prompting. [...] In the instruction part, we provide a list of scenarios where the system should refrain from answering user questions."*
>
> *-Senior Data Scientist, Case Company*

The second way of addressing the issue is by providing sources for the information and putting the responsibility of double-checking the outputs to the users. However, this requires efficient training and communication because the users are often lazy and unwilling to check the source materials, as the Director of Data Science from Gamma points out. The interviewees suggest that one way they have solved the problem is to make the system provide only concise answers, forcing users to retrieve the complete information from the source documents. However, this degrades the user experience and should be used only when required from a safety perspective.

> *"[...] The risk caused by hallucinations is tried to be limited by forcing the system to source documents. The text generated by the LLM is so short that it forces the user to open the documents instead of only reading the generated text."*
>
> *-Digital Innovation Expert, Case Company*

Along with misinformation, Gen AI models bring another challenge that amplifies misinformation's effects. This challenge is overconfidence. The models are often designed to sound professional and confident while generating the

outputs. This helps the users to accept the information provided as truth. However, this becomes an issue when the system provides misinformation, as it provides the information with a highly confident tone, making it extremely difficult to recognise mistakes. The interviewees explained that they struggled with this while building Gen AI solutions. They also hope that the models will learn to express uncertainty in the future. However, for now, this can be achieved only through recognising the deficiencies in the knowledge base and by forcing the system to express uncertainty when asked about these topics:

> *"If you now try to ask the system about it [not supported topic], it sometimes makes mistakes. Therefore, we have hard-coded the system prompt so that if the user asks about this topic, the system tries to help but expresses uncertainty. For example, it could say, 'I have not yet been trained to answer these questions, but this is my best guess about the topic'. "*
>
> *-Director of Data Science, Gamma*

The interviewees pointed out that the risk of misinformation should be considered already when evaluating the possible use cases. As part of the evaluation of new use cases, there should always be a feasibility evaluation, which should consider the possible effects of misinformation as a critical part of investigating Gen AI solutions. If the risk of misinformation cannot be handled, it should be considered if the solution should be developed with other technologies or if it can be developed at all:

> *"One critical question is whether the system is allowed to make mistakes. For example, are you doing some medical stuff where the system cannot, in any case, be allowed to make mistakes? However, there are use cases where it is kind of okay for the system to be mostly in the right but also make some mistakes from time to time. Therefore, it is currently one criterion for building solutions because it is still a fact that the system sometimes provides misinformation."*
>
> *-Director of Data Science, Gamma*

Cybersecurity and data dependency

In addition to misinformation, the interviewees pointed out that data security is a critical challenge with Gen AI solutions. This does not mean cybersecurity in the sense that externals gain access to confidential information, which is sometimes emphasised in media and literature. As the interviewees point out, the cybersecurity risk is often low if you are using commercial models such as GPT models from Open AI. From the cybersecurity point of view, the more significant threats are related to company employees inputting confidential data to off-the-shelf solutions and using potentially malicious open-source models. The issue with off-the-shelf Gen AI solutions such as Chat

GPT is that in the past, they have periodically changed the practices about which data is used for training new models. If confidential information is used to train the new models, it becomes achievable through the model.

A more significant risk related to data security is data leakages. While designing the solutions, one should consider what kind of data the users should have access to. If a model is trained with a dataset, the information can be retrieved from the model. This creates a challenge, especially with fine-tuned models, but RAG solutions must also be designed carefully. The interviewees point out that the risk can be limited by curating the dataset, carefully designing the workflow, and building safeguards. Utilising the workflow to tackle data leakage issues means that, for example, in RAG models, the knowledge base is limited based on the user.

> *"For example, someone in China had recently developed something with Copilot Studio. I asked the system to sell competitor products instead of our products, and it provided me with instructions for selling them. Then I asked it to reveal some fault codes, and it gave me some. […] In a way, there is nothing bad, but when you make a chatbot, you need to scope it properly so that it does the work it is intended to.*
>
> *-Analytics Manager, Case Company*

Having the systems leaking data is not necessarily a significant problem. However, allowing a system to answer questions it is not designed to answer can lead to a decreased quality of answers and a higher amount of misinformation as the system is likely not tested for those questions. Additionally, some interviewees see the risk of data leakages as an opportunity to patch possible holes in their current data management protocols:

> *"We took it from a risk management perspective that people can get access to data where they did not know they had access to. We saw it so that it helps us patch the holes if we see that someone has access to somewhere they should not get. In that case, we can block the access if needed."*
>
> *-Senior ICT Architecture Manager, Alpha*

Performance, transparency and regulation

As discussed in section 4.2, Gen AI is often seen as a general-purpose tool that can be applied to multiple different use cases. To do this, the models are trained with massive amounts of data, and their size is enormous. In addition to good usability, this is visible to the users of models as relatively high costs, as the training and maintenance costs are high for the models' providers. The interviewees mentioned the challenge of costs on multiple occasions. However, there seems to be a consensus that when applied correctly, the costs of

the solution can be mitigated by the value created. In practice, this means that the solutions often need to help humans in one way or another. However, applying Gen AI to all use cases is not feasible as the costs can quickly become very high compared to the value created, and similar results can be achieved with other technologies:

> *"These LLMs are not very fast, so you cannot put them on a critical path, which requires swift user experience. Then, if we consider use cases where the system helps a human in decision-making, it is ok that it costs, e.g. 10 cents per question, because it creates more value than that. However, if we consider our systems, which compute billions of forecasts and optimisations each night, if there is an LLM on the critical path, it could cost over 100 million per night. Our budget could not handle costs like that:"*
>
> *-Director of Data Science, Gamma*

It is important to note that in addition to costs, the applicability of Gen AI in high-scale automation processes is also limited by the possibility of misinformation, as discussed above. The high probability of the system making mistakes forces the outputs to be checked by humans. Therefore, at least in the current state, the technology is not widely applicable in completely automated workflows.

> *"[...] In the core, the model guesses the text. It is not absolute truth, and therefore, we cannot build solutions where we unquestioningly trust what the model generates. The users need to be trained, and they need to understand that the model generates a proposal, but it requires validation from the end user. So, you cannot trust it blindly."*
>
> *-Head of Enterprise Architecture, Case Company*

The last challenge brought up by the interviewees is the tendency of Gen AI to be a black box. In practice, this means that it is not transparent how the system comes up with the responses. This has some effects from the development perspective as it is closely tied to the non-deterministic nature of Gen AI development, as discussed in section 4.2. However, poor explainability of the system logic can drastically affect how much the users trust the solution, and this needs to be addressed while rolling out the solutions. There has already been discussion about developing explainable Gen AI models, but these have not yet been achieved.

As discussed in section 2.1, the European Union has recently published the EU AI Act (2024). The Act works as the base regulation related to using and developing Gen AI solutions. The interviewees have noted the existence of the regulation and consider it as something that needs to be addressed while designing new use cases. However, they do not see it as limiting but rather as a tool for evaluating the risks of new ideas. One interviewee also argues that

the act should be used as a tool in project risk management. They state that the approach should be that when you make the first estimate of the risk category, you should always aim to find feasible measures to decrease the solution risk level to fall to one category lower than the first estimate.

> *"The act takes a risk-based approach. Similarly to GDPR, the act does not clearly state that this is something you are allowed to do and this you are not, but rather you need to estimate the risk case by case."*
>
> *-Legal Counsel, Case Company*

4.3.2 Adapting to Changes by Developers and Users

While discussing with the interviewees, an often-surfacing theme was that they, as developers of Gen AI solutions, must either adapt to technological changes or manage users' expectations and help them understand the technology. A common factor between the developers and users that creates the need for adapting seems to be the novelty of the technology. The interviewees explained that with older and more mature technologies, there are typically only minor changes during the life cycle of projects. However, Gen AI is still developing rapidly, which forces the project team to constantly study the best practices and new tools that are popping up like mushrooms after rain.

> *"The industry keeps changing quickly, and models can be released every month or week. […] So, in these Gen AI projects, you need to be open to these changes, keep up to date with the latest industry practices, and keep studying those new services and practices. […] This is quite rare with other technologies."*
>
> *-Senior Data Scientist, Case Company*

In addition to keeping up with changes, the developers must constantly study to find the best practices. Many companies have also completed only a limited number of Gen AI projects. Therefore, there are not many experienced Gen AI developers in companies who can tell how the solutions have been implemented previously. This will, of course, change during the coming years as more and more companies are experimenting with Gen AI and building knowledge about the technology.

> *"There is a challenge that you cannot find anyone with years of experience. Therefore, you do not have anyone in your team who could say that this is how we have done this in the past five projects."*
>
> *-Digital Innovation Expert, Case Company*

From the user perspective, Gen AI has brought varying expectations along with its benefits. The interviewees explain that there is a significant need for change management to address the different expectations that the users and

other stakeholders may have. Many interviewees mentioned that even though the end users are interested in Gen AI and its potential benefits, they are also afraid they might lose their jobs. This has required the project teams to put effort into communication with the end users even though, in most projects, the target is not to replace the current employees but rather make their work more efficient:

> *"It is also quite terrifying for some people. They think that AI will take their job. We have had quite a lot of these discussions. […] We have then circled back to the business case and showed them that the whole business case is built so that we are not trying to get rid of them but rather improve growth, profitability and speed."*
>
> *-Business Development Manager, Case Company*

In addition to communicating about the effects of the new solutions, the interviewees explained that there has been a need to train the users carefully. As discussed, Gen AI solutions contain the risk of misinformation, and communicating this to end users is a must. This is partly due to people's varying expectations related to Gen AI. The interviewees have been struggling with skewed expectations related to the technology capabilities. Many people seem to think that Gen AI is some magical solution that solves everything, and the users can trust the solutions completely:

> *"There have been very high expectations related to this solution. People, of course, think a bit that Gen AI does everything, and we can throw anything to AI, and it handles it. This has been quite straining as it is not so easy. […]"*
>
> *-Business Development Manager, Case Company*

These high expectations are also common for management, which has been translated into high expectations regarding the ability to generate business value. However, the interviewees also noted that getting resources for the Gen AI projects has been relatively easy. Many companies have recently wanted to ride the Gen AI wave and get the benefits from having Gen AI as part of their products. Even though this has made getting resources easy, it also transfers to high demands on delivering value quickly.

Lastly, it is worth noting that contrary to others, one of the interviewees also felt that implementing Gen AI solutions has been very easy on the change management side. They have had no visible resistance from the users which is not typical for their projects. They hypothesise this is probably due to the widespread interest towards Gen AI. In addition, they have organised extensive training related to the solution, which most likely contributes to lowering the resistance towards the solutions as the users know what to expect from it:

"There has been the most hype from the people, and this has required the least change management. There has not been so much resistance to change, at least yet."

-Senior ICT Architecture Manager, Alpha

4.4 Accelerating Innovation Process

High demand for Gen AI innovations has created a need to accelerate the innovation process, as described also in section 4.1.3. The interviewees discussed three methods for achieving this. The first way is to enable quick experimentation on new ideas. The interviewees argue that with Gen AI, it is easy to conduct quick tests on the technology, making it easier to evaluate the ideas before investing many resources. The second point that the interviewees raised is that there is a need to find information about Gen AI development, and they argue that an expert team can accelerate the development by providing easy access to knowledge. The third way the interviewees brought up is enabling a broader population of employees to build Gen AI solutions for their own use. However, some interviewees had concerns about implementing this citizen development practice as, in the worst case, it can also hinder the innovation process by creating a significant demand for support.

4.4.1 Experimentation for Efficient Evaluation

"The role of the innovation team is to bring evidence and confidence that this [new idea] is worth scaling."

-Senior Innovation Expert, Case Company

As an interviewee said, the purpose of an innovation team is to study new ideas and create evidence that a new idea is worth developing. For doing this, there are two aspects. First, you need to build an understanding of the innovation. After that, you need to be able to evaluate if the innovation is worth pursuing in the light of the gathered knowledge or if the project should be put on hold or discarded completely. Considering the evaluation of the ideas, the interviewees argue that Gen AI solutions should be evaluated through standard evaluation criteria that can be utilised with most software solutions:

"[...] In my opinion, here, apply the same rules as with other technology choices. My favourite framework is four questions: feasibility, desirability, viability, and strategic fit. [...]"

-Director of Data Science, Gamma

The proposed evaluation criteria revolve around four key concepts. The first criterion is viability or business case, which is emphasised especially by business-oriented interviewees. In innovation management as in all business, it is essential to create more value than what the innovation's costs are. Therefore, it is often not wise to pursue innovations that do not have the potential

for future profitability. This also makes getting investments, especially from the business units, challenging.

> *"In my opinion, through business case, but then IT, a data scientist or an AI expert could determine if AI is the right technology or if it should be some hybrid model. However, from our [Business development] perspective, the question is if there is a big enough business case."*
>
> *-Business Development Manager, Case Company*

Another highly emphasised criterion is desirability, which means whether the end users want and benefit from the solution. If the solution does not help the end users in any way or, in the worst case, makes their work more complex, getting the users to adopt the new solution is challenging. In addition to adopting the solutions, the user's willingness to assist the development process is also highly affected by the desirability of the solution. With Gen AI, desirability can be considered especially important as the solutions are often very user-centric and affect how users work.

The last two criteria suggested by the interviewees are feasibility or technological fit and strategic fit. Strategic fit is essential, especially from the resourcing perspective. The resources of the innovation team are often limited, and for scaling the innovations, a buy-in is needed from some business unit. Also, as discussed in section 4.1.2, the case company's innovation management practices revolve around strategic themes, and it can become challenging to justify innovations that do not fit under any of the themes. The interviewees explain that resources are mainly allocated for projects that are aligned with the company strategy as the whole company has committed to pursuing it:

> *"If you want to bring out something new, there needs to be a good reason why you should do that. This needs to be done by the strategy saying: 'Hey, we need to go there'."*
>
> *-Senior Innovation Expert, Case Company*

Feasibility is a slightly more challenging criterion to evaluate. A key component of feasibility in Gen AI and especially RAG solutions is the availability of high-quality data. Currently, the available models perform best with text-based data, but the newest models are moving towards multimodality and can already handle images, videos and sound in addition to text. In the future, this can create new opportunities regarding the source data. However, the format of the data is not typically the most significant restriction but rather the pure availability and quality of the available data:

> *"I think that in the scoping stage, the most important thing is what kind of data sources you have. Assuming that there is a business model that we can make work, then technology-wise, the first thing*

to see is what data would be needed to execute this, where it exists and who owns it. Then also we would need to see whether we have a meaningful way of getting this data […].”

-Analytics Manager, Case Company

In addition to data availability, the feasibility of Gen AI solutions also depends on the use case and the risks involved. The section 4.3 introduces the critical risks associated with Gen AI solutions, which must be considered while evaluating the technology fit. However, in the end, the feasibility evaluation boils down to the question of whether you can implement the solution with the given technology or not.

Even though the evaluation criteria suggested by the interviewees are pretty trivial, making the evaluation can be challenging, especially in the early phases of the process, since there is a limited amount of information available. The interviewees have, however, noticed that experimenting with Gen AI ideas can be pretty fast. A control systems expert from the case company explains that he has been experimenting with different Gen AI use cases and ideas. For that, he has built a small platform with an existing connection to a couple of Gen AI models and a light UI. He says that on this platform, testing new ideas can be done as quickly as under an hour. In addition to custom platforms, the interviewees mentioned that they have used different off-the-shelf solutions and LCNC tools for experimentation.

With Gen AI, multiple different tools can be utilised for testing the ideas. However, one interviewee points out that it is not always possible and necessary to do the experiments with technical solutions. They argue that in these situations, you can utilise more simplistic methods and, for example, make a draft of the business model or plan what the user workflow could look like:

“With LLMs, you have, of course, some tools like custom GPTs or Microsoft Copilot Studio with which you can at least try this chat analysis. But when it comes to, e.g. generating images or something like that, I think it really depends on the use case because you do not always need to start with the technology. You can also do some kind of paper model and do the responses yourself to figure out the idea or this kind of things.”

-Senior Strategic Designer, Case Company

The interviewees have noticed that sometimes companies tend to avoid showing unfinished solutions to users, especially to customers. However, for Gen AI solutions to succeed, it is necessary to thoroughly understand the user’s perspective and use case, as discussed in section 4.2. To achieve this, the interviewees suggest that the users should be involved in the innovation process already in the beginning by discussing the idea and findings from the experimentation with them. This way, it is possible to understand more

deeply what kind of value the innovation can produce and whether it solves a problem.

> *"In my opinion, we have been very slow and cautious about bringing the solution to users for testing. We could have already determined half a year ago if this actually helps and if anyone uses this."*
>
> *-Digital Innovation Expert, Case Company*

4.4.2 Gen AI Team Governs and Unifies Development Practices

New technologies such as Gen AI introduce challenges and opportunities in terms of keeping innovation projects running smoothly and quickly. The interviewees explained that having to study the technology constantly can be time-consuming and make the process rather heavy. However, it is vital to keep moving forward quickly to keep up with the industry and competition. To achieve a smoother process, the knowledge from projects should be gathered, and the companies should form unified practices for both internal and outsourced development of the solutions. These unified practices can speed up the development, decrease maintenance costs, and provide a better overall experience for the project members.

The interviewees agree that working with a new technology is challenging as you do not have any previous experience with similar projects. This can lead you to make mistakes that could have been easily avoided. It also forces you to study a lot during the projects as you need to find the best tools and development practices:

> *"There is a challenge that you cannot find anyone with multiple years of experience. There is no team member who could tell how things have been done in the past five projects. This forces us to study a lot about how similar things have been done elsewhere so that we can avoid stupid mistakes that could be avoided with experience."*
>
> *-Digital Innovation Expert, Case Company*

These kinds of challenges are natural during the first projects with new technologies. However, moving forward, it is possible to tackle the problem by gathering knowledge from projects within one unit and sharing it across the organisation. Having a unit formed around Gen AI is also supported by the fact that Gen AI solutions often contain standard components. According to interviewees, these components include at least the generative model, vector database, pipelines, data sources and caching systems. These base components can be built and formed into a platform which can be utilised while experimenting with new ideas and building solutions:

"While we monitored the first use cases, we began to understand that the solutions are built of similar components. We began to consider if it would be wise to build reusable constructs so that you would not need to reinvent the wheel for every use case."

-Head of Enterprise Architecture, Case Company

Even though it might sound easy to build an expert team around Gen AI, the implementation must be planned carefully for it to work smoothly. The interviewees explained that similar units have been utilised for other topics, but not all could meet the expectations. According to the interviewees, the most important consideration related to the Gen AI unit is how to utilise its limited resources efficiently. The interviewees explain that the worst-case scenario would be that the team becomes a bottleneck in Gen AI projects, as the core idea of this kind of unit is to enable others to work efficiently. Therefore, the Gen AI unit should not be heavily invested in multiple projects but rather remain in an advisory and governing role in the Gen AI projects of the organisation. The critical contribution that the Gen AI team can provide to the project teams is to develop the Gen AI platform containing ready-to-use components that can significantly accelerate solution development.

The interviewees argue that in addition to distributing knowledge about Gen AI, a core task of the team should be to create unified development practices for Gen AI projects. These practices should apply to both internal and outsourced projects. Having the solutions developed with unified technologies and practices helps to keep maintenance costs lower, as there is no need to have employees who can maintain multiple niche technologies. The interviewees have recognised that specifying the development practices is especially important for outsourced projects. Otherwise, the suppliers tend to use technologies and practices that they prefer:

"When a business wants something quickly, they usually buy it from some vendor. There [in the project] are no technical persons from our side looking after how things are done. This leads to a situation where we have ten different systems, which are completely different because every vendor builds them as they are used to, as the team only states how the solution should work and that it does not matter what happens under the hood."

-Digital Innovation Expert, Case Company

4.4.3 Citizen Development with LCNC Tools

Currently, many people are interested in Gen AI and improving their work with Gen AI solutions. However, companies have limited resources and cannot allocate them to all projects. In these situations, companies can take advantage of the high interest and enable the employees to develop solutions by themselves, which is often called citizen development. The interviewees point

out that enabling citizen development can be seen as valuable and also necessary in some situations. They argue that the high interest towards Gen AI can otherwise drive people to experiment by themselves without any governance. In the worst-case scenario, this can cause more harm than value since the risk of, for example, cybersecurity breaches increases:

> *"When we offer the tools, we also avoid the risk that everyone buys some licenses and tools by themselves and do some weird solutions."*
>
> *-Head of Data and Analytics, Case Company*

Citizen development is not a new concept, and it has been seen, for example, with macros in Microsoft Excel. It is typical that people want to build small tools that help them with their tasks. However, according to the interviewees, the development must be governed to limit the risks created by the development. They, however, note that governance should be light so that people can easily build solutions without diminishing their interests.

A commonly mentioned challenge related to citizen development is the ownership of the solutions. The interviewees agree that developing solutions for their own use can be enabled relatively easily. However, if the solutions are published, for example, for the use of a team or even a broader population, the governance needs to be stricter. Some interviewees are rather strongly against the idea of citizen developers building solutions for others than themselves. They argue that in most cases, the citizen developers do not understand the effects that publishing the solutions for wider use has. In most situations, this makes the citizen developer the single support person of the tool who needs to maintain it and answer all questions of other users:

> *"We have had situations where someone has developed some dashboard, given it to a bigger crowd, and then left the company so that no one knows anything about the solution anymore. Therefore, ownership is also one perspective in addition to maintenance and support. If someone develops some handy solution and shares it for others to use, they may not understand at that point that they are the sole support person, who answers all questions if the solution breaks or the users need help."*
>
> *-Head of Enterprise Architecture, Case Company*

Another reason for contesting the idea of enabling citizen developers to publish solutions for other employees is their limited skills. As the citizen developers are not necessarily very technologically oriented, they cannot implement sophisticated safeguards. In the worst-case scenario, this can allow the system to provide even harmful responses or leak information that it is not intended to share:

"I think citizen development is good if you are developing something for yourself. Once you start developing something you put out for other people, even within our organisation, it needs proper governance structure and safeguards, which do not automatically come with solutions like Copilot Studio. You need to build these safeguards, and as a citizen data scientist, you are not qualified, and we are not expecting you to be qualified to build these safeguards. […]"

-Analytics Manager, Case Company

Indeed, citizen developers cannot be expected to be very technology-oriented and be able to build top-notch solutions. However, who should be allowed to become a citizen developer is debatable. Some interviewees argue that anyone with an idea should be able to build solutions for their own use. Others, however, consider that citizen development should be allowed only for employees who have the capability to teach themselves the required skills. This can, of course, be supported by the Gen AI team providing knowledge about Gen AI development. However, the Gen AI team resources are limited, and therefore, they cannot invest time in teaching and supporting all employees interested in citizen development:

"I feel that sometimes people have the wrong idea about citizen development and think it would be something anyone could do. However, it usually is like that, and you need to be familiar with the tools and understand the subject so that you know at least somewhat what you are doing. […]"

-Head of Enterprise Architecture, Case Company

To enable citizen development, the technologies used should be easy to learn. Due to this, the interviewees suggest utilising LCNC tools for citizen development as it is easy to learn how to build solutions with them. In addition, the solutions are often somewhat limited in what you can do with them. Even though the limitations can restrict some possible use cases, they can enable easier governance of the solutions. However, the limitations can also emerge as risks, such as the limited possibility of creating safeguards.

From the governance perspective, managing data access is one of the challenges that needs to be addressed. It is easy to manage data access as long as people are developing tools for themselves, as they can base the solutions only on the data they have access to. However, if the solutions are shared with others, then the data access is difficult to control. The interviewees explain that if the solutions are shared with other employees, they may get access to data that they are not allowed to see:

"In citizen development, a good thing is that you access the systems with your own credentials, so you have visibility to only the data that you already have access to in the systems. However, when you take a data extract from the system and put it, for example, on some dashboard or as a source material for some chatbot and share the access to others, then how can the data visibility be managed? Could someone gain access to some data that they should not have access to? […]"

-Head of Enterprise Architecture, Case Company

In addition to LCNC tools, citizen development can also happen with more sophisticated tools. This, of course, requires more skilled employees who know how to use them. Therefore, it is not possible for all organisations or the whole organisation but only for a part of them. At Gamma, they have built their own RAG system around their company information. The system can be used both as a chatbot and be integrated into other solutions through an API. For finding different use cases and developing the core system, they want to utilise the skills of their employees and enable them to work on the system in a similar sense as in citizen development:

"[…] I definitely want to enable and encourage people to build these use cases. There is also an extra benefit that we have thought of doing this in this inner source way, meaning open source but internally. So we can provide an opportunity for any team to build extensions to this solution. […] In addition to enabling agile testing and building use cases, we also want to enable building extension to the backend system."

-Director of Data Science, Gamma

5 Results

This section brings together the findings from existing literature and interviews. The findings are incorporated into a proposed model for managing Gen AI innovation projects. Table 3 illustrates how the interview findings have fed the framework design.

Table 3: Relationships between interview findings and the proposed model

Aggregate dimension	***2nd order theme***	***Influence on the framework design***
Business needs and organization	Business unit needs to get involved	The business unit needs to be involved at the latest during prioritisation, and a business case is utilised as one evaluation criterion
	Innovation unit controlling process and testing ideas	The innovation unit and Gen AI team have the responsibility to test and prioritise the ideas but a project team builds the actual solutions
	Practices aligned with surrounding organisation	The process is adapted to the current practices of the case company, and the organisational fit is considered one key evaluation criterion
Challenges of Gen AI projects	Adapting to changes by developers and users	Involving users in the process makes the process more efficient. The Gen AI team monitors the industry changes and advises teams to discard the need for constant studying. Change management is not explicitly addressed in the framework since it primarily concerns the process's implementation phase.
	Gen AI introduces risks which can be managed	Identified risks are considered, especially during the technology evaluation, to measure the use case's feasibility. However, the risks and their mitigation must be considered throughout the process.
Nature of Gen AI development	Non-deterministic, iterative and fast development	Emphasis on iterative development of the solutions and utilisation of fast experiments at the beginning of the process
	Designing Gen AI solutions to human-computer interface	Users are heavily involved in the process, focusing on identifying and solving a user problem. Desirability is also measured as one key evaluation criterion.
	Domain knowledge and data skills emphasized	The process focuses on understanding the user perspective already at the idea card and later through user feedback and testing. Data dependency is considered during the technology evaluation.
Accelerating innovation process	Citizen development with LCNC	Enabling citizen development is supported, but it is separated from the innovation process. LCNC tools are recommended for both citizen development and early experimentation
	Experimentation for efficient evaluation	Experimenting with ideas is a core element of the process, and it is utilised to build knowledge and speed up the process.
	Gen AI team unifying practices	The Gen AI team is recommended to drive the front end of the innovation process but only to advise during the development of the solution

5.1 Framework for Managing Gen AI Innovation Projects

While building the new model, the current innovation management process of the case company from section 4.1.2 works as the starting point of the work. As revealed by the interviews, the model works quite well and only needs to be adjusted to the requirements of Gen AI. The model also has a pretty robust workflow for the incubation and go-to-market phases. Therefore, this framework focuses on the early phases of the innovation process, which is the path leading up to the incubation phase. The framework needs also be adjusted to having a Gen AI focused team and citizen development taking place all around the company.

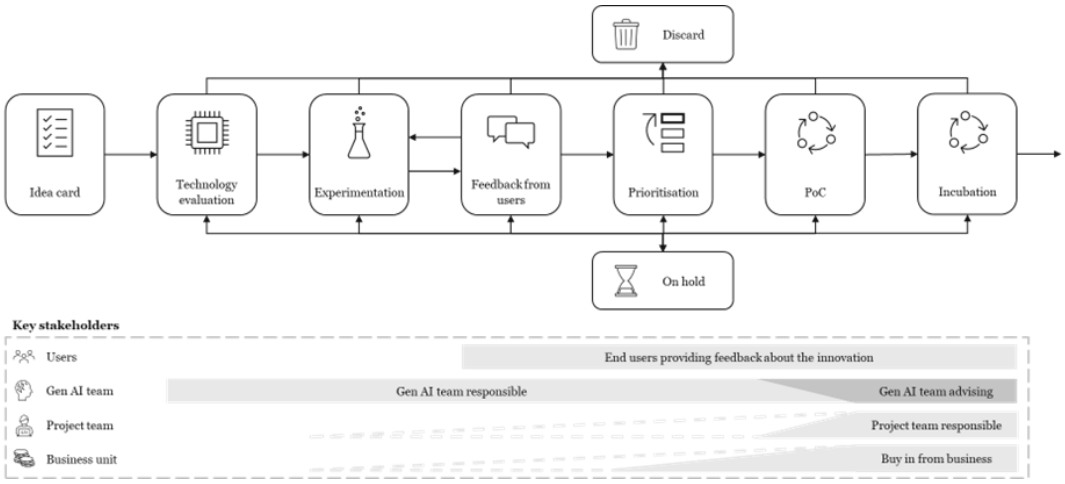

Figure 5: Framework for organising around Gen AI innovation projects

Figure 5 shows the framework, which is the artefact designed during this study. This study does not consider the methods of gathering innovation ideas; therefore, the framework begins with the assumption that some innovation ideas exist inside the organisation. The process begins by documenting the idea through an idea card. The card is introduced in more detail below. However, the core idea of the card is to document the idea, turn the focus towards the problem to be solved, and help to prioritise resourcing between different ideas. The idea card should not be Gen AI specific; thus, the technology used for the solution should be decided only later, allowing the idea provider to be less technologically oriented.

After documenting the idea, the development of the innovation begins. If the innovation unit sees that the idea can be developed using Gen AI, the idea is given to the Gen AI team for evaluation and experimentation. The technological evaluation is done using a technology evaluation card, which considers the characteristics of Gen AI. The answers to these questions and the idea

card are used to decide whether the idea should be moved forward, put on hold, or removed from the process.

If the idea is moved forward, the Gen AI team shall complete experimentation on the idea. The experimentation is completed with either LCNC tools or the Gen AI platform developed by the Gen AI team. The experimentation aims not to build a complete solution but to develop an understanding of the opportunities and challenges of the idea and technology. After experimentation, the idea is discussed with the planned end user of the solution to get feedback early on. If necessary, the feedback is utilised for extra experimentation before moving forward in the process. However, as these steps build knowledge about the idea and solution, the result of the steps can also be to put the project on hold or to discard it.

The team will proceed to evaluate the idea once they are happy with the experimentation. The evaluation is completed through business case, organisational fit and desirability. The evaluation is used to prioritise the available resources between different projects while moving towards PoC and building a project team around the idea. During the PoC, the Gen AI team will begin to transfer into an advisory role as the responsibility of driving the project is transferred to a project team. After this, the process will follow the case company's current innovation management practices. This means that the PoC is developed in collaboration with the users. After the PoC is completed, the business unit, together with the R&D unit, can propose that the project is moved to incubation, where an MVP is developed and a committee steers the process.

It is necessary to note that the process can continue in three directions after each step. The idea can be moved to the next stage, put on hold or discarded. However, after feedback collection, there is also a fourth possible direction, which is moving back to the experimentation. The critical difference between placing an idea on hold and discarding it is that the idea can be included back into the process from hold. This is done by evaluating the idea against other ideas that reach the same stage. However, discarding the idea means that it is deemed not worth pursuing and should not be included back into the process without radical changes in the idea or circumstances around it.

Table 4 summarises the responsibilities, stakeholders and outputs of each step. These are discussed in the sub-sections below, while discussing each step of the process in more detail. The table also outlines an indicative timeline for the process, illustrating that the first steps of the process are designed to be fast and, therefore, help the Gen AI team to quickly evaluate multiple innovation ideas.

Table 4: Stakeholders and targets of each stage in the process

Stage	*Responsible*	*Stakeholder engagement*	*Duration (indicative)*	*Output*
Idea card	Idea provider		< 1 day	Documentation of the idea and identifying the problem to be solved
Technology evaluation	Gen AI team	Possible discussion with the idea provider	< 1 day	Initial understanding of technical feasibility and critical risks to be considered
Experimentation	Gen AI team		1-5 days	Technical feasibility
Feedback from users	Gen AI team	The Gen AI team interviews a few end users	1-2 days	Understanding of the user requirements and desirability
Prioritisation	Gen AI team	Initial commitment from business	1 day	Evaluation of business value, organisational fit and desirability. Prioritised list of projects for resourcing
PoC	Project team (& Gen AI team)	The Gen AI team begins the process but mainly advises. Business unit guiding the process. Users providing feedback	2-8 weeks	Proof of concept solution tested by users and final technology selection
Incubation	Project team	Gen AI team advising, business unit guiding, users providing feedback, and steering committee governing the process	2-12 months	Minimum viable product tested by users and proof of scalability

5.1.1 Idea Card

The first step of the framework is a common way of documenting the new ideas that emerge in the organisation. The documentation is completed by the idea provider who has developed the idea. Documenting all the ideas helps with concretising them and enables discussion about them. Documenting the ideas needs to be easy and fast to avoid too much friction at the beginning of the process. However, it is necessary to be able to communicate and track the innovations of the organisation.

The interviewees emphasised that to create successful innovations, it is essential to understand the user problems thoroughly. Therefore, the idea documentation focuses on ensuring that the end user problem is identified and understood. Innovation projects built purely on top of a technology can sometimes succeed, but, in most cases, they end up in situations where the user needs are never matched. Due to the Gen AI boom, many companies have, however, entered a mode where they try to include Gen AI everywhere because having your solution associated with the technology has helped with getting investments and customers. Moving forward, it is necessary to recognise that Gen AI is only a technology among others, and you should not innovate specifically for Gen AI but rather solve a problem.

An early realisation of this study was that it is not meaningful to design a separate process for Gen AI that runs along the normal innovation process. Even though the technology is new and disruptive, it does not introduce such radical changes from an innovation management perspective that it would need a completely separate process. Instead, the current innovation process has been adjusted to accommodate the needs and opportunities that Gen AI has introduced. Therefore, it is not wise to include technology-specific questions in the idea card as otherwise, there would need to be technology-specific idea cards for all possible technologies. The idea card must be applicable to any idea that emerges in the organisation. The characteristics of Gen AI projects can then be considered during the next steps while evaluating if Gen AI is an appropriate choice for building the solution.

In addition to documenting the ideas, the idea card can be used to prioritise resource use between new ideas. The resources of the Gen AI team and innovation unit are limited; therefore, they cannot act on all ideas generated by the organisation. This forces them to select between different ideas, which are the ones they should focus on. To make this possible, the idea card must document the innovation thoroughly enough so that comparing the ideas is possible. However, it is necessary to note that since the idea provider fills the idea card at the beginning of the process, there is not a lot of concrete data about the idea and possible solution. Therefore, the questions cannot be too

specific, and the prioritisation needs to be based on assumptions about the potential solution, the value created by it and the difficulty of achieving it.

Idea card

1. What problem have you identified?
2. Who has the problem and will be the end user of the solution?
3. What is the idea for solving the problem?
4. How much value can be created by solving the problem?
5. Who are the key stakeholders?
6. What kind of resources are needed to build the solution?
7. What are the innovation's potential risks (opportunities and threats)?

Figure 6: Idea card for documenting new innovations and identifying the problem

5.1.2 Technology Selection

After the idea provider has documented their idea through the idea card, it is necessary to select the technology used for building the innovation and solving the identified problem. The technology selection is done by considering the applicability of the planned technology and its potential effects on the innovation. The evaluation should be done by employees with enough expertise in the technology so that they can confidently evaluate if the technology is applicable to the given use case. With Gen AI related innovation projects, these experts can naturally be found from the Gen AI team and therefore the evaluation should be done by them.

Figure 7 illustrates the questions used to evaluate whether Gen AI is a feasible technological choice for the innovation project. The questions included in the list are inspired by the characteristics of Gen AI projects that emerged from literature and interviews. Answering the questions can be done by the Gen AI team either based on the idea card or by interviewing the idea provider. In an ideal world, the idea provider explains the idea with enough details so that others can understand it. However, in reality, this will most likely not happen, and therefore, the Gen AI team has to be in touch with the idea provider and gather more information about the use case.

Technology evaluation card

1. How can Gen AI be utilised as part of the solution?
2. What kind of data is required for the solution, and how to get it?
3. What are the possible effects of misinformation, and how can they be mitigated?
4. In which EU AI Act risk category does the solution fall?
5. How does the end user workflow look like?
6. What is the scope of prompts the systems should respond to?

Figure 7: Technology evaluation card with Gen AI specific questions

5.1.3 Experimentation and Feedback Collection

After the Gen AI team has identified that Gen AI can possibly be used to develop the innovation, it is time to experiment with the technology and idea. However, a limited number of resources are available, so there is a need to prioritise which ideas are experimented first. To do this, the Gen AI team can utilise the knowledge gathered through the first two steps. The prioritisation must, however, be done on limited knowledge, and therefore, the aim should be to experiment with as many ideas as possible. The core criteria that can be used at this stage are the assumed value potential of the solution and the difficulty of implementation, including risk levels.

The experimentation aims to develop an understanding of the idea and the applicability of the technology. As Gen AI provides good opportunities for experimentation by utilising either prefabricated environments or LCNC tools, it is recommended that all new ideas should be experimented on before they are further evaluated. The experiments should be done using the most straightforward methods available and should not take more than a few days.

After the experimentation, the findings and whole innovation idea are discussed with users. It is necessary to include the users in the process early on because especially Gen AI solutions often affect the user workflow significantly, and most often, only users can evaluate if the outputs provided by the system are useful or not. Therefore, this feedback collection should be used to steer the innovation in the right direction and ensure that it answers the

user's problems. Therefore, the result of the feedback collection can also be to move back to the experimentation phase to continue experimentation based on the findings gathered from the discussions with the users.

5.1.4 Evaluation and Prioritisation

In innovation management, a core challenge is to find an optimal way to allocate resources between different ideas. In an ideal world, the innovation unit would have enough resources to act on all new ideas. However, this is unrealistic and would not be an efficient use of resources. As the literature emphasises, it is wiser to create a funnel shape in the innovation process by having plenty of ideas in the beginning and discarding them on the way. To do this, one must evaluate and prioritise the ideas before beginning to develop a PoC.

The literature and empirical findings suggest that innovations should be evaluated through three core criteria. These criteria are business case, organisational fit and desirability. When selecting the different evaluation criteria, especially the literature reveals that there is a multitude of different criteria that could be chosen. However, the evaluation must remain focused on the most important criteria so that it does not become too complex and allows efficient comparison between different ideas.

A business case as the first criterion is universally recognised and often considered the most important criterion. While drafting the business case, the two key elements are the created business value and the costs that achieving it requires. The business case can remain on a relatively abstract level, but for easy comparison, it is often best to use singular values such as net present value (NPV). However, since the innovations are evaluated in the relatively early phase of the process, there is often only a limited amount of knowledge that can be used for building the business case. Therefore, the aim should not be to find out the exact values but rather create a ballpark estimate that illustrates the potential of the innovation.

The second criterion to be used in the evaluation is organisational fit. This is a more abstract concept than a business case, but the two key elements of organisational fit are strategic alignment and buy-in from the business. The purpose of the criterion is to evaluate whether the organisation is ready to support the innovation. As the innovation unit at the case company has limited resources, it is necessary to have the business unit behind the innovation from early on. To make this easier, it is beneficial that the innovation is aligned with the current corporate strategy, as it drives the decisions the business units make. Therefore, without strategic alignment, getting the business

unit behind the innovation and providing resources for developing the solution is challenging.

The last criterion in the evaluation framework is desirability. It has been brought up on multiple occasions that for innovations to succeed, it is necessary to solve some user problem and that the users want the solution. Working on innovations that users need and desire helps get them involved in the process. Users are often more willing to use their time for testing and providing feedback if they feel they need the solution being developed. However, this buy-in from users should be considered only after the business case and organisational fit since, in many situations, the users may not even realise the benefits they get from the innovation and, therefore, might not desire it.

In addition to these criteria, many have suggested including technical feasibility as part of the evaluation criteria. However, the technical feasibility has already been studied in the previous steps and, therefore, does not need further evaluation at this stage. The Gen AI team completes the evaluation as they have been driving the innovation through the previous steps and, therefore, have the best understanding of it. However, they need to get the business unit involved in the process at the latest during this step as the business unit's resources are required for building the PoC and later also for the incubation phase. To smooth out the process, the business can be kept in the loop already from the beginning of the process. However, it can be challenging to communicate the idea and its potential value before any experiments have been done. Therefore, prioritisation is the step during which they must be contacted and included in the process at the latest.

5.1.5 Proof of Concept and Incubation

The last step considered in this framework is the proof of concept (PoC), which is also part of the case company's current innovation process. After PoC, the incubation phase begins, during which a minimum viable product (MVP) is developed, and proof of scalability is searched. The incubation phase is entered through a gate where the business unit and R&D unit propose the innovation for the incubation based on findings from the PoC phase. As explained in section 4.1.2, the incubation phase is steered by a committee composed of high-ranking employees who, as a group, have visibility in the operations of the whole organisation. At the end of the incubation, the committee also decides whether the project is moved forward to the go-to-market phase.

The incubation phase is the phase where this framework considers the process to be continued based on the case company's current innovation process. So, let us still study the PoC stage which leads up to it. During the PoC, the

aim is, of course, to build a proof-of-concept solution but, more importantly, to show that the innovation can indeed be built and to find the best tools for building the final solution during the following stages. Doing this might require multiple iterations since judging the quality of outputs of Gen AI solutions can be challenging. Therefore, it is encouraged to have relatively short iteration cycles where the solution is developed and then tested by a group of users. The solution is not yet viable at this stage, so the testing should be done in a controlled environment.

A significant change that occurs during the PoC is that the Gen AI team transfers the responsibility of driving the process to a project team. The reason for doing this is that building a PoC is much more time-consuming than the earlier steps, and if the Gen AI team is heavily invested in the development of the PoC, there can only be one or two projects running in parallel. In practice, this can, however, be slightly challenging to implement since there might not be resources available when building the PoC should start. There are two options in these situations: 1) the project is put on hold until resources are available, or 2) developing the PoC is outsourced. If the projects are outsourced, there must still be at least one person managing the project. Therefore, the projects should not advance to the PoC phase until the project has backing from the business unit and someone is ready to take the lead on the project.

To make the transition smoother, the project team can be searched already during the early stages of the innovation process. If a project lead is found already before the experimentation phase, the Gen AI team can transfer the responsibility of driving the process to them already before the PoC and focus on other projects. After the project is transferred from the Gen AI team to a project team, the Gen AI team transitions into an advisory role. In practice, this means that members of the Gen AI team will monitor and support the projects by sharing knowledge during the development of the solution. In addition, the Gen AI team will develop a Gen AI platform that contains reusable components that can be utilised to speed up the development of solutions.

5.1.6 Citizen Development Separated but Tracked and Governed

As Gen AI has taken the world by a whirl, the case company wants to exploit this interest among its employees. They want to enable their employees to develop Gen AI solutions by allowing citizen development. The LCNC tools offer a good platform for citizen development as they bring accessible development environments close to employees with limited programming skills. However, this does not mean that development would be easy for everyone, and enabling citizen development requires more consideration than simply providing access to the tools.

Citizen development must be guided and governed to get it running while avoiding unnecessary risks caused by inexperienced developers experimenting with their ideas. However, the Gen AI team should not be utilised as a support channel for citizen development as they have limited resources and should focus on more valuable projects. While the Gen AI team governs the development practices of Gen AI solutions, they must also define the best practices for the tools used in citizen development. This can, of course, be done in collaboration with other teams that are responsible for maintaining the LCNC tools, thus discarding the workload of the Gen AI team.

A key consideration related to enabling citizen development has been how to incorporate it into innovation management practices. However, from an innovation management perspective, citizen development must remain a separate concept but still be monitored. This monitoring should be established by requiring the citizen developers to fill out the idea card similarly to any other innovation. The Gen AI team can then screen these documented ideas. In most cases, the ideas should be such that the Gen AI team does not need to act on them in any way. However, in situations where the solution provides significant value and would be used by a large user base, the Gen AI team can consider transferring the project to the innovation process. The main reason for keeping citizen development as a separate concept is that there should be as little friction as possible so that the process does not become a burden for the citizen developer. If there are many formal steps and requirements from the process perspective, the citizen developers will often either drop the idea or work on it secretly.

In addition to LCNC tools, it is also possible to allow citizen development to be done with more advanced tools. One task of the Gen AI team is to develop a Gen AI platform where exists ready-to-use components and knowledge about Gen AI development. The more advanced citizen developers can also take advantage of this platform and develop solutions with these more advanced tools. However, the work must be governed more carefully since more sophisticated tools introduce more risks. In this case, the development needs to be monitored more thoroughly, but as the Gen AI team needs to focus on driving more significant innovation projects, the monitoring and support needs to be established by other units such as IT.

5.2 Evaluation of the Proposed Model

The framework was evaluated through expert interviews with the case company employees. As discussed in section 3, a core element of the design science method is evaluating the designed artefact. The selected interviewees were two Senior Innovation Experts, an Analytics Manager and a Senior Strategic Designer. They were selected due to their broad knowledge of innovation management and Gen AI and their varying perspectives from which they analyse the innovation process. During the interviews, the framework was presented to them thoroughly, and then the framework was discussed with them from different perspectives. The core message of the interviewees was that the model is simple enough and answers to the needs of the case company.

The first business need recognised in section 4.1.3, is that the case company needs to find ways to answer the high demand for Gen AI innovations. To achieve this, the framework proposes a combination of short stages, each deepening the understanding of the innovation. The interviewees agreed that utilising sets of questions and experimentation to build understanding about the innovations quickly can enable the case company to evaluate more ideas and to find the ones worth pursuing. They agreed that utilising LCNC tools for experimentation speeds up the testing but can still provide enough understanding of the use case and the idea's technical feasibility. The interviewees also saw the potential in utilising LCNC tools in citizen development but agreed that it should remain separate from the innovation process.

The second business need that was recognised is that the case company needs to understand how Gen AI projects should be managed. The framework proposes that Gen AI innovations should utilise the same innovation management practices as other innovations. The interviewees agreed that developing a separate process for the Gen AI innovations is not wise since it would introduce unnecessary complexity to innovation management. The interviewees agreed with the identified characteristics of Gen AI innovation projects and that especially the risks must be considered when evaluating potential use cases. They also recognised the need to involve the users in the development process already at the beginning of the process. There was also discussion about the idea provider should be involved in the process similarly to the users, but from the framework perspective, the idea provider can be considered as a user to avoid unnecessary complexity.

The last business need is finding an operating model for the Gen AI team. The framework suggests utilising their expertise to drive the innovation projects in the early stages and transferring them in PoC to an advisory role. The interviewees agreed that as experts, the Gen AI team has a broad

understanding of the technology and is a logical option for evaluating the use cases. They also noted that the transition from a Gen AI team to a project team needs to happen at the latest during the PoC. They argued that if the Gen AI team is still heavily involved in the PoC, it sets expectations to have them also during the later stages for which they do not have enough resources. The interviewees also wondered if it would be beneficial to make the transition from the Gen AI team to the project team already earlier in the process or at least begin to search for them. They explained that in most cases, people are not waiting for new projects, but you need to find people who can take on a new project.

In addition, the interviewees recognised the need for a structured way of documenting innovative ideas. They liked the idea of documenting the innovations through common questions since creating a separate process for Gen AI is not feasible in the long term. They also noted that in their current process, they face situations where they discard ideas without any proper documentation, and it is difficult to revisit these ideas later. Even though the proposed model does not contain a separate step for documenting the reasons for discarding a project, the documentation built during the process illustrates the reasons behind the decisions.

Even though the interviewees mostly agreed with the framework, they also provided healthy criticism and development ideas. The framework presented in this study has gone through one last iteration after the evaluation interviews, and the development ideas have been included in it. The most highlighted development need was to visualise the process's timeline and have the outputs of each stage included in the framework. These were asked to make the framework more approachable and easier to implement in practice.

Table 4 was created to answer this need and provide more guidance for each step. The second change made based on the provided feedback was to emphasise the inclusion of the business unit and project team already in the earlier stages of the process. The interviewees noted that getting the business behind the idea and finding a project team can take much time; therefore, including them in the process earlier can smoothen it. In the final framework, it is still defined that the project team's responsibility begins from PoC, and the business unit needs to be involved in prioritisation. However, it is pointed out that it is beneficial to get in touch with both already at the beginning of the process and involve them if possible.

In addition to these, the interviewees pointed out some more minor challenges. Most of these were related to understanding the visualisation of the framework. Therefore, minor updates to the visualisation were made to make the framework clearer and easier to understand. Otherwise, the interviewees

considered the framework to be applicable and in line with their processes and business needs.

6 Discussion

This section discusses the results of this study and their implications. The first sub-section briefly summarises the key results of this study and explains how the research questions were answered. Then, the results are discussed in relation to the existing literature to understand the theoretical implications of this study. Lastly, this section discusses the practical implications of the findings and limitations of this study.

6.1 Summary of the Results

The main result of this study is the framework designed for managing Gen AI innovation projects, which is presented in detail in section 0. To achieve this, the study has two research questions that supported the development of the framework: 1) What are the characteristics of Gen AI innovation projects? 2) How can Gen AI innovation projects be managed to accelerate the innovation process? The knowledge gathered by studying these questions was utilised while designing the framework.

The first research question was approached through both literature and interviews. In section 4, the interviews were analysed through Gioia (2013) methodology and the aggregate dimensions answering the first research question are: 1) Nature of Gen AI development and 2) Challenges of Gen AI projects. The characteristics of Gen AI innovation projects can be divided into three categories: 1) Nature of development, 2) User-centric solutions, and 3) Risks of Gen AI projects. Each category is discussed in more detail in the next section, and they are summarized in Table 5 below.

The second research question was also approached through both literature and interviews. However, more emphasis was placed on the interviews. In the analysis of interviews, the fourth aggregate dimension, “Accelerating innovation process”, describes measures proposed for making the innovation process more efficient, especially for Gen AI projects. The findings can be summarised into three key concepts: 1) quick experimentation on ideas, 2) expert team working as a knowledge centre, and 3) enabling citizen development.

Table 5: Characteristics of Gen AI innovation projects

Category	Characteristic	Source
Nature of development	Non-deterministic and experimental	Literature & Interviews
	Fast	Literature & Interviews
	Domain knowledge over technical expertise	Interviews
	High data dependency	Literature & Interviews
User-centric solutions	Solutions in human-computer interface	Literature & Interviews
	Need for change management	Interviews
Risks of Gen AI projects	Misinformation and overconfidence	Literature & Interviews
	Black box	Literature
	Biases and fairness	Literature
	Ethical challenges	Literature
	Data leakages and cybersecurity	Literature & Interviews
	Laws and regulations	Literature & Interviews

6.2 Results in Relation to Existing Research

6.2.1 Characteristics of Gen AI Innovation Projects

From the perspective of characteristics of Gen AI, this study is mainly aligned with the existing literature. However, while the literature primarily considers the specific characteristics of Gen AI as a technology, this study takes a broader perspective and considers the characteristics from the innovation project perspective. The characteristics were divided into three categories and are illustrated in Table 5 above.

The first category is “Nature of development”. The most relevant characteristic in this category is that developing Gen AI solutions is non-deterministic, which forces the development process to be experimental and iterative. This was highly emphasised by the interviewees who had been developing Gen AI solutions. Also, the literature has noted the non-determinism of Gen AI systems and the necessity of experimental development (Engel, Ebel and van Giffen, 2021; Aleti, 2023). Aleti (2023) and Harshvardhan et al. (2020) also

pointed out the challenges related to testing that the unpredictable nature of the systems creates.

Even though the development is non-deterministic, this study argues that the development is relatively fast, which both interviewees and the literature agreed. This was recognised by Goyal et al. (2023) and Roychowdhury (2024), who argue that the speed is due to the use of pre-trained models. The interviewees agreed with this and pointed out that the fast nature of development can be utilised, especially when experimenting with different ideas. Additionally, they noted that the solutions have other common architectural components that can be reused, which accelerates the development.

Since the Gen AI solutions often utilise either RAG or fine-tuning, this study argues that the development is also highly data-dependent. The interviewees emphasised this since the solutions they had been developing focused on providing answers based on some dataset. The literature also noted the ability to utilise data sources and train the models, but data dependency was not emphasised as strongly.

The last characteristic recognised by this study in this category is that the technical expertise required for the development decreased with Gen AI compared to traditional AI solutions. From the literature, Goyal et al. (2023) and Roychowdhury (2024) visit this topic while arguing for the speed of development, but it is not widely recognised. However, the interviewees highly emphasised this. They also argued that understanding the use cases thoroughly is much more important, for example, to evaluate if the system's outputs are acceptable.

The second category is “user-centric solutions”. This study argues that while developing Gen AI solutions, it is necessary to consider that most solutions operate in the human-computer interface. Both literature and interviewees have recognised the ability of Gen AI to process natural language efficiently, which enables opportunities from the perspective of creating improved human workflows (Goyal, Varshney and Rozsa, 2023). It is also necessary to note that most of the business value that Gen AI solutions can provide is created by aiding humans in making better decisions. Related to this, the interviewees emphasise the need for change and expectation management. Even though the literature does not highlight this, Tankelevitch et al. (2024), Fui-Hoon Nah et al. (2023), and Weisz et al. (2023) argue for the necessity of being user-centric in the solution design. However, they take a slightly more risk-focused perspective than the interviewees and emphasise the need to limit the risks of the user. The interviewees focused more on being able to provide value to the users through user-centric solutions.

Even though Gen AI offers significant opportunities, it also introduces risks and limitations that must be considered while developing new solutions. These are described by the characteristics in the third category, "Risks of Gen AI projects". Both the existing literature and this study agree about the most common risks related to Gen AI but with slightly differing emphases. Both this study and the existing literature agree that misinformation is the most significant risk with Gen AI (e.g., Banh and Strobel, 2023; Leslie and Rossi, 2023; Kalota, 2024; ...). Similarly to Banh & Strobel (2023), also this study recognises that the overconfident tone of the models emphasises the effects of misinformation.

In addition to misinformation, this study and existing research agree that there are challenges with the explainability of Gen AI (Engel, Ebel and van Giffen, 2021; Banh and Strobel, 2023), cybersecurity (Goyal, Varshney and Rozsa, 2023; Orchard and Tasiemski, 2023; Jeong, 2024), biases (Leslie and Rossi, 2023; Cheng *et al.*, 2024; Ferrara, 2024), and ethics (Leslie and Rossi, 2023; Ramdurai and Adhithya, 2023; Voorneveld, 2024). While the existing research considers these as significant risks and limitations, this study perceives them from a more optimistic perspective. This study recognises these risks, but since the characteristics are considered from the innovation project perspective, it considers them more as challenges that need to be addressed than as limiting factors. It is overall notable that part of the existing research, such as Leslie & Rossi (2023) take a highly conservative stand on Gen AI and see significant threats with the technology. However, this study considers the risks more manageable but, of course, as something that needs to be considered while developing new solutions.

6.2.2 Accelerating Gen AI Innovation Projects

Considering the acceleration methods for Gen AI innovation projects, this study identified three key concepts: 1) quick experimentation on ideas, 2) expert team working as a knowledge centre, and 3) enabling citizen development. Utilising experimentation to speed up and steer the innovation process is also suggested by the existing research (Thomke, 2003; Tuulenmäki and Välikangas, 2011; Bianchi, Di Minin and Pisano, 2020; Liedtka, Magistretti and Chen, 2024). This study finds that experimentation is beneficial, especially while trying to understand the idea more thoroughly in the early stages of the innovation process, which is supported by Thomke (2003) and Liedtka et al. (2024). Additionally, the existing research suggests that the experimentation should be continued throughout the innovation process (Tuulenmäki and Välikangas, 2011). Even though the framework has experimentation only at the beginning of the process, this study suggests that the development of the solutions is kept iterative due to the nature of Gen AI. For the experimentation, Thomke (2003) suggests utilising the newest technologies. Related to

that, this study suggests that the experimentation is done with LCNC tools or through a custom platform.

Currently, a challenge with Gen AI is that the technology is very new, and the industry is developing rapidly. This introduces a significant requirement for constantly studying the technology and its latest developments. There is a limited number of projects completed by the organisations; therefore, there is only a limited amount of knowledge from previous experiences. To tackle this challenge, this study recommends building an expert team that can focus on keeping up with the latest developments and advise others. Also, the existing research recognises the benefits of leveraging the learnings and knowledge from previous projects (Ellwood, Grimshaw and Pandza, 2017). However, the existing literature does not take a stand on building an expert team around a technology such as Gen AI.

Lastly, this study suggests utilising citizen development to manage the demand for Gen AI solutions. Also, the existing research has identified the potential of utilising citizen development in innovation management (Binzer and Winkler, 2022; Nimje, 2024; Prinz *et al.*, 2024). Nimje (2024) argues that enabling citizen developers to build basic applications can foster an organisation's innovativeness. This study agrees with the literature that utilising LCNC tools as the development platform for citizen development is wise. The LCNC tools enable employees without programming skills to participate in the development of solutions (Hoogsteen and Borgman, 2022; Binzer and Winkler, 2024). Similarly to Nimje (2024), this study finds that the LCNC tools are designed for building only moderate-complexity applications, which limits the possible use cases implemented through citizen development. However, this study finds this as an opportunity to govern citizen development more easily and limit the possible risks of the process. The literature does not argue how citizen development should be organised in relation to innovation management practices. Therefore, this study recommends that it remain as a separate concept to limit the strain on both innovation management practices and citizen developers.

6.2.3 Managing Gen AI Innovation Projects

The main result of this study is the framework designed for managing Gen AI innovations. The process utilised in the framework is built on top of the ideology presented by Cooper (1990), and the process includes different steps, of which complexity increases while moving forward. However, as Mathews (2013) argues, the Stage-Gate process cannot accommodate all the needs of early-stage innovation projects. Similar to what Mathews (2010) argues, the framework can be considered to combine two ideologies for different parts of the process. At the beginning of the process, the innovations are approached

more through a portfolio perspective, where projects are compared to each other, and the best set of projects is advanced. However, during the PoC, the approach moves towards the Stage-Gate system (Cooper, 1990), where the projects are evaluated more as singular entities.

Similarly to Andrén and Meddeb (2021), this study suggests that it is good to have multiple ideas at the beginning of the process but which are discarded quickly once more knowledge is gathered. For this, the framework includes four relatively easy and fast steps aimed at building knowledge around the ideas. After this, the ideas are evaluated and either continued, discarded or put on hold. For the evaluation, this study suggests three criteria: business case, organisational fit and desirability. The existing research does not have a consensus about the correct criteria for evaluating innovations. However, financial criteria such as business case are the most common to be suggested by the literature (e.g., Ernst, 2002; Aristodemou, Tietze and Shaw, 2020; Si, Kavadias and Loch, 2022; ..). The second most commonly proposed criterion is strategic alignment (e.g., Tzokas, Hultink and Hart, 2004; Binneman and Steyn, 2014; Si, Kavadias and Loch, 2022; ..), which is also considered as part of the organisational fit proposed by this study. However, the existing research did not emphasise the desirability as an evaluation criterion.

Related to the sections 6.2.1 and 6.2.2, it is good to note two key components of the framework. This study suggests technology evaluation as the second step of the innovation process. For this, the study outlines a set of questions drawn from the characteristics of Gen AI. As discussed in section 6.2.1, the risks identified in this study are well aligned with the existing research and they are utilised while evaluating if Gen AI is an appropriate technology for the innovation. Even though the literature takes a slightly negative stand on the risks of Gen AI, this study sees them as a tool in the framework so that the project members can evaluate the innovations against the possible risks and mitigate them when possible. The second core component to note is the experimentation combined with user feedback. Similarly to the existing literature, this study emphasises the experimentation of innovative ideas. In the framework, the experimentation aims to build an understanding of the innovation and enable discussion with the end users. Similarly to Ernst (2002), this study considers that involving users in the process early on is beneficial for the success of the innovation.

6.3 Practical Implications

From the perspective of the case company, this thesis has two key effects. Firstly, applying the designed framework enables the case company to accelerate its innovation process, especially concerning Gen AI solutions. They currently have a significant number of different ideas from different parts of

the organisation. With the help of the framework, they can efficiently test and evaluate the different ideas without investing too much resources in singular ideas. Applying the framework does not require significant changes to the case company's current processes and can, therefore, be done quickly.

Even though the framework was developed with Gen AI in mind, it is designed to be applicable to any innovation. Applying the framework in practice should be started with Gen AI innovations, but it can later be applied to the whole innovation management process. Applying the framework widely in innovation management will create a more structured approach for managing projects in the early stages of the innovation process. However, to do this, the case company must define an applicable set of questions for different technologies in the technology evaluation phase since the questions proposed in this thesis are designed for Gen AI solutions.

The second effect of this study's findings from the case company's perspective is that the characterisation of Gen AI projects deepens the organisation's understanding of the opportunities and limitations of Gen AI. This helps the case company to identify possible risks and opportunities while evaluating new use cases. In addition, understanding the technology's effects on the development process helps the project managers adjust their management practices to achieve the best possible outcomes.

Even though the framework was designed for the case company's needs, other companies can also utilise it. Other organisations need to consider how the process is aligned with their current practices, but they can bring elements from it to their process. In addition, the results from the two research questions of the study can be utilised by other companies. The characteristics can be used to understand Gen AI projects and evaluate possible use cases. The acceleration methods are also universally applicable and not tied to a single organisation. These can be utilised similarly than in the framework designed in this study, or the organisations can also use them as building blocks while designing their own processes.

6.4 Limitations and Future Research

Considering the research design, one limitation remains with the study, which is that the evaluation of the framework was implemented only through interviews. A case study could be conducted to evaluate the framework's applicability more thoroughly. However, this was not feasible in the context of this study. Therefore, one possible future study direction is to evaluate further the effectiveness of the framework designed in this study and compare it to other similar frameworks.

From the perspective of the generalisability of the framework, this study is limited since it focuses on the needs of the case company. The study aims to mitigate this limitation by involving three external interviewees in the data collection. However, the needs of innovation management were studied only in the context of the case company. Therefore, there remains a need to investigate if the framework matches the needs of a broader set of companies or if these needs differ drastically.

While scoping the research, a decision was made to focus on innovations that contain Gen AI as part of the solution. However, Gen AI can also be part of the innovation process, which was out of this study's scope. The scope was defined since utilising Gen AI as a tool in innovation management has already been studied rather comprehensively. The framework proposed in this study focuses on the process and primarily does not consider the tooling for each step. A future study could be established around the framework to identify the best tools to be utilised in each step to make the process even more efficient.

The last limitation of this study is that the interviewees have worked mainly with RAG solutions. This creates a limitation from the perspective of generalising the characteristics of Gen AI for all different architectures. A future research topic could be to investigate more thoroughly how different architectural choices affect the development of the solutions.

7 Conclusions

Since the launch of Chat GPT, Gen AI has been a hot topic in all industries. While many people have recognised the technology and its disruptive potential, it has created a significant need for companies to experiment with Gen AI to find ways to benefit from it. From the innovation management perspective, this has created a high demand for Gen AI based innovations. However, the limited resources in the use of innovation units cannot account for the demand, and a more efficient process is needed.

This study designs an innovation management framework for organising around Gen AI innovations. The framework is developed for the needs of a case company, but other companies with similar needs can apply the framework's elements. The framework is designed to consider the specific requirements and opportunities of Gen AI. This is approached by first characterising Gen AI innovation projects and researching different acceleration methods to make the innovation process more efficient. These findings are then utilised to develop the final framework.

This study's primary limitation is that the framework's evaluation remains on a theoretical level. Therefore, there exists a need for further research to evaluate the applicability of the framework in practice through a comprehensive case study, where innovation projects are developed utilising the designed process. The framework is also focused on the needs of the case company, and therefore, its generalisability to other contexts should be further investigated.

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A. Interview Guide

This is the interview guide used in the study. The interviews were semi-structured, and the questions were adapted to the interviewee's background and expertise.

Introduction & Warm-up

- Acceptance of recording and transcribing the interview
- Introduction of the research topic and the planned agenda for the discussion
- How familiar are you with Gen AI, and have you used it in your work?
- What is your background in innovation management, and what kind of innovation projects have you participated in at your company?

Innovation management

- How are innovation projects generally selected and evaluated at your company?
- What kind of project structure is utilised with the innovation projects, and is it tailored from project to project?
- How is resourcing organised for innovation projects?

Characteristics of Gen AI projects

- What are the characteristics of Gen AI innovation projects?
- What differences have you recognised between Gen AI and other innovation projects?
- What are the technical requirements of Gen AI solutions?
- How do these requirements compare to other technologies?

Managing Gen AI innovation projects

- What are the main aspects to consider when managing Gen AI innovation projects?
    - What are the pitfalls in Gen AI projects?
    - What are the most significant risks associated with Gen AI projects?
        - How do the risks differ from other innovation projects?
    - What are the opportunities from the innovation management perspective?
- What capabilities do organisations need to manage Gen AI projects successfully?
    - Processes

    - People
    - Technology and infrastructure

Accelerating Gen AI innovation projects

- What measures have helped to accelerate the Gen AI innovation projects?
- What has slowed down the Gen AI innovation projects?

LCNC tools and citizen development

- What kind of experience do you have with LCNC tools?
- What opportunities and challenges do you see for utilising LCNC tools in innovation management?
- What measures should be taken to enable citizen development?
- How should citizen development be linked to innovation management, and what are its key risks and opportunities?