



delaware

Exploring Generative AI in Business Intelligence: A Qualitative Study

MSc Information Management Tilburg University, School of Economics and Management (TiSEM)

Submission date: June 6, 2024

Written By:

Dennis Wartenberg

ANR: 281251

SNR: 2107996

+31 6 13 54 52 81

D.A.F.M.Wartenberg@tilburguniversity.edu

Company:

Name: delaware Netherlands

Adress: Hambakenwetering 5J, 5231 DD 's-Hertogenbosch

Contact Person: Bertil Bor

Supervisor: Ekaterini Ioannou

Second Reader: Ulrich Laitenberger

Management Summary

This research explores the impact of Generative AI on the Business Intelligence project cycle, focusing on its capabilities and the challenges faced by professionals. The core problem addressed is the lack of comprehensive research on the practical application of GenAI within BI processes, despite its potential to enhance efficiency and decision-making.

The research employed a qualitative approach, utilizing a literature study and a single explorative case study within delaware Netherlands' Business and Analytics department. The methodology involved semi-structured interviews with BI professionals to gather insights into the practical applications and concerns associated with GenAI.

Key findings demonstrate that GenAI significantly enhances various aspects of BI projects. It automates code generation, assists in documentation and reporting, efficiently handles errors, and improves data management and analysis. These capabilities streamline BI processes and enable professionals to focus on strategic and creative tasks, thereby boosting overall productivity. GenAI's ability to generate and summarize documents, create advanced visualizations, and enhance customer interactions through automated systems highlights its transformative potential.

However, several challenges need addressing. Concerns about the reliability and accuracy of AI-generated outputs were common, with respondents noting the need for significant manual corrections. Data quality and input precision are crucial for accurate AI outputs, emphasizing the importance of well-formulated questions and high-quality data. Ethical and security concerns were also prominent, underlining the necessity for robust frameworks to ensure responsible AI use and data protection. Additionally, the potential for job displacement and the risk of over-reliance on AI tools were significant challenges.

The study concludes that while GenAI offers significant potential for enhancing efficiency, decision-making, and innovation in BI projects, realizing these benefits fully requires addressing ethical concerns, managing the balance between AI and human roles, and ensuring robust security measures. Future research should focus on quantitative studies to measure the specific impacts of GenAI on various BI project phases and explore ethical and security implications in greater detail. Expanding research to include multiple case studies across diverse organizational contexts will enhance the generalizability of findings and provide a more holistic understanding of GenAI's role in BI.

Preface

This thesis was conducted during the thesis period for my MSc in Information Management at Tilburg University start started in February, within the Business and Analytics department of delaware Netherlands. The assignment focused on exploring the influence of GenAI on the Business Intelligence project cycle.

My interest in Business Intelligence began during my bachelor's studies and has grown throughout my master's program. The intersection of AI and BI particularly captured my attention, aligning perfectly with the interests of the department at delaware. The team at delaware warmly welcomed me and provided invaluable support whenever I needed it. The interviews conducted during the case study introduced me to various professionals, each offering unique and insightful perspectives that enriched the results of this research.

I would like to express my deepest gratitude to Ekaterini Ioannou for her time, guidance and insightful feedback throughout this process. Additionally, I am thankful to Bertil Bor from delaware for his support, guidance, and for providing the necessary resources to complete this study. Lastly, I extend my appreciation to all the respondents who participated in the interviews, contributing significantly to the depth and breadth of this research.

Dennis Wartenberg

‘s-Hertogenbosch, June 2024

Table of Contents

1. Introduction	6
1.1 Problem statement	8
1.2 Research questions	10
1.3 Research method	12
1.4 Delaware Netherlands	13
2. Literature Study	14
2.1 Literature Review	14
2.2 Business Intelligence	15
2.2.1 Definition of BI	15
2.2.2 Business Intelligence Architecture	16
2.2.3 Business Intelligence Project Cycle & Agile Methodology	18
2.3 GenAI	22
2.3.1 Defining GenAI	22
2.3.2 GenAI in Organisations	23
2.3.3 GenAI Capabilities in Knowledge Work	24
2.4 Conceptual Research Model	27
2.4.1 Ideal Conceptual Research Model	27
2.4.2 Conceptual Research Model to be investigated	28
3. Methodology	30
3.1 Explorative Case Study	30
3.2 Data Collection	31
3.3 Data Analysis	32
3.4 Expert Validation Sessions	33
3.5 Usage of AI	33
4. Results	34
4.1 Case Overview	34
4.2 Theme: GenAI Applications	36
4.2.1 Code Generation	36
4.2.2 Documentation and Reporting	37
4.2.3 Error Handling	38
4.2.4 Data Management	38
4.2.5 Data Analysis	39
4.3 Theme: Concerns	40
4.3.1 Output Quality and Reliability	40
4.3.2 Data Quality and Input	41
4.3.3 Ethical and Security Concerns	41
4.3.4 Job Security and Roles	42

4.3.5 Over-Reliance.....	42
4.3.6 Technical Limitations	43
4.4 Theme: Other Remarks	43
4.4.1 Human Inventiveness	43
4.4.2 Integration and Ethics.....	44
4.4.3 Support and Not Replacement.....	44
5. Validation	46
5.1 Validation Sessions for Interview Results	46
5.1.1 Session with Expert 1	46
5.1.2 Session with Expert 2	47
5.2 Validation Session for BI Lifecycle.....	48
6. Discussion	49
6.1 Main Findings	51
6.2 Limitations	55
6.3 Recommendations for Future Research	56
7. Conclusion.....	57
References	59
Appendices	64
Appendix 1: Session BI Methodology with Expert 1.....	64
Appendix 2: Semi-Structured Interview.....	67
Appendix 3: Interview Reports	69
Appendix 4: Thematic Analysis	77
Appendix 5: Validation E-Mail with Results	82
Appendix 6: Notes from Validation Sessions.....	96

1. Introduction

Generative Artificial Intelligence (GenAI) refers to the production of previously unseen synthetic content, in any form and to support any task, through generative modelling, marking a significant breakthrough in AI technology (García-Peñalvo & Vázquez-Ingelmo, 2023). This means that GenAI is capable of writing like a human, creating photos, or even writing music based on large amounts of training data. One of the most well-known examples is ChatGPT that is designed using the Generative Pre-trained Transformer (GPT). In other words, it employs a model that has been trained on large amounts of data from the internet for the purpose of predicting the next word in a sentence, similar to an intelligent auto-complete feature (Lee, 2023; Schade, 2023). This is referred to as Natural Language Processing (NLP) enabling the model to have human-like interactions. The benefits of using GenAI are known across many domains by helping organisations improve productivity, creativity, and decision-making processes (Cribben & Zeinali, 2023; Deng & Lin, 2022; Dwivedi et al., 2023).

This evolution of GenAI technology, using complex algorithms to generate new content and insights autonomously, has been rapidly advancing. For example, GenAI can now analyse huge amounts of data and generate valuable insights for decision-making, boosting creativity and productivity, and addressing repetitive tasks (Benbya et al., 2023). Therefore, traditional business processes are being revolutionized by the applications of GenAI, which range from creative data analysis to automated customer service (Dwivedi et al., 2023).

In the world of Business Intelligence (BI), the usage of GenAI is able to redefine traditional methodologies. BI traditionally follows the following phases: Discovery, Design, Development, Deploy and Value Delivery (Larson, D., & Chang, V. 2016), focused on the strategic use of information to improve business results, utilizing data mining, processing, and analysis to inform business decisions (Negash, 2004). However, as BI environments become more complex, incorporating technologies such as OLAP, data warehousing, data mining and analytical algorithms, the need for more advanced tools has become apparent (Sharda, R., et al 2013). GenAI is considered to be a significant improvement in this area, as it provides new approaches to cope with the increasing amounts of data in modern businesses. As pointed out by Eboigbe, E. O. et al (2023), GenAI plays a crucial role in the transformation of BI, including the enhancement of data collection, analysis, and prediction. This corresponds with the capabilities of tools like ChatGPT that can act as a tool to assist and enhance the BI development process, which is a significant advancement in the handling of data and the BI project management.

Despite the potential benefits, there is a notable gap in research concerning the practical application of GenAI within BI processes. While GenAI can enhance the efficiency of data processing and contribute to more informed decision-making, its real-world applications in BI are not well-documented. This lack of

detailed research limits understanding of how GenAI can effectively be used in BI projects to optimize data workflows and decision-support mechanisms. The potential of GenAI to revolutionize BI by automating complex analyses and generating deeper insights into data signifies a critical area of investigation (Susarla et al., 2023; Mayer et al., 2020).

Past studies, such as the ones by Bharadiya (2023) and Raimundo & Rosário (2021), have begun to discover AI's diverse influence in BI, focusing on aspects like data security and decision-making enhancement. However, the specific role of GenAI in the BI's project lifecycle is an area that warrants deeper investigation. This shows the necessity for empirical research into effective usage of GenAI in BI development processes, considering both the potential benefits and the complexities involved as mentioned by Strich et al., (2021).

This research explores how GenAI technologies are used within BI contexts and assessing their impact on BI projects. By focusing on the operationalization of GenAI in BI, the study aims to provide a comprehensive analysis of its effects on business analytics processes, offering insights that could drive further innovations and improve the robustness of the BI's project cycle. This approach aligns with key academic contributions in the field and addresses the need for more applied research on the convergence of AI technologies and business analytics (Tarafdar et al., 2023; Benbya et al., 2023).

1.1 Problem statement

GenAI is an emerging field that is redefining the processes of information management and introducing a set of opportunities for automated content generation and advanced data analysis (Benbya et al., 2023; Susarla et al., 2023). The potential of GenAI in transforming industries and improving decision making and business operations is widely recognized. However, its use within the context of BI's project is yet to be fully understood despite the literature suggesting that there could be major breakthroughs in business data processing and analysis (Eboigbe et al., 2023).

BI systems are essential for supporting decision-making in organisations through insights from analysed data. However, they are limited by the volume and complexity of data available (Negash, 2004). GenAI can support and improve these processes but there is lack on detailed empirical research on its integration and practical application in a BI environment. This gap is important as organisations are seeking to use GenAI for more accurate predictions and personalized data interactions, with the goal of evolving traditional BI systems into more dynamic and responsive systems. (Mayer et al., 2020; Strich et al., 2021).

The core issue lies in the lack of comprehensive research exploring how GenAI tools can be used in the BI's project life cycle. This includes understanding how these tools can enhance phases in a BI project, i.e., discovery, design, development, deploy and value delivery, as outlined by Larson, D., & Chang, V. (2016). While the potential benefits of increased efficiency and improved decision-making capabilities are acknowledged, the specific mechanisms and best practices for using GenAI within these project cycle remain underexplored. This research aims to fill that gap by providing detailed insights for using GenAI in BI projects.

The primary stakeholders facing this problem are BI *developers* and *project managers*, specifically those in organisations aiming to leverage the latest AI technologies to improve their BI projects. Additionally, this issue extends to *company executives* and *IT strategists* who are responsible for decision-making and ensuring the successful integration of AI in BI systems. They are the ones who need the solution and will decide if the problem has been effectively addressed. **The envisioned solution to this problem is an insight how Generative AI can be utilized in the BI project cycle. This report will include an overview, showing tasks that can be supported by GenAI.**

The scope of this research lies within the department of Business and Analytics of delaware Netherlands¹, an organisation that provides advanced IT solutions and services. This department focuses on providing BI, analytics, and data management solutions to a broad range of industries, enabling the organisations to effectively use data to drive strategic decisions and operational efficiency. The purpose of this study is to explore how GenAI affects the BI project cycle based on current GenAI activities and potential applications of the BI department's infrastructure. By focusing on the real-world implementation and impact of GenAI within delaware Netherlands' Business and Analytics department, the research seeks to provide practical insights for enhancing BI processes through GenAI.

¹ <https://www.delaware.pro/nl-nl/solutions/data-and-analytics>

1.2 Research questions

The main research of this thesis is as follows: “How does the usage of Generative AI influence the Business Intelligence projects cycle?”. To answer the above research question, several sub-questions will be investigated. More specifically, these are the following:

1. What are the Characteristics and Capabilities of Generative AI?

The sub-question "What are the Characteristics and Capabilities of Generative AI?" aims to define Generative AI and explore its unique abilities. This involves identifying key features such as the ability to generate new content from existing data, learn and adapt from large datasets, and its applications in creating text, images, and other media. By understanding GenAI's capabilities, a foundation can be established for understanding its potential impact on BI projects.

2. What is Business Intelligence?

The sub-question "What is Business Intelligence?" focuses on providing a definition of BI and its importance in the business landscape. This involves explaining how BI systems collect, process, and analyse data to support decision-making processes. The answer will include an overview of BI components, architectures, and the role of BI in enhancing business performance and decision-making, providing context for how GenAI can integrate with these systems based on the literature study.

3. How is the BI project cycle structured?

The sub-question "How is the BI project cycle structured?" examines the phases of the BI project lifecycle, such as Discovery, Design, Development, Deployment, and Value Delivery. Understanding the BI project cycle is crucial for analysing how GenAI can be integrated into each phase. This will detail the processes and methodologies used in BI projects, highlighting the critical steps involved in developing and deploying BI solutions and setting the stage for evaluating GenAI's role in these processes. Literature study will be used to answer this questions, and empirical findings to validate the theory.

4. What tasks can be supported by GenAI within BI projects?

The sub-question "What tasks can be supported by GenAI within BI projects?" explores the specific tasks and activities within BI projects that can benefit from the application of Generative AI. By providing specific tasks, this sub-question will illustrate how GenAI tools can support and transform traditional BI

processes. Mostly, empirical research will be used to answer this question due to the novelty of this area.

By answering these sub-questions, the research will provide a deep understanding of Generative AI and Business Intelligence. This approach will provide insights into how GenAI can be used into BI projects. The findings will help explore how the leveraging GenAI capabilities can support the BI cycle, addressing the main research question.

1.3 Research method

To answer the main research question, this study employs a qualitative approach, specifically a single case study of an exploratory nature with interviews. This method allows for an in-depth, contextual analysis of the subject matter, enabling the researcher to gain a deeper understanding and explore the phenomena in detail (Gustafsson, 2017). The study is designed to explore whether the usage of GenAI impacts the BI lifecycle. Firstly, a literature study is conducted to answer the outlined sub-questions and to provide a theoretical basis for the thesis. Based on the literature study, a conceptual research model will be presented, illustrating the model that will be investigated. This model will help in hypothesizing how GenAI might influence the BI lifecycle and address the research question.

After the literature study, a single explorative case study will be used. This is particularly suited for this research because it allows for a detailed examination of the subject. According to Gustafsson (2017), single case studies are advantageous for their ability to produce high-quality theory and provide rich, contextual insights that are not always achievable with multiple case studies. Additionally, the choice of a single case study is due to the scope of the research, allowing for a focused and manageable research within the department. In this study, the goal of the empirical findings of the case study is to show practical applications and challenges of GenAI in the BI project cycle.

The data collection process involves gathering qualitative data from various sources, such as semi-structured interviews, documentation, and expert sessions for validation of the findings. This method is consistent with the case study approach, which relies on multiple sources of information to provide a comprehensive understanding of the case (Yin, 2003; Baxter & Jack, 2008). The collected data will be analysed using a thematic analysis to identify patterns and themes that emerge from the data following the phases outlined by Braun & Clarke (2006).

1.4 Delaware Netherlands

Delaware Netherlands is a global company that specializes in delivering advanced Information and Communication Technology (ICT) solutions and services. The organisation focuses on guiding their customers through business and digital transformations, leveraging their expertise in various ICT domains. Delaware Netherlands is known for its commitment to delivering high-quality solutions and services, playing a significant role in shaping the future of businesses through digital innovation and transformation. Delaware Netherlands is structured into various departments, each specializing in different aspects of ICT solutions and services. For this thesis, the research will be conducted within the "Data & Analytics" department, a field that aligns closely with this research topic on the impact of Generative AI in BI.

2. Literature Study

In this chapter, relevant literature about the role of GenAI in BI will be discussed. This literature review will partially address the sub-questions from this research, within the bounds of existing literature. While not all sub-questions may be fully answered due to the novel nature of this field, this review will provide as comprehensive an overview as possible. In this chapter, the first section shows the literature review. Section 2.2 delves into the literature about BI where the focus is on the definition of BI, the infrastructure and the BI lifecycle. Section 2.3 describes what GenAI is, how it is used in organisations and the capabilities of GenAI in knowledge work. Finally, in section 2.4, a conceptual research model is presented, illustrating both an ideal conceptual research model and the model that will be investigated based on the literature study.

2.1 Literature Review

The literature review in this study serves the purpose of addressing the sub-questions formulated for the research. To gather relevant papers, Google Scholar was used as the main tool due to its large coverage of academic literature. Also, searches were conducted in databases of top journals in the field of Business Intelligence and related areas. Keywords such as "Gen AI," "generative AI," "business intelligence," "BI," "agile," and "BI lifecycle" were used for searching the literature.

In particular, academic journals like the "International Journal of Information Management" and "Management Information Systems Quarterly" were targeted to ensure the inclusion of well-accepted sources in the review process. Additionally, references and in-text citations from top articles were examined to find additional papers relevant to the research topic. Given that GenAI is a relatively novel technology, the availability of peer-reviewed papers in the literature is limited. Therefore, several heuristics were employed to assess the quality of the identified papers. Factors such as the number of citations, author credibility, abstract and conclusion were used for evaluating the relevance and reliability of each paper.

The literature review includes elements such as the definition of BI, Business Intelligence Architecture, and Business Intelligence Project Cycle & Agile Methodology, as well as aspects related to Generative AI, including Defining Generative AI, GenAI Capabilities, and Integrating Generative AI. By synthesizing and comparing findings across different studies, the review aimed to provide a broad understanding of the current state of research in this field. Through the examination of existing literature, this study lays the groundwork for addressing the research questions and advancing knowledge in the fields of GenAI and BI systems.

2.2 Business Intelligence

This section will provide an overview and discuss the concept of Business Intelligence, its importance in the business landscape, and its typical development processes.

2.2.1 Definition of BI

According to Sharda, R., et al (2013), Business Intelligence originated from the concept of decision support systems (DSS). One of the first concepts of a DSS was introduced by Scott-Morton in 1971, who defined DSS as: “interactive computer-based systems”. These systems were used by decision makers to solve unstructured problems, by utilizing data and models (Gorry, G., & Scott-Morton, M. (1971). A few years later, the definition was sharpened to: “Decision support systems couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions. It is a computer-based support system for management decision makers who deal with semi-structured problems.” (Keen, P. G. W., & Scott Morton, M, 1978).

After DSS, executive information systems (EIS) surfaced in the early 1980’s, caused by the growth of enterprise-wide systems and the rise of new technologies. Managers were capable of making quick decision, due to the user-friendly reports provided by EIS. Eventually, many capabilities were introduced to this concept, such as: dynamic multidimensional (ad hoc or on-demand) reporting, forecasting and prediction, trend analysis, drill-down, status access, and critical success factors. Gartner Group acknowledged this evolution and introduced the term “BI” in mid-1990s (Sharda, R., et al 2013).

Over the years, the definition of BI developed and changed which is illustrated in Table 1. An important remark is that terms in the field of IT, such as DSS and EIS, is a content-free expression. This means that there is no such thing as a universally accepted definition, because the definition of a term can be experiences differently based on the context and person. Therefore, there is no universally accepted definition of BI. (Sharda, R., et al 2013).

Year	Author(s)	Definition of Business Intelligence
2004	Negash, S.	BI is an umbrella term for technologies, strategies, and practices aimed at better decision-making. It includes collection, integration, analysis, and presentation of business information to improve business performance. It is seen as a variety of applications, infrastructure, tools, and best practices for informed decision-making.
2010	Popovič, A., et al.	BI is applied to identify responsiveness, trends in markets, changes in technology, regulatory environments, and competitor actions.
2011	Gad, S.	BI has evolved into a conceptual framework containing technologies and tools for informed decision-making. It involves reporting and evaluating company data to enable decision-

Year	Author(s)	Definition of Business Intelligence
		making processes, with significant roles in supply chain management and organizational decision support.
2013	Sharda, R., et al.	BI is an umbrella term that combines the processes, technologies, and tools needed to transform data into information, information into knowledge, and knowledge into plans that drive profitable business action.
2015	Sangari, M. S., & Razmi, J.	Gartner defines BI as a technology and process used for the collection and analysis of data, giving organisations a competitive edge in decision-making.
2016	Wowczko, I.	BI ensures better productivity and continuous development in businesses through reporting, data analysis, data mining, and event processing.
2022	Masson, T., et al.	BI is a multiplex term involving methods, processes, and tools for easier and more efficient decision-making in enterprises.

Table 1 - Definition of Business Intelligence over the years

2.2.2 Business Intelligence Architecture

Properly built Business Intelligence Systems (BIS) should facilitate the analysing of business information in order to support and enhance the overall activity of management decision making. Firms today, in the face of rapid technological evolution, often need to search for new ways of value positioning. (Elbashir et al., 2008). According to T. Davenport (2005), the ultimate potential of BI systems is in the maximization of information utility for improving company capability in structuring a large volume of information and making it accessible, resulting in competitive advantage. This means that a BIS optimally employs a huge amount of data collected during the daily operational processes, which is further transformed into information and knowledge.

The main characteristic of a BIS is its capability to provide representative information to high-level management to help them in strategic activities such as setting goals, planning, and forecasting performance and gathering, analysing, and integrating both internal and external data into dynamic profiles of key performance indicators. BIS can access both historical and real-time data based on an executive's information needs through ad-hoc queries. In short, the managers at each level are empowered to have a tailor-made view drawing from distinct information sources to consolidate such into incisive indicators. (Bâra, A., et al. 2009)

According to Bâra, A., et al. (2009), the architecture of BIS is built of the following three levels: (1) data management, (2) model management and (3) data visualization tools. Data management can consist of relational databases, data warehouses, and other types of data sources. It is often combined with the use

of a data warehousing, so that information can be collected and organized both from internal and external sources. The data warehouse, therefore, directly opens and allows one to extract and analyse data from databases of the host systems to be used for reporting and analysing purposes (Lungu & Bara, 2007).

Model Management is the level where extractions, transformation and processing are done with statistical interpretation, analysis, and forecasting using different models. Used technologies at this stage are Online Analytical Processing (OLAP), data mining, and analytical reporting. OLAP provides facilities to browse and analyse detailed and summarized information in a multidimensional database, while data mining tools searches for further knowledge in huge databases using techniques that look for consistent hidden patterns and relationships. The software allows one to make new discoveries made through statistical or modelling techniques applied either on warehouse data or that from the relational databases. Once validated and verified, the results can be seen as operational data that supports the processes of decision-making (Moss & Atre, 2004).

The third level shows data visualization tools, which represents the presentation and reporting of data in an understandable way. Within these tools, a BI portal can be implemented. This portal serves as a solution for integrating data, offering a web-based interface that merges information from a variety of sources. This allows for a comprehensive view of systems, both internal and external to an organisation, through a single access point. (Bologa et al., 2008; Diaconita et al., 2008).

Sharde et al. (2013) verify the structure and components of BI systems, as defined within the preceding body of research, by identifying four critical components that established the core principle to architecture of BI systems. These components are: (1) a data warehouse that stores the source data; (2) business analytics, which is a set of tools for modifying, extracting, and evaluating the data in the data warehouse; (3) business performance management, or BPM, which tracks and evaluates performance; and (4) a user interface, such as a dashboard.

Sharde et al. (2013) have not only confirmed the importance of these four components but have also showed an additional dimension in relation to BI systems architecture, which is the integration of Business Process Management (BPM). BPM enables managing, optimizing, and aligning organizational processes into the strategic process by utilizing BIS capabilities, furthering their efficiency and strategic value for the BI system. This integration shows a BI systems ability to turn into more complete and process-based frameworks, offering improved support for organizational decision-making and strategic management. This infrastructure can be seen in Figure 1.

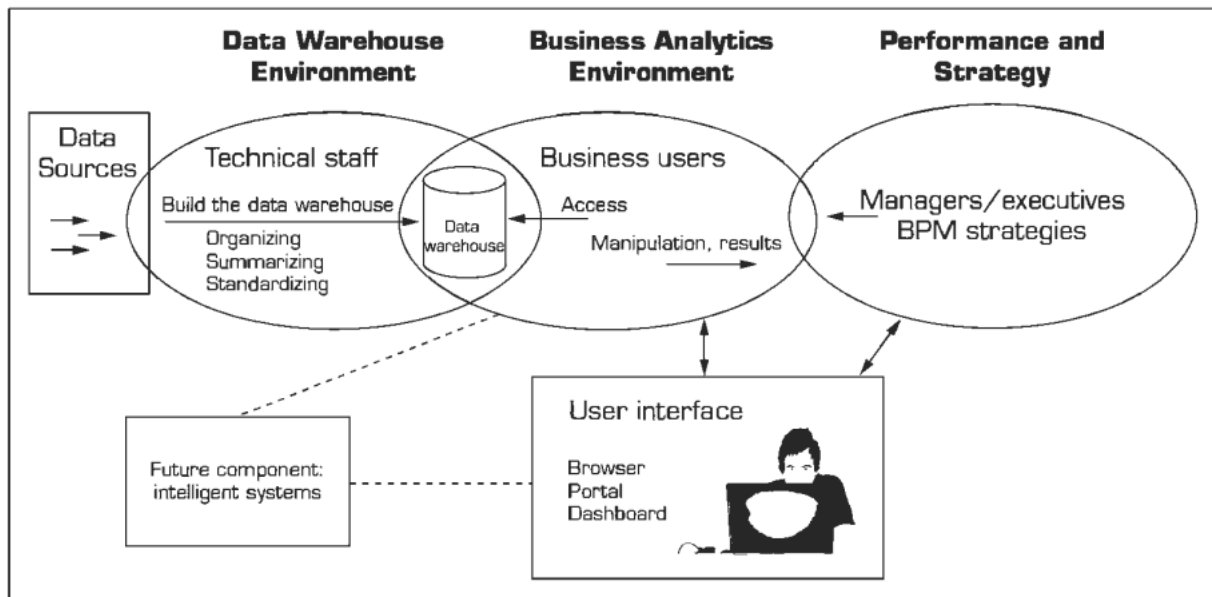


Figure 1 - BIS Infrastructure as illustrated in the figure from Sharde et al. (2013)

2.2.3 Business Intelligence Project Cycle & Agile Methodology

According to Larson, D., & Chang, V. (2016), the Business Intelligence lifecycle mirrors the lifecycle in software development with an emphasis on information utility instead of the development of software. The BI project cycle has the following phases: the requirements discovery phase where the requirements are determined; the design phase, where the structuring of data are organized; the development phase, the one in which code and databases are generated; the testing phase, one in which the validity of developments is assured; followed by deployment and ongoing support and value assessment. In Figure 2, the framework is presented that combines the project life cycle of a BI project, and the Agile principles to enable BI delivery.

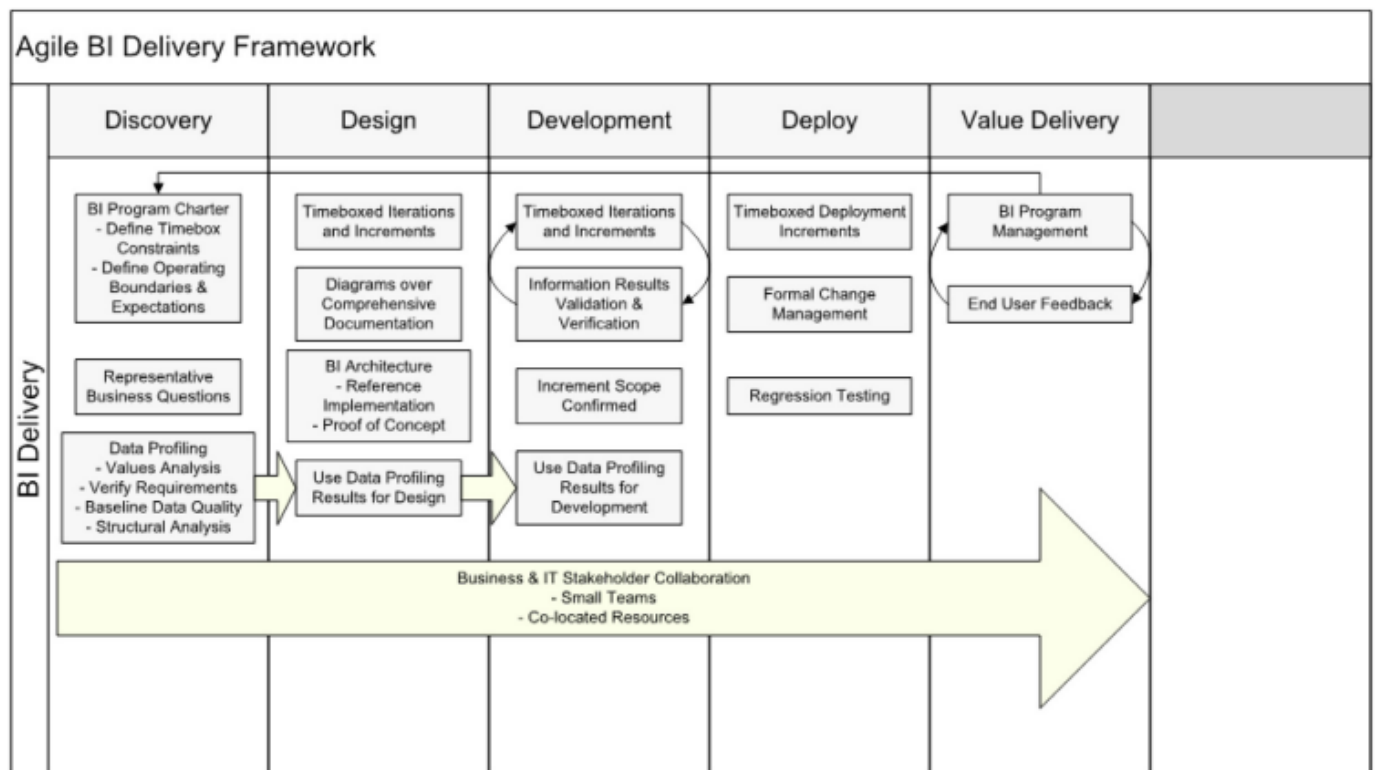


Figure 2 - Agile BI delivery framework from Larson, D., & Chang, V. (2016)

The Phases of BI Lifecycle

Discovery: Stakeholders' expectations of BI projects are initially unclear during the discovery phase. Business users know that information and analytical skills are necessary from the beginning, and IT specialists are prepared to determine the requirements without a defined beginning point. Due to these factors, information requirements are clarified by stakeholders during the discovery phase, which is the first stage. The first step in identifying information needs is to formulate business questions that offer insight into the necessary facts, dimensions, and data sources. Facts are the measurable data points like sales figures or customer counts, dimensions are the categories or attributes like time or location that help organize these facts, and data sources are where the data comes from, such as databases or reports. (Larson, D., & Chang, V. 2016)

Design: The design phase starts with laying down the architecture of the system through modelling. In BI, the architecture takes an aspect that is beyond the hardware installation, touching on business, technical, process, data and project aspects. Business architecture within BI focuses on identifying what the drivers, objectives, and strategies of the organisation are that support the information requirements. The project architecture outlines a brief architectural small rollout with the methodology outlined in steps. On the other hand, process architecture points the way from data collection to finally presenting it. Regarding data architecture, it focuses on data planning, organizing, and structuring within the storage solutions, e.g. data marts or warehouses. The BI technical architecture involves the hardware, software,

and network infrastructure needed in running BI projects. After setting up the BI architecture, a lot of attention at the design stage goes into developing models of how to meet the information needs with an outline in conceptual, logical and physical models. (Larson, D., & Chang, V. 2016).

Development: This is the stage that contains many tasks focused on constructing a working system, through which the user is to contextualize his data with actionable insights. This normally involves activities such as ETL coding, configuration of BI tools, and database scripting. ETL coding is the process of extracting, transforming, and loading data from various sources into a data warehouse, configuration of BI tools involves setting up and customizing business intelligence software to analyse and visualize data, and database scripting involves writing code to manage and manipulate databases efficiently. Because the BI system is so complex, deployment needs to be strictly controlled. The step will make sure that the addition of new elements is done without hampering the existing functions. (Larson, D., & Chang, V. 2016)

Value Delivery: This final phase focuses on system stabilization, maintenance, change management, and collection of feedback from the end users. BI systems are designed to change and, therefore, should be managed in a way that allows their changing together with the changing organisation and environment in order for them to remain valuable to the organisation. This is where the use of the feedback from the users helps in understanding the utility of the information given and the effects to the system. (Larson, D., & Chang, V. 2016)

Agile

Beck et al. (2001) describe agile methodologies that emphasise adaptable communication in software product development. So, rather than prescribing the plan in detail from the start, Agile divides projects into tiny and easily manageable increments, iterations, or sprints. This enables teams to build and release pieces of a project quickly, collect user feedback, and then make the required modifications. The Agile methodology also emphasises collaborating with stakeholders to ensure ongoing engagement and input throughout the development process. This means working closely with customers and getting their input regularly, rather than just at the end of the project.

After Beck et al. (2001) first described Agile methodologies, practitioners moved towards a more dynamic, informal, and customer-driven approach. This shift resonates quite well with the challenges of the BI projects, where the flexibility and iterative principles of Agile seem to offer leverage. The Agile approach's principles of very fast, iterative products and close, direct stakeholder involvement match with the BI changing landscape, especially in Big Data and analytics.

The Agile principles put people in a place of respect, and their priority includes individual and interactions, working solutions, and collaboration with the customer, rather than processes and tools, comprehensive documentation, contract negotiation, and fixed plans. This is a principle, especially, that relates to BI environments characterized by complexity and variability, hence demanding an approach subtler, more collaborative, and adaptive. For instance, the Agile principle that the working solution is more important, rather than necessarily demanding extensive documentation, is meant to respond to pragmatic difficulties not only of staying updated but also of remaining practicable within the fast-changing landscapes (Adamson, 2015). Similarly, strong preference for collaboration with customers is a reflection of the iterative nature of BI projects, where understanding and meeting evolving information needs is critical (Davenport, 2014).

Agile methodologies can be integrated with BI in order to support the specific demands of data-driven projects. It has newer approaches, especially targeted for delivering incremental value within shorter cycles with even closer collaboration between technical teams and stakeholders: Agile Data Warehousing and Extreme Scoping. In fact, such approaches stress not only the importance of the data involved in BI projects, but also call for agility in processes of data integration, transformation, and analysis (Larson, 2009). Agile's compatibility with Big Data projects further exemplifies its relevance to modern BI initiatives. This synergy enables rapid cycles of discovery and validation, which are crucial for the development of predictive and prescriptive analytics in Big Data. The iterative, results-focused framework that Agile embodies fits together with the fast and exploratory nature Big Data analysis takes, whereby the idea is to be able to derive actionable insights from the huge, disparate sources of data.

2.3 GenAI

Here, the focus will be on the emergence of Generative AI tools like ChatGPT, their technological foundations, usage in organisations and their capabilities.

2.3.1 Defining GenAI

GenAI represents a significant advancement in the field of artificial intelligence, enabling the creation of content that was previously impossible to generate. Before exploring what GenAI can do, it's important to understand what it is and its scope.

GenAI, as defined by García-Peñalvo and Vázquez-Ingelmo (2023), refers to "the production of previously unseen synthetic content, in any form and to support any task, through generative modelling." This means that GenAI uses complex algorithms to create new content that has never been seen before. This content can be anything from text, images, and music to more complex forms like video or even entire virtual environments. The term "generative modelling" refers to the process of using these algorithms to learn patterns from existing data and generate new data that mimics those patterns. Selecting this definition is justified because it is derived from an extensive review of the literature, summarizing 631 out of 1963 unique works. This analysis from García-Peñalvo and Vázquez-Ingelmo (2023) makes it one of the most informative and well-researched definitions available. The authors have provided a clear and concise explanation of what GenAI entails, emphasizing the importance of creating new and original content. Additionally, their definition highlights the broad applicability of GenAI, capable of supporting various tasks across different fields. Understanding this definition helps clarify the potential and limitations of GenAI, preventing misunderstandings and unrealistic expectations. By knowing what GenAI can realistically achieve, industry practitioners and the general public can better appreciate its capabilities and embrace its adoption in mainstream applications.

GenAI significantly differs from traditional AI models. According to Hacker et al. (2023), GenAI models are 'advanced machine learning models that are trained to generate new data, such as text, images, or audio.' Traditional AI typically focuses on making predictions, classifications, or performing specific tasks. GenAI, on the other hand, uses generative modelling and deep learning to create diverse content from existing data sources, including text, graphics, and video (Jovanovic & Campbell, 2022), which embraces the definition laid out in the above paragraph.

A prominent example of GenAI in action is ChatGPT, which is based on the Generative Pre-trained Transformer (GPT) architecture. This model has been trained on extensive text data from the internet to predict the next word in a sentence, functioning similar to an advanced auto-complete feature (Lee, 2023; Schade, 2023). This process, known as Natural Language Processing (NLP), allows the model to engage in conversations that sound remarkably human.

2.3.2 GenAI in Organisations

GenAI is revolutionizing how organisations operate, offering new ways to enhance efficiency, decision-making, and productivity. Tools, such as ChatGPT, are being utilized to improve customer service by reducing response times and providing 24-hour availability (Wang et al., 2022). However, the impact of GenAI extends beyond customer interactions.

Brachten et al. (2021) highlighted that while the primary focus has been on customer service, the use of enterprise chatbots to assist employees is gaining traction. Implementing such chatbots within an organisation is a complex, long-term decision that hinges on employee acceptance. Factors such as ease of use, perceived usefulness, trust, and attitude significantly influence this acceptance (Lewandowski et al., 2021; Brachten et al., 2022). When accepted, enterprise chatbots can enhance efficiency by automating repetitive tasks and providing quick access to information, thereby freeing up resources for more complex activities (Dwivedi et al., 2021). For instance, employees can use chatbots to quickly obtain information or perform routine tasks without waiting for human assistance, thereby improving overall productivity. In the financial sector, such tools can even enhance the accuracy of audit and advisory services (Dwivedi et al., 2023). However, if employees struggle to adapt to the technology, it could result in decreased productivity as they spend more time learning to use the system (Brachten et al., 2022).

Integrating GenAI into existing workflows enables a transformative shift in data analysis, decision-making, and project efficiency. GenAI is capable of not only generating new data but also providing new insights, thus enhancing the accuracy and depth of analysis. This capability allows for more nuanced and strategic decision-making, as evidenced by studies like those of Smith and Doe (2023), who highlighted GenAI's ability to uncover deeply rooted patterns in data. Furthermore, GenAI can automate routine tasks, allowing teams to focus more on innovation and creative problem-solving. As Zhang et al. (2024) demonstrated, this can lead to increased efficiency and productivity, enabling organisations to process workflows more effectively.

Despite its benefits, integrating GenAI into organizational processes presents several challenges. The implementation of disruptive technology often requires changes in job profiles and the acquisition of new skills. Lee (2023) discussed the potential loss of traditional development jobs and suggested a framework for companies to manage this transition. To address these challenges, organisations must adopt comprehensive strategies that include training programs, adaptive leadership, and a culture of continuous learning and innovation. Another significant concern is the regulation of GenAI technologies. Issues

related to data privacy, security, and transparency remain largely unregulated (Dwivedi et al., 2023). The forthcoming AI Act aims to address these concerns by categorizing AI systems based on their risk levels and implementing appropriate regulations. For instance, high-risk AI systems will be evaluated before public release and monitored throughout their lifecycle, while generative AI tools will need to ensure transparency and prevent the creation of illegal content.

From a technological perspective, GenAI chatbots can sometimes produce biased or low-quality responses. These systems often require precise input to generate accurate answers, which means users need a certain level of expertise to use them effectively. Additionally, training data limitations, such as outdated information, can affect the relevance and accuracy of responses, increasing the cost and effort required for maintenance. Understanding these limitations is crucial for organisations to effectively utilize generative AI tools and maximize their benefits while mitigating potential drawbacks. By adopting a strategic approach to implementation, including employee training and regulatory compliance, organisations can harness the transformative potential of GenAI to enhance their operations and drive innovation.

2.3.3 GenAI Capabilities in Knowledge Work

Knowledge Work, as defined by Benbya et al. (2023), refers to tasks and processes that involve the creation, distribution, or application of knowledge. It typically requires a high degree of expertise, education, or experience and is characterized by activities that depend on mental rather than physical power, e.g. to solve complex problems, generate new ideas, and drive innovation within organisations. GenAI is rapidly becoming a viable tool to enhance activities in knowledge work. In terms of utilizing GenAI for knowledge work, Benbya et al. (2023) acknowledges four key capabilities: knowledge creation, knowledge storage and retrieval, knowledge sharing, and knowledge application. Table 2 provides a detailed summary of these capabilities, highlighting their descriptions, benefits, and potential limitations, along with the used sources.

Capability	Description	Benefits	Limitations	Sources
Knowledge Creation	GenAI can generate new ideas, insights, or data by analysing vast amounts of information, similar to a brainstorming partner.	Facilitates innovation and new idea generation, improves feedback mechanisms.	Risks include spreading outdated practices, misinformation, and innovation stagnation.	Benbya et al. (2023), Brea & Ford (2023), Haefner et al. (2021)
Knowledge Storage and	GenAI efficiently organizes and retrieves	Improves search accuracy and	Potential for security breaches and data	Jarrahi et al. (2023), Hacker et

Retrieval	information, functioning like a super-smart librarian that understands complex inquiries.	information retrieval efficiency.	privacy issues, unauthorized access to sensitive data.	al. (2023)
Knowledge Sharing	GenAI tailors the distribution of knowledge to individual needs, acting like a personalized teacher that adapts to different learning styles.	Enhances professional development, facilitates personalized learning experiences.	May struggle with context-specific knowledge, risk of over-reliance on AI over human expertise.	Benbya et al. (2023), Khahn (2023), Giermindl et al. (2022)
Knowledge Application	GenAI applies information to solve problems and improve processes, enhancing productivity by automating routine tasks and suggesting improvements.	Boosts productivity, supports task automation, and assists in complex decision-making.	Employees may feel displaced, changes in job roles and identity, ethical concerns in decision-making.	Ziegler et al. (2022), Brynjolfsson et al. (2023), Strich et al. (2021), Oracle (2020), Waizenegger et al. (2020)

Table 2 - Capabilities of GenAI

Knowledge Creation

GenAI enhances knowledge creation by processing unstructured data such as emails, logs, and transcripts to uncover hidden patterns and insights (Brea & Ford, 2023). This capability allows organisations to generate new ideas and innovate by synthesizing existing knowledge in ways that might not be immediately obvious to humans. For instance, GenAI can read through scientific papers and suggest new compounds for medication or propose innovative design ideas by analysing current trends. This approach facilitates the discovery of insights previously hidden within routine communications and strengthens feedback mechanisms for continuous AI learning (Haefner et al., 2021). However, there are challenges, such as the risk of perpetuating outdated practices, spreading misinformation, and creating a feedback loop that hinders true innovation (Benbya et al., 2023).

Knowledge Storage and Retrieval

The efficiency of storing and retrieving information is significantly improved by GenAI, especially through the use of large language models. These models can handle vast amounts of data and provide precise knowledge within specific domains (Jarrahi et al., 2023). GenAI functions like a super-smart librarian that not only knows where every piece of information is stored but can also interpret complex inquiries to find exactly what is needed. This advanced natural language processing capability allows for better search accuracy and retrieval of relevant information, making it easier to find specific data across thousands of documents. However, the downside includes potential security and data privacy issues, where sensitive information could be accessed unauthorizedly, leading to significant risks and ethical concerns (Hacker et al., 2023).

Knowledge Sharing

GenAI goes beyond generating content; it also personalizes learning experiences and professional development. It can assess learners, provide custom feedback, and offer tailored educational courses, acting like a personalized teacher that adapts to different learning styles (Benbya et al., 2023). This capability allows for the smooth transition in careers and acquisition of new skills, enhancing professional growth. For example, Khan Academy's AI tutor, delivers personalized tutoring, showcasing how GenAI can transform educational frameworks (Khan, 2023). Nonetheless, GenAI may struggle with understanding the specific context or details of technical and legal aspects within a project, leading to potential over-reliance on AI-generated data at the expense of human insight (Giermindl et al., 2022).

Knowledge Application

GenAI significantly impacts workplace productivity by automating routine tasks and enabling employees to focus on more complex activities. This leads to improved efficiency and output quality (Ziegler et al., 2022). For instance, a novice software engineer can use GenAI to write efficient code, while a financial analyst can make more accurate predictions (Brynjolfsson et al., 2023). This capability also helps by suggesting improvements and automating parts of the coding process or business forecasting. However, this capability also raises concerns about job displacement, changes in professional roles, and the ethical implications of decisions made based on AI-generated content (Strich et al., 2021). Additionally, while GenAI can provide a non-judgmental platform for discussing mental health issues, employees might also question their professional identity as GenAI takes on tasks traditionally done by humans (Oracle, 2020; Waizenegger et al., 2020).

2.4 Conceptual Research Model

In order to address the research question, this research clarified two central concepts based on the literature study: GenAI and Business Intelligence. For GenAI, four capabilities have been outlined: Knowledge Creation, Knowledge Storage and Retrieval, Knowledge Sharing, and Knowledge Application. Additionally, the nature of BI has been expounded upon, including how BI projects are developed by outlining the phases of the BI lifecycle, which include the following phases: Discovery, Design, Development, Deploy, and Value Delivery.

2.4.1 Ideal Conceptual Research Model

Initially, the research model was designed to explore how GenAI's capabilities specifically impact each phase of the BI lifecycle, showed in Figure 3. This model assumes that the capabilities outlined by Benbya et al. (2023) positively affect each phase of the BI agile lifecycle from Larson, D., & Chang, V. (2016). The research aims to find out if the benefits of GenAI's capabilities apply to the BI lifecycle. Knowledge Creation facilitates innovation and new idea generation, potentially enhancing the overall lifecycle. Knowledge Storage and Retrieval improves search accuracy and information retrieval efficiency, which could streamline processes. Knowledge Sharing enhances professional development and personalized learning, ensuring that team members are well-informed and skilled. Lastly, Knowledge Application boosts productivity, supports task automation, and assists in decision-making. This study seeks to determine if these potential benefits can positively influence each phase of the BI lifecycle.

This model aimed to explore a gap in existing literature, given the novelty of GenAI within BI. The original model proposed testing multiple hypotheses from H1a to H1e for Knowledge Creation, from H2a to H2e for Knowledge Storage and Retrieval, from H3a to H3e for Knowledge Sharing, and from H4a to H4e for Knowledge Application, each assessing the positive influence of these capabilities on the respective phases of the BI lifecycle.

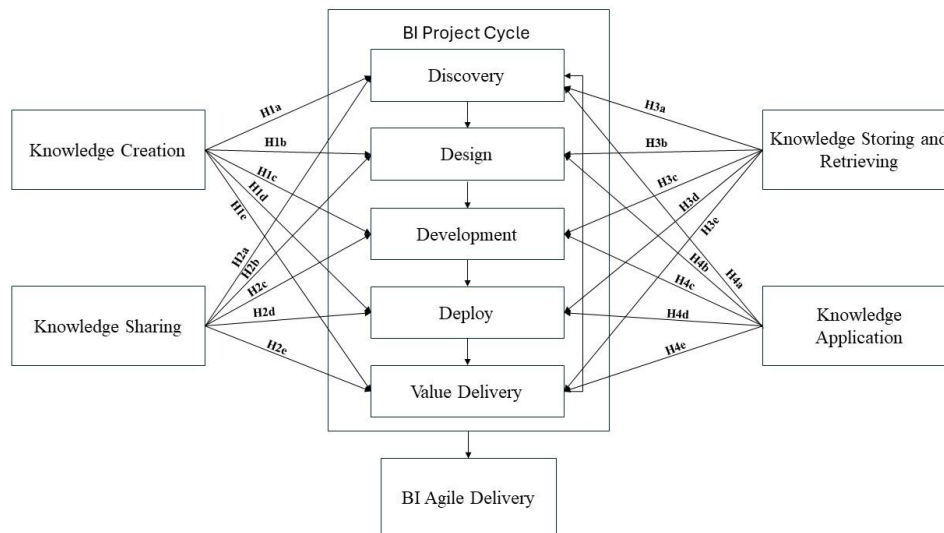


Figure 3 – Ideal Conceptual Research Model

Hypotheses/Propositions for the Ideal Model:

- *Knowledge Creation (H1a to H1e)*: Proposed that Knowledge Creation positively influences each phase of the BI lifecycle, from Discovery to Value Delivery.
- *Knowledge Storage and Retrieval (H2a to H2e)*: Aimed to examine the positive impacts on all BI lifecycle phases from Discovery to Value Delivery.
- *Knowledge Sharing (H3a to H3e)*: Intended to test the positive influence on each BI lifecycle phase.
- *Knowledge Application (H4a to H4e)*: Focused on assessing the positive impacts across all phases of the BI lifecycle.

2.4.2 Conceptual Research Model to be investigated

Due to the novelty of the department and a limited number of respondents, the comprehensive model initially constructed proved to be too advanced to research at this stage. The variability in respondents' project statuses, work experiences, and role responsibilities means not every respondent engages with every phase of the BI lifecycle, thereby limiting the feasibility of testing all proposed hypotheses.

Consequently, this research focused on investigating four overarching hypotheses that assume a positive influence of each GenAI capability on the BI lifecycle as a whole, rather than on its individual phases. This revised approach, illustrated in Figure 4, fits the current capabilities and limitations of the department, providing a more manageable framework for exploring the impact of GenAI within BI contexts.

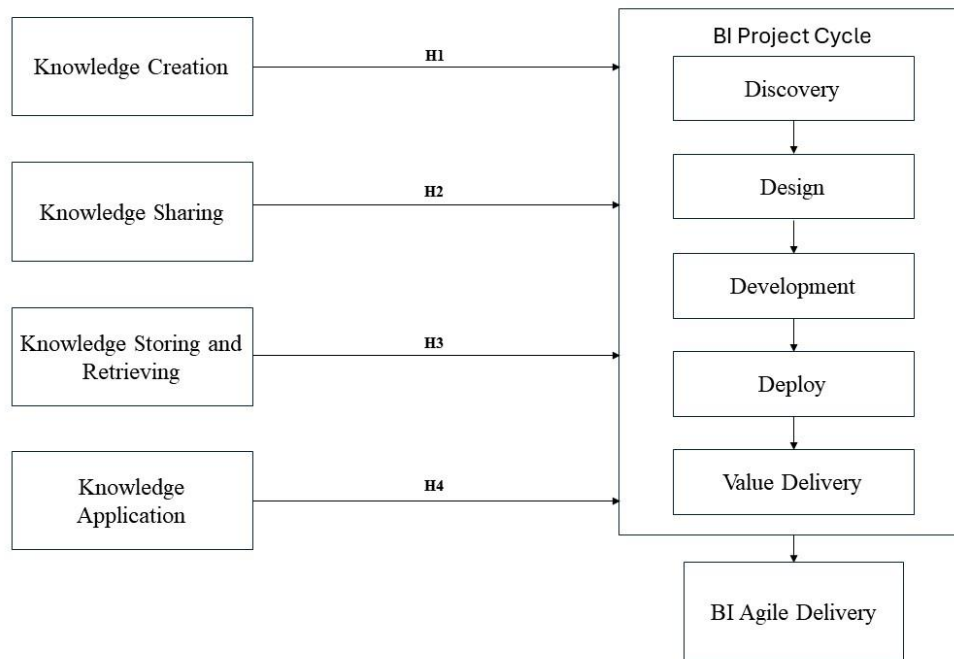


Figure 4 – Current Conceptual Research Model

Revised Hypotheses for the Current Model:

H1: Knowledge Creation enhances the BI project cycle.

H2: Knowledge Sharing enhances the BI project cycle.

H3: Knowledge Storage and Retrieval enhances the BI project cycle.

H4: Knowledge Application enhances the BI project cycle.

3. Methodology

In this chapter, the methodology used for the research is outlined. Section 3.1 discusses the used research methodology. Section 3.2 describes how the data is collected in this research. Section 3.3 describes how the collected data is analysed. Section 3.4 mentions how the results are validated. Finally, section 3.5 describes how AI is used within this research.

The research consists of two main components: a literature study and a single case study. The literature study is used to develop a theoretical basis on which a conceptual research model is built, hypothesizing an impact between two models or theories. The case study is employed to gather empirical data, given the limited existing research on GenAI in BI, to explore whether the hypotheses can be supported in a real-life context.

3.1 Explorative Case Study

It is important to note that this qualitative study adopted an exploratory research approach due to the novelty of GenAI within the context of BI. Given the emerging nature of GenAI technology and its applications in BI systems, there was limited existing research and practical experiences available. To address this gap, a single case study was employed. This method allowed for an in-depth, contextual analysis of the subject matter, enabling the researcher to gain a deeper understanding and explore the phenomena in detail. Single case studies are advantageous for their ability to produce high-quality theory and provide rich, contextual insights that are not always achievable with multiple case studies (Gustafsson, 2017).

The case study was conducted within a single department of an organisation and involved semi-structured interviews with data, AI, and BI consultants, developers, and managers. This practical approach aimed to explore the use of GenAI in BI, addressing the lack of empirical research on this subject. However, single case studies do have certain limitations. They can be criticized for their lack of generalizability due to the focus on a single context, making it difficult to apply findings broadly (Yin, 2003). Additionally, there is a risk of researcher bias, as the in-depth nature of the study can lead to subjective interpretations (Flyvbjerg, 2006). To address these downsides, validation sessions with experts were conducted, which helped to improve the reliability of the findings and provide a more balanced perspective, thereby enhancing the overall credibility of the research.

3.2 Data Collection

To gather insights about the adoption factors of GenAI in BI, interviews were conducted with professionals including developers, contractors, and managers. These professionals were approached through the network of Delaware, ensuring no prior relationship between the interviewer and interviewees. All participants needed to be actively involved in the business and analytics branch of Delaware. Due to the novelty of the department in the Netherlands, traditional sampling methods were not feasible. However, including participants with varied experience levels enabled a diverse range of perspectives on GenAI adoption within the organisation. Participants were selected from the business and analytics branch, in which a total of 5 participants were approached, and all of them agreed to participate voluntarily, resulting in 5 respondents. The interviews were conducted in Dutch via Microsoft Teams. Semi-structured interviews were chosen to allow for deeper insights while maintaining consistency the interviews using open-ended questions. An interview agenda was developed to ensure consistency and structure within the interview, showed in Appendix 2.

Before conducting the interviews, participants received an agenda of the interview, and their consent was obtained for transcribing and utilizing the interview data. The participants were each given the same understanding of the four GenAI capabilities to provide a starting point for this topic. Open-ended questions were asked to allow the respondents to give their insights for possible and current application areas. Transcriptions were generated using Microsoft's transcription function. These transcriptions were then utilized to develop comprehensive interview reports based on the interview points covering all questions posed during the interview. Each interview report was sent to the respondent to ensure that all the information was valid and to check if any important information was missing. The finalized interview reports are shown in Appendix 3.

Besides interviews, existing data was used in the form of a presentation to gain understanding of the BI methodology in the department. This was elaborated upon within an expert session where the BI cycle from the literature was shown and validated against this presentation.

3.3 Data Analysis

Analysing the collected data is crucial for uncovering new insights. Qualitative data was gathered to help tackle the sub-questions laid out earlier. To guide this analysis, the process outlined by Braun and Clarke (2006) was followed, which provides a six-phase guide for thematic analysis.

Phase 1: Familiarizing with the data: The first step involved reading and re-reading the interview reports of the respondents to become deeply familiar with the content. Due to the structured interview reports, early patterns and potential themes were already spotted.

Phase 2: generating initial codes and Phase 3: searching for themes were carried out hand in hand. In Phase 2, interesting features of the data were coded across the reports. Each report was carefully examined, and relevant segments were coded to capture essential insights. In Phase 3, these codes were collated into potential themes. The structured reports already revealed themes, with one being GenAI applications based on the possibilities mentioned and outlined in the report which could be seen as the initial codes. The same approach applied to the concerns (negative points) and the other remarks, which highlighted key points that didn't fit into the previous themes. This organisation helped in identifying broader patterns and relationships within the data.

Phase 4: Reviewing themes: The themes were then reviewed to ensure they accurately represented the coded extracts and the entire dataset. Adjustments were made to refine the themes, ensuring coherence and distinction. Tasks, concerns, and remarks mentioned multiple times were combined to prevent redundancy. For example, one respondent mentioned “generating DAX code” and another respondent mentioned “Generating SQL code”. Both of these codes refer to a GenAI applications but due to the similarities, they were combined to “automatic code generation” resulting in sub-themes within a theme.

Phase 5: Defining and naming themes: Ongoing analysis refined the specifics of each theme, resulting in clear definitions and names. For instance, the theme "GenAI applications" encompassed tasks supported by GenAI, while "concerns" addressed negative points about using GenAI. A third theme, "other remarks," captured additional comments that did not fall within the previous themes.

Phase 6: Producing the report: Following the list of themes including sub-themes and codes in Appendix 4, tables for each theme was created which are showed in Chapter 4: Results. Theses tables included all GenAI applications, concerns, and other remarks along with the identification of the respondent who mentioned them. Also, relevant quotes from the interview reports were used to provide the evidence for the mentioned codes within the themes.

3.4 Expert Validation Sessions

One of the weaknesses of single case studies, as discussed by Gustafsson (2017), is that they can lack generalizability due to the focus on a single context, making it difficult to apply findings broadly. Additionally, there is a risk of researcher bias, as the in-depth nature of the study can lead to subjective interpretations. These issues can affect the credibility and reliability of the findings (Baškarada, 2014). To address these weaknesses, expert validation sessions were incorporated into the study. Expert validation sessions might enhance the reliability and robustness of the findings by providing another perspective and confirming the accuracy of the collected data.

The BI life cycle found in the literature was validated in a single expert session. This was done by first showing the cycle from the literature and then having the expert show the cycle that is familiar to him within the department. This comparison ensures that the theoretical model is accurate and aligns with the department's practices, thereby enhancing its generalizability.

Two other validation sessions focused on the findings from the interviews. To ensure the reliability and robustness of the data, the expert was asked if the content within the identified themes, such as GenAI applications, concerns, and other remark, were familiar and if any important aspects were missing. This feedback helped confirm the relevance of the themes and identify any gaps, thereby strengthening the overall findings.

3.5 Usage of AI

Tilburg University requires clarification regarding the use of AI in research. In this study, ChatGPT was employed to assist in various aspects of the research process. Specifically, ChatGPT was used to generate tables, construct sentences for enhanced readability, and provide alternative phrasing when needed. Additionally, a summarizing tool was utilized to help write the management summary and summarize literature findings. ChatGPT also aided in translating interview reports and relevant quotes into English, ensuring accuracy and consistency in presenting qualitative data. The use of AI aimed to improve the overall clarity and coherence of the research documentation, thereby contributing to a better reading experience.

4. Results

This chapter presents the findings from the thematic analysis of semi-structured interviews, detailed in Appendix 4. The analysis revealed three main themes: GenAI Applications, Concerns, and Other Remarks. Section 4.1 describes the case of Delaware Netherlands' Business and Analytics department, highlighting its context and respondents. Section 4.2 explores the applications of GenAI within the department. Section 4.3 discusses the concerns related to GenAI, including challenges and risks identified by respondents. Finally, Section 4.4 includes additional insights and reflections from the respondents. This structured approach provides a comprehensive understanding of GenAI's impact on the department.

4.1 Case Overview

Delaware Netherlands is part of delaware consultancy, a global company that delivers advanced IT solutions and services to organisations striving for a sustainable, competitive advantage. This case study is conducted within the Business and Analytics department, a relatively novel department to the company's Dutch network. This department is dedicated to leveraging cutting-edge technologies to transform data into actionable insights, thereby enhancing decision-making processes and business performance. The Business and Analytics department focuses on a range of services, including business intelligence, data analytics, and advanced data management. This department is crucial for helping clients navigate the complexities of modern data environments, offering solutions that encompass data integration, reporting, and visualization based on data from the clients Enterprise Resource Systems (ERP). By utilizing innovative tools and methodologies, delaware Netherlands aims to empower businesses with the insights needed to drive growth and efficiency.

To gain a comprehensive understanding of the department's impact and the experiences of its team members, semi-structured interviews were conducted. This qualitative research method, detailed in the methodology chapter, was chosen for its flexibility and depth, allowing for the collection of rich, detailed information. The interviews were conducted with five respondents who hold various roles within the department, including data consultants, analysts, and developers. Their diverse backgrounds and experiences provided a broad perspective on the application and implications of GenAI in their work.

Table 3 presents a summary of the roles and responsibilities of five respondents in the field of BI, highlighting their varying levels of experience and specific functions within their organisations. This information is crucial as it provides a contextual understanding of the diverse expertise and responsibilities of each respondent.

Respondent	Function	Years of Experience	Summary of Responsibilities
1	Data Analyst	2,5	Involved in BI projects within Delaware, bridging the gap between technical terms and business needs, gathering requirements, presenting KPIs, and handling backend tasks.
2	SAP-BI Consultant	2	Works on building and adapting BI reports, validating analyses, and providing aftercare services.
3	BI Consultant	9	Bridges the gap between technical BI tools and business processes, delivering insights for better decision-making, and combining requirements, backend, and frontend analyses.
4	Senior BI-Consultant	24	Specializes in SAP BI, solves complex architectural issues, and advises on optimizing BI strategies and processes, and guides junior team members.
5	Senior BI-Consultant	7	Involved in various BI projects from presales to implementation, implements data products, and guides junior team members.

Table 3 - Overview of Respondents

4.2 Theme: GenAI Applications

This section presents the results related to the applications GenAI within Delaware Netherlands' Business and Analytics department. Based on the thematic analysis, several sub-themes emerged within this theme, reflecting the diverse ways in which GenAI is utilized. These sub-themes include code generation, documentation and reporting, error handling, data management, data analysis, and customer interaction.

Table 4 shows a list of the sub-themes based on tasks that GenAI can perform or support. Each sub-theme listed is provided with a description of how GenAI contributes to that particular function within the department. The table also identifies which respondents mentioned each task with an 'x', while using numbers to maintain their anonymity. This format helps to illustrate the range of applications that professionals in the field believe GenAI can support. The inclusion of respondents next to each task highlights the diversity of tasks among the respondents, as well as areas of consensus where multiple respondents recognize the same benefits of GenAI. By organizing this information into a table, the data is made accessible for quick reference, offering a clear view of how GenAI technologies are perceived to impact various aspects of business intelligence and IT operations. A 'total' column is included to illustrate the popularity of each task among the respondents.

Sub-theme	Description	R1	R2	R3	R4	R5	Total
Code Generation	Automating the generation of code, such as DAX formulas, SQL queries, and coding assistance	X	X	X	X	X	5
Documentation and Reporting	Generating and summarizing documents, creating technical documentation, presentations, and gathering feedback	X	X		X	X	4
Error Handling	Detecting and troubleshooting errors, including bug fixing and error resolution	X	X	X		X	4
Data Management	Extracting, transforming, modelling data, and providing detailed explanations (data lineage)	X			X	X	3
Data Analysis	Analysing data, providing decision support, and creating advanced visualizations	X	X		X		3
Customer Interaction	Enhancing customer service through automated responses and chatbots	X	X				2

Table 4 - GenAI applications across the respondents

Each sub-theme is discussed below with detailed insights and perspectives from the respondents.

4.2.1 Code Generation

This sub-theme involves the automation of code generation, including creating DAX formulas, SQL queries, and providing coding assistance. It reflects how GenAI accelerates development processes, reduces manual coding effort, and helps in error prevention.

Respondent 1 highlighted the time-saving aspect, stating, *"I can quickly generate a DAX formula or something similar without having to construct it entirely by myself, giving me a head start and saving time in creating these formulas."*

Similarly, Respondent 2 mentioned the efficiency gained through automation, noting, *"I have used GenAI for automation tasks such as generating SQL/DAX code for BI applications."*

Respondent 4 provided a forward-looking perspective, explaining, *"So what I see in this respect at the moment, given the state of technology, is that maybe in 4 or 5 years it will be completely different or further expanded. But on the one hand, you have the generation of SQL to retrieve data from a formalized database."*

Respondent 3 emphasized the practical assistance GenAI offers, stating, *"So I talk in the form of a scenario, and I get code output that are technically sound. For example, if you need to create a measure in Power BI, you ask a question, and it tells you to right-click, create a new measure, and write this."*

Lastly, Respondent 5 described the frequent use of GenAI in their workflow, saying, *"You use it almost daily for generating code."*

4.2.2 Documentation and Reporting

This sub-theme covers the automatic generation and summarization of documents, creation of technical documentation, generating presentations, and gathering feedback. It highlights how GenAI helps streamline reporting and documentation processes, ensuring consistency and efficiency.

Respondent 1 discussed the automation of documentation, saying, *"GenAI helps me by automatically generating the documentation required for project compliance and consistency, summarizing key points from dense documents without manual effort."*

Respondent 2 highlighted the ability to generate and summarize documents from conversation inputs, noting, *"AI can be used for generating and summarizing documents, such as creating requirements from conversation input."*

Respondent 4 shared their experience with technical documentation, stating, *"So what I foresee is a personal frustration. I am always lax in creating technical documentation. Technical documentation can be generated from your development object with GenAI."*

Respondent 5 expressed a desire to utilize GenAI in pre-sales processes, mentioning, *"I would like to use it more in a pre-sales process, for gathering requirements and generating presentations or collecting feedback."*

4.2.3 Error Handling

This involves the use of GenAI for detecting and troubleshooting errors, as well as resolving bugs. Respondents noted the efficiency gains from having AI assist in identifying and fixing issues quickly.

Respondent 1 explained the time-saving benefits, stating, *"If I run into a major error or bug, I can input it into the system, and it helps find the error for me and possibly suggest a solution, which saves a lot of time understanding and fixing these errors."*

Respondent 2 discussed the potential of AI in error resolution, noting, *"AI has the potential to identify and resolve errors based on error codes, which can help solve problems faster and improve overall efficiency."*

Respondent 3 emphasized the practical troubleshooting assistance, stating, *"For example, if I have a piece of code that doesn't work, I can ask it to make it work."*

Respondent 5 highlighted the comprehensive search capabilities, saying, *"The nice thing about Copilot is that it sifts through the internet and immediately gives a summary of multiple potential causes."*

4.2.4 Data Management

This sub-theme includes data extraction, transformation, modelling, and providing detailed explanations of data origins. GenAI's role in managing and structuring data is crucial for accurate and effective reporting.

Respondent 1 discussed the utility in data extraction, stating, *"By using GenAI, I can extract specific values or add new fields in SQL Server, which really assists in front-end reporting through tools like Power BI."*

Respondent 5 highlighted the importance of data structuring, noting, *"Once the infrastructure is in place, we move towards what I usually call the data structure, which involves retrieving the necessary tables and fields from the source system to transform and model them."*

Respondent 4 mentioned the role of GenAI in explaining data lineage, stating, *"I can imagine GenAI functioning as a question-and-answer system, where AI provides detailed explanations of technical aspects, such as the origin of specific data fields in reports."*

4.2.5 Data Analysis

GenAI is used for analysing data, offering decision support, and creating advanced visualizations. This helps in evaluating business processes and strategies, providing insights that aid in decision-making.

Respondent 1 highlighted the decision-making support, stating, *"GenAI analyses data and provides insights that assist in decision-making, particularly in evaluating business processes and strategies."*

Respondent 2 emphasized the analytical capabilities, noting, *"GenAI can analyse data and provide insights that aid in decision-making, particularly in evaluating business processes and strategies."*

Respondent 4 discussed the potential for advanced visualizations, explaining, *"Another possibility I see is that once you have made data available from a large dataset and turned it into information, then you also often see, increasingly in your reporting tools, that a person can ask questions in natural language. For example, 'Give me a timeline with these revenue figures, these profit figures and compare it to last year'."*

4.2.6 Customer Interaction

GenAI enhances customer service by automating responses to customer inquiries through systems like chatbots, improving speed and accuracy in customer interactions.

Respondent 1 noted the improvement in customer service, stating, *"GenAI can be deployed to enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots."*

Respondent 2 echoed this sentiment, saying, *"GenAI can enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots."*

4.3 Theme: Concerns

This section explores the theme “concerns”, associated with the use of GenAI within the case. Through thematic analysis, several sub-themes were identified, each reflecting different aspects of the challenges and risks posed by GenAI. Table 5 summarizes these sub-themes, indicating which respondents mentioned each concern.

Sub-theme	Description	R1	R2	R3	R4	R5	Total
Output Quality and Reliability	Issues with the reliability and accuracy of AI-generated outputs		X			X	2
Data Quality and Input	Dependence on the quality of input data and questions for accurate AI outputs		X		X	X	3
Ethical and Security Concerns	Ethical considerations and potential security risks associated with AI usage		X	X	X		3
Job Security and Roles	Concerns about job displacement and changes in job roles due to AI		X	X			2
Over-Reliance	Risks of becoming overly dependent on AI without understanding underlying principles					X	1
Technical Limitations	Issues related to the availability and contextual understanding of AI technologies				X	X	2

Table 5 - Concerns across Respondents

Each sub-theme is discussed below with detailed insights and perspectives from the respondents.

4.3.1 Output Quality and Reliability

This sub-theme involves concerns about the reliability and accuracy of AI-generated outputs, highlighting the potential need for manual correction and the inefficiency it may introduce. The respondents indicated that while AI can generate code and other outputs quickly, these outputs often require significant manual adjustment to meet quality standards.

Respondent 2 highlighted the inefficiency in using AI-generated code, stating, *"Sometimes, cleaning up the code generated by AI takes more time than writing the code yourself."* This suggests that the initial time saved by using AI can be offset by the additional time needed for corrections.

Respondent 5 echoed this sentiment, explaining, *"No matter how iterative it is, you can keep providing it*

with more information, but it can just end up leading nowhere, and you eventually have to look for another solution or think for yourself." This indicates a frustration with the iterative process of refining AI outputs, which can sometimes lead to dead ends.

Respondent 2 also pointed out issues with complexity and accuracy, mentioning, *"I think a lot of things still don't work perfectly, like with transcripts where you have to go back and adjust a lot yourself because the technology isn't quite there yet."* This highlights the ongoing challenges with the precision of AI-generated content.

4.3.2 Data Quality and Input

This sub-theme covers the dependence of AI on high-quality input data and well-formulated questions to produce accurate and relevant outputs. The quality of AI outputs is directly tied to the quality of the inputs it receives, making it crucial for users to provide clear, accurate, and relevant data.

Respondent 2 emphasized the importance of input quality, stating, *"If the input isn't good, the output won't be good either. This is true for most things, not just AI."* This underscores the fundamental principle that quality input is necessary for quality output.

Respondent 4 elaborated on the need for precise questions, noting, *"While GenAI offers significant benefits, the quality of the output is highly dependent on the input. Poorly formulated questions can lead to inaccurate answers, requiring additional review and adjustment."* This highlights the importance of crafting well-thought-out questions to obtain useful results.

Respondent 4 also shared personal experience with input quality, explaining, *"It's true, if I ask a bad question to... GPT, it also gives a bad answer. I have experienced this; I can ask bad questions, but then it turns out to be less applicable. You need to go back to the question and improve it for a better answer."* This illustrates the iterative process needed to refine questions to achieve better outputs.

Respondent 5 highlighted the challenge for users, stating, *"If you don't know how to ask your question, it will be difficult for the system to provide a good answer."* This indicates that effective use of AI requires not only quality data but also user proficiency in formulating appropriate queries.

4.3.3 Ethical and Security Concerns

This sub-theme addresses the ethical considerations and potential security risks associated with the use of AI, including the need for human oversight and the risks of data exposure. As AI becomes more integrated into business processes, ensuring ethical use and data security becomes paramount.

Respondent 2 stressed the importance of critical oversight, stating, *"It's crucial to remain critical of AI output and maintain human oversight in AI processes. The ethical boundaries of AI use are also a significant concern."* This emphasizes the need for continuous human involvement to ensure AI is used responsibly.

Respondent 4 raised concerns about data security, mentioning, *"There are business risks attached. Suppose you expose your business processes entirely to a GenAI application, which then forms its own interpretation. Companies need to ask if they are willing to allow this."* This highlights the potential risks of exposing sensitive business processes to AI, which could lead to unintended interpretations and actions.

Respondent 3 emphasized the necessity of control, stating, *"No matter how good the computing power of AI is, it should always remain under your control at all times."* This underscores the importance of maintaining human oversight and control over AI applications to prevent autonomous decisions that could have negative consequences.

4.3.4 Job Security and Roles

This sub-theme encompasses concerns about job displacement and changes in job roles due to the increasing use of AI technologies. The respondents expressed mixed feelings about how AI might impact their job security and roles within the company.

Respondent 2 expressed a balanced view on job displacement, noting, *"If we are all eventually replaced by AI, we'll just have to find something else to do. Humans are inventive enough to come up with new roles."* This reflects an optimistic outlook on human adaptability and the potential for new job creation despite AI advancements.

Respondent 3 voiced anxiety about job loss, stating, *"But if you take my job, then you are also my enemy on the other side."* This comment highlights the personal fear and resistance that can accompany the introduction of AI, particularly when it threatens existing job roles.

4.3.5 Over-Reliance

This sub-theme highlights the risks of becoming overly dependent on AI without fully understanding the underlying principles and technologies. The concern here is that reliance on AI could lead to a lack of critical skills and understanding among users.

Respondent 5 warned against over-reliance, saying, *"What I see going wrong a lot in the BI world is that new people come in who want to become BI developers and they are too quick to use ChatGPT or*

Copilot to generate their code." This indicates a potential pitfall where new developers might rely too heavily on AI tools, bypassing the essential learning and understanding of fundamental concepts.

4.3.6 Technical Limitations

This sub-theme addresses issues related to the availability and contextual understanding of AI technologies, including challenges in integrating AI with existing systems. Respondents highlighted that while AI has significant potential, there are practical limitations to its current capabilities.

Respondent 4 pointed out availability issues, stating, *"Technology is not always available where you need it. If you work with an on-premises environment, you cannot simply connect it to a GenAI application that operates outside the company."* This highlights the logistical challenges in implementing AI solutions, especially in environments with strict data and technology constraints.

Respondent 5 highlighted the limitations in contextual understanding, mentioning, *"At the moment, I don't see GenAI setting up a fully functional data platform."* This reflects the current limitations of AI in handling complex, context-specific tasks that require deep understanding and integration with existing systems.

4.4 Theme: Other Remarks

This section presents additional remarks from the respondents that did not quite fit into the other themes but were emphasized as important. While many of these insights have been referenced in previous sections, three sub-themes emerged that warrant separate mention. These sub-themes reflect broader perspectives on the impact of AI and underscore the respondents' view on GenAI. Each sub-theme is discussed below with detailed insights and perspectives from the respondents.

4.4.1 Human Inventiveness

This sub-theme highlights the belief in human adaptability and the capacity to innovate new roles and functions even as AI changes the job landscape. The respondents stressed that while AI may replace certain jobs, it simultaneously creates opportunities for new kinds of work. This belief underscores a fundamental optimism about human creativity and resilience in the face of technological advancement.

Respondent 2 expressed confidence in human ingenuity, stating, *"Humans are inventive enough to come up with new roles if AI displaces current jobs."* This remark reflects a broader sentiment that the disruption caused by AI could lead to the emergence of new industries and job roles that we cannot yet fully envision. The adaptability and problem-solving skills inherent in humans are seen as key to navigating the changes brought about by AI.

4.4.2 Integration and Ethics

This sub-theme addresses the optimism regarding the integration of AI in business intelligence while emphasizing the importance of ethical considerations and data security. Respondents highlighted the potential of AI to significantly enhance business processes and decision-making. However, they also noted that this potential must be balanced with strict ethical standards and robust data security measures to prevent misuse and ensure that AI benefits society as a whole.

Respondent 1 reflected a positive outlook on AI integration, saying, *"Respondent 1 is optimistic about the integration of AI in BI, emphasizing the importance of ethical considerations and data security."* This highlights the dual focus on leveraging AI for business improvements while maintaining a vigilant stance on ethical issues and protecting sensitive data. The integration of AI is seen not just as a technological advancement but as a responsibility to uphold ethical standards in its deployment.

4.4.3 Support and Not Replacement

This sub-theme encompasses the belief that AI should support and enhance human tasks rather than replace human expertise. Respondents stressed that AI technologies are tools designed to augment human capabilities, making tasks easier and more efficient. However, there is a clear consensus that AI should not be allowed to replace the critical thinking, creativity, and decision-making abilities that humans bring to the table. This sub-theme also emphasizes the need for careful management and control over AI technologies to ensure they remain tools rather than autonomous entities.

Respondent 1 emphasized the supportive role of AI, noting, *"AI is a valuable tool that can support and accelerate human tasks, especially repetitive ones, but it is not a replacement for human expertise."* This remark underscores the idea that while AI can handle repetitive and mundane tasks, the strategic and creative aspects of work should remain human-led.

Respondent 3 highlighted the importance of control and management, stating, *"Companies need to ensure that AI technologies remain supportive and do not make autonomous decisions beyond human control."* This statement reflects concerns about the potential risks of AI making independent decisions without human oversight, which could lead to unintended consequences.

Further elaborating on control, Respondent 3 added, *"If something goes wrong, I can take over control immediately, so it's under my control at all times, even though it's flying fully automatically."* This illustrates the importance of having mechanisms in place for humans to intervene and correct AI actions, ensuring that AI remains a tool under human command.

Respondent 3 also discussed the importance of managing AI applications carefully, saying, *"They emphasize the importance of managing AI applications carefully to ensure that AI technologies remain supportive and do not make autonomous decisions beyond human control."* This reiterates the necessity of maintaining a balanced approach where AI is closely monitored and managed.

Finally, Respondent 3 summed up the complementary role of AI, stating, *"They see AI as a tool that complements human capability, not as a replacement."* This involves the overall perspective that AI should enhance human work without overshadowing or replacing the essential human elements of creativity, judgment, and empathy.

4.4.4 Environmental Impact

During the validation sessions, Expert 2 introduced a crucial consideration regarding the environmental impact of massively deploying GenAI, saying *"The servers enabling GenAI tools could have a substantial environmental impact due to emissions, emphasizing the need to consider this aspect when deploying AI technologies on a large scale."* The infrastructure required to support these AI technologies, particularly the servers enabling different tools, can contribute significantly to environmental emissions.

5. Validation

This chapter validates the findings from Chapter 4, drawing on insights from two experts within Delaware Netherlands. In total, two validation sessions were conducted to discuss the interview findings, one with Expert 1 and one with Expert 2, which are described in section 5.1. Additionally, a third validation session was conducted during the literature study with Expert 1 to validate the BI Lifecycle from the literature research, which is described in section 5.2. Table 6 summarizes the experts' roles, years of experience, and job descriptions.

Expert	Function	Years of Experience	Job Description
Expert 1	Team Lead of Business & Analytics	25	Expert 1 has been in the field since 1999, currently leading the Business & Analytics department. His role involves overseeing the implementation of BI solutions, guiding strategic initiatives, and ensuring that analytics projects align with business goals. He is responsible for managing a team of analysts and developers, driving innovation, and maintaining high standards of data accuracy and utility.
Expert 2	Team Lead of Data & AI	8	Expert 2, as the Team Lead of Data & AI, is focused on leveraging AI and data analytics to enhance business operations. His role includes developing AI-driven solutions, overseeing data governance, and integrating advanced analytics into the company's strategy. He ensures that AI initiatives are ethically sound and technically robust, providing guidance on the application and management of AI technologies.

Table 6 - Overview of Experts

5.1 Validation Sessions for Interview Results

To ensure a comprehensive validation of the interview results, each expert was sent the same content before the meeting showed in Appendix 5. This included a short summary of the thesis research, a brief explanation of the GenAI capabilities (similar to what the respondents received verbally), and the results obtained at that time. During the sessions, their opinions and feedback on the results were discussed in detail and concisely noted in Appendix 6. The subsequent sections, 5.1.1 and 5.1.2, discuss the sessions with Expert 1 and Expert 2.

5.1.1 Session with Expert 1

The session confirmed the relevance and accuracy of the findings within the results. Expert 1 highlighted the widespread use of code generation tools and the common issues related to error detection. They emphasized the importance of high-quality outputs from document generation tools to minimize the need

for revisions. Clarifications were made on definitions related to "definition and quality assurance," stressing the need to understand technical aspects to maintain document quality. The expert acknowledged the potential of data visualization to enhance data presentation. Observations on the usefulness of AI tools indicated that initial responses are often the most accurate, with perceptions evolving as familiarity with the tools increases. Expert 1 noted the varying perspectives of respondents regarding the usefulness and application of AI tools. There was a consensus that initial responses to AI tools tend to be the most accurate, and at the time of the interviews, the respondents might have not considered other GenAI possibilities.

Besides validating the findings, expert 1 provided highly valuable feedback, suggesting that some findings could be split or joined into more coherent themes to enhance clarity and utility. Specific concerns were raised about data security, particularly the handling of sensitive information, and the potential for job displacement due to AI tools. The complexity and accuracy of AI outputs were also highlighted as areas needing attention to ensure reliability. The expert agreed on the next steps, which include refining task descriptions and consolidating and splitting related sub-themes for better clarity. These revisions and feedback have been integrated into the current Chapter 4 of the thesis.

5.1.2 Session with Expert 2

In general, expert 2 agreed with the findings of the interview. Expert 2 acknowledged the mentioned GenAI applications and the varying levels of experience among the interviewees, pointing out that certain tasks were niche and specific to particular roles. This observation led to a discussion on the logical structure and relevance of the identified tasks in the thesis. Expert 2 validated the categorization and analysis presented, confirming their relevance.

Concerns regarding the accuracy and reliability of outputs were addressed, emphasizing the importance of high-quality input and the challenges associated with controlling and verifying AI-generated outputs. Expert 2 highlighted issues related to data security and the ethical implications of AI use, stressing the necessity for rigorous oversight in these areas. Additionally, the environmental impact of AI technologies was identified as a significant consideration.

Expert 2 provided general observations on the findings, noting that the research effectively captured the concerns and practical applications of the tasks. The expert confirmed that the findings were logical and thorough, offering additional insights and feedback for further refinement of the thesis. Overall, Expert 2 affirmed that the thesis findings were well-structured and relevant, providing constructive feedback to further enhance the research.

5.2 Validation Session for BI Lifecycle

The session began with Expert 1 presenting his view on BI methodologies, as detailed in Appendix 1. He elaborated on a structured, step-by-step methodology that includes phases such as Scope, Architecture & Infrastructure, Realization Infrastructure, Information Analysis, Source Analysis, Output Analysis, Design and Modelling, Backend Realization, Frontend Realization, and Implementation. This methodology, known as the "Compass," is dynamic and adaptable, supporting various project sizes and types, and incorporates agile principles for continuous improvement and flexibility. Although this methodology is not formally implemented at Delaware Netherlands, it is implied to be in practice based on Expert 1's insights.

Following Expert 1's presentation, the session proceeded with the introduction of the BI project lifecycle model from Larson, D., & Chang, V. (2016). This model was then validated by Expert 1, who confirmed that while it is organized into larger phases, it encompasses the same steps outlined in the "Compass" methodology. However, the expert mentioned that the BI architecture that is described within this model, has significantly changed. The model explains that the technical architecture involves the hardware, software, and network infrastructure. The expert noted that this architecture does not represent the current architecture, emphasizing that the technology evolved severely to a cloud infrastructure. Cloud infrastructure, in the context BI, refers to remotely hosted resources that provide on-demand access to data storage, processing power, and analytics tools.

6. Discussion

In this chapter, the results of the research will be interpreted based on the main findings from the analysis of the results. The main questions, which addresses the mentioned knowledge gap, will be answered in this chapter with the help of the hypotheses derived from the conceptual research model. Before diving into the hypotheses and addressing the main research question, the sub-questions will be answered first. This study focuses on identifying the capabilities of GenAI and leveraging them in BI projects. To achieve this, it was important to gain an understanding of both GenAI and business intelligence, as well as the project lifecycle. This led to the researching and answering of the following sub-questions.

1. What are the Characteristics and Capabilities of GenAI?

To answer this sub-question, the study conducted a comprehensive literature review reviewing many papers. GenAI represents a significant advancement in AI, capable of creating new content such as text, images, and videos through generative modelling. GenAI enhances organizational operations by improving efficiency, decision-making, and productivity. Its applications include chatbots and tools that automate tasks and provide quick access to information. It also improves data analysis by uncovering patterns, leading to better strategic decisions. In knowledge work, GenAI's key capabilities include knowledge creation, knowledge storing and retrieval, knowledge sharing, and knowledge application. While these capabilities offer significant benefits, they also present challenges such as security risks, over-reliance on AI, and ethical concerns.

2. What is Business Intelligence?

To answer this sub-question, a literature review was conducted. Business Intelligence is an umbrella term for technologies, strategies, and practices aimed at better decision-making. It involves collecting, integrating, analysing, and presenting business information to improve business performance. BI systems are designed to support management decision-making by transforming data into actionable insights. These systems use data from various sources to provide comprehensive, real-time views for executives. The architecture of BIS typically includes data management, model management, and data visualization tools, enabling detailed and summarized information analysis. Key components of a BI system include a data warehouse, business analytics tools, business performance management, and user interfaces such as dashboards. The integration of Business Process Management further enhances BI by aligning organizational processes with strategic goals.

3. How is the BI project cycle structured?

The literature study, which reviewed many papers, showed that the capabilities of GenAI suggested various benefits, such as generating new ideas, organizing and retrieving information, personalizing knowledge distribution, and solving problems. However, it was initially unclear how these capabilities could be applied specifically within BI projects. The empirical findings from the interviews revealed a theme named "GenAI Applications," highlighting several tasks that GenAI can support within BI projects in the case. Based on the thematic analysis, the tasks supported by GenAI were categorized into sub-themes:

- **Code Generation:** GenAI can automate the generation of code, such as DAX formulas and SQL queries, and provide coding assistance, which accelerates development processes and reduces manual effort.
- **Documentation and Reporting:** GenAI helps generate and summarize documents, create technical documentation, and develop presentations, as well as gather feedback, streamlining reporting and documentation processes.
- **Error Handling:** GenAI can detect and troubleshoot errors, including bug fixing and error resolution, leading to more efficient troubleshooting processes.
- **Data Management:** GenAI supports data extraction, transformation, and modelling, and provides detailed explanations of data origins (data lineage), which is crucial for accurate and effective reporting.
- **Data Analysis:** GenAI analyses data, offers decision support, and creates advanced visualizations, aiding in the evaluation of business processes and strategies.
- **Customer Interaction:** GenAI enhances customer service by automating responses to customer inquiries through systems like chatbots, improving speed and accuracy.

6.1 Main Findings

In this section, key findings will be addressed by discussing the hypotheses initially developed based on the conceptual research model to help answer the main research question: “How does the usage of Generative AI influence the Business Intelligence projects cycle?” The empirical findings from the interviews, combined with insights from the literature review, provided a comprehensive answer to this question. The literature mentioned various capabilities of using Generative AI in knowledge work. However, it was unclear if these capabilities could be used in the BI project cycle. Therefore, hypotheses were established to investigate this potential impact, and empirical data was gathered through interviews to determine if these capabilities were indeed applicable to the BI lifecycle.

Aligning the sub-themes among the capabilities was challenging due to the broad definitions and varying interpretations. Within the analysis, the definitions of each capability were used in combination with the definitions of each sub-theme. In the following sections, each hypothesis will be discussed, examining how the empirical evidence from the interviews supports or challenges the initial hypotheses developed from the literature. This discussion will provide an understanding of the role of GenAI in enhancing the BI project cycle.

H1: Knowledge Creation enhances the BI project cycle.

The literature showed that knowledge creation involves generating new ideas and insights by analysing large datasets, functioning similarly to a brainstorming partner. This capability enhances feedback mechanisms and stimulates innovative thinking, leading to novel strategies and improved decision-making processes.

The results from the interviews show that in the BI context, knowledge creation is adapted to focus on practical data analysis and effective communication of insights rather than abstract idea generation. This adaptation emphasizes actionable data and thorough documentation to drive strategic decisions and business innovations. *Data Analysis* is a direct match, as it involves analysing data to provide decision support and create advanced visualizations. This capability helps in developing new business strategies by quickly processing large datasets and offering perspectives that might not be immediately obvious to human analysts. *Documentation and Reporting* also support knowledge creation by ensuring that new insights are effectively captured and communicated, facilitating further analysis and idea generation. For instance, generating and summarizing documents helps maintain consistency and improves the efficiency of documentation processes, which is crucial for the continuous development and refinement of business insights.

The literature highlights several concerns about the use of GenAI for knowledge creation, such as the risk of spreading outdated practices and misinformation, which can hinder true innovation. These concerns were confirmed by respondents, who emphasized the need for detailed validation of AI-generated ideas to ensure their accuracy and relevance. Respondents also mentioned the difficulty of integrating GenAI into existing workflows, requiring substantial adjustments and training. These challenges underscore the need for careful management to harness the full potential of knowledge creation capabilities in the BI project cycle.

The hypothesis that knowledge creation capabilities of GenAI enhance the BI project cycle is supported to a moderate extent by the empirical evidence. While GenAI's ability to quickly process large datasets and generate actionable insights is recognized, its application is limited by challenges such as integration into existing workflows and the need for rigorous validation of AI-generated ideas.

H2: Knowledge Sharing enhances the BI project cycle.

The literature showed that knowledge sharing involves distributing knowledge effectively and consistently, often personalized to meet individual needs, similar to a personalized educator.

The results from the interviews show that in the BI context, knowledge sharing shifts from the concept of a personalized educator to the practical necessity of ensuring consistent and efficient information dissemination. This adaptation highlights standardized documentation and effective customer communication to maintain operational efficiency and support decision-making processes.

Documentation and Reporting involve generating and summarizing documents to ensure consistent and accurate information dissemination across the organization. This ensures that all team members have access to the same information, which is crucial for decision-making and project execution. For instance, creating technical documentation helps maintain consistency in the information shared, facilitating better coordination among team members. *Customer Interaction* enhances service delivery by providing accurate and timely information to customers through automated responses. This practical adaptation ensures that customer inquiries are handled efficiently, reflecting the distribution of knowledge in a business context rather than personalized education.

However, concerns were raised about AI's ability to fully grasp specific contexts, potentially leading to over-reliance on AI-generated content without adequate human oversight. Respondents noted that while AI can draft requirements and generate summaries, it might miss critical nuances that human experts would catch. This limitation poses a risk of incomplete or incorrect information being shared, negatively impacting decision-making processes. Furthermore, respondents mentioned the reduction in human interaction and collaboration as a significant concern, highlighting the need for a balanced approach that

leverages AI for knowledge sharing while retaining substantial human input to ensure the accuracy and completeness of shared information.

The hypothesis that knowledge sharing capabilities of GenAI enhance the BI project cycle is moderately supported by the empirical evidence. GenAI has improved the consistency and efficiency of documentation processes and customer interactions. However, concerns about AI's understanding of context and the need for human oversight highlight the importance of balanced implementation.

H3: Knowledge Storage and Retrieval enhances the BI project cycle.

The literature showed that knowledge storage and retrieval involve organizing and retrieving information efficiently, improving search accuracy and accessibility.

The results from the interviews show that in the BI context, the focus of knowledge storage and retrieval is on managing large volumes of business data efficiently and ensuring that this data is accurate and accessible. This adaptation emphasizes the need for robust data management practices that can handle complex data structures and provide clear insights into data origins and transformations. *Data Management* is a direct match for this capability. It includes extracting, transforming, and modelling data, providing detailed explanations of data lineage, and ensuring efficient data organization and retrieval. These tasks support accurate reporting and decision-making by making relevant data easily accessible. For example, using GenAI to extract specific values or add new fields in SQL Server facilitates front-end reporting through tools like Power BI, streamlining workflows and enhancing report accuracy.

Despite these benefits, significant concerns about data security and privacy were raised. Respondents emphasized the risk of unauthorized access to sensitive data and the need for robust security measures and rigorous validation processes to ensure data integrity. Additionally, the performance of GenAI heavily depends on the quality of input data, and any issues with data quality can significantly affect the outputs.

The hypothesis that knowledge storage and retrieval capabilities of GenAI enhance the BI project cycle is moderately supported by the empirical evidence. While GenAI improves the efficiency of organizing and retrieving information, concerns about data security and privacy and the quality of input data necessitate cautious implementation.

H4: Knowledge Application enhances the BI project cycle.

The literature showed that knowledge application involves using information to solve problems, improve processes, and enhance productivity through automation and decision support.

The results from the interviews show that in the BI context, knowledge application focuses on improving operational efficiency and reliability through automation. This adaptation emphasizes the immediate, operational applications of GenAI in supporting daily business operations and decision-making. *Error Handling* involves detecting and troubleshooting errors, thus improving process efficiency and reliability. This ensures that systems operate smoothly and any issues are promptly addressed. For example, using GenAI to identify and resolve bugs can significantly reduce downtime and improve overall system reliability. *Code Generation* automates coding tasks, enhancing productivity and supporting complex decision-making by providing quick and reliable outputs. This directly applies information to solve problems and improve processes. For instance, automating the creation of DAX formulas and SQL queries accelerates development processes and reduces manual effort. *Customer Interaction* through automated responses improves service delivery efficiency, directly applying knowledge to solve customer-related issues quickly and effectively. This ensures that customer inquiries are handled efficiently, enhancing customer satisfaction and operational efficiency.

The interviews highlighted significant concerns about job displacement and ethical implications. Respondents expressed fears that automation could lead to job losses and changes in job roles, stressing the importance of continuous human oversight and the development of ethical guidelines for AI use. They emphasized the need to manage GenAI integration carefully to ensure it complements rather than replaces human expertise.

The hypothesis that knowledge application capabilities of GenAI enhance the BI project cycle is strongly supported by the empirical evidence. GenAI's role in automating routine tasks, detecting errors, and providing decision support has significantly improved efficiency and decision-making. However, concerns about job displacement and the need for human oversight and ethical guidelines must be addressed.

6.2 Limitations

Several restrictions limited the research of this study, influencing the results. One notable constraint was the relatively new Business and Analytics department of Delaware Netherlands. This limited the number of responses accessible and had an impact on the depth and breadth of the data collected, as well as the range of views available for analysis. The department's novelty reflected a limited awareness of GenAI's capabilities and uses in its existing operations. As the department continued to investigate the integration of GenAI, there was a lack of established best practices and thorough understanding about the most successful methods to use this technology. This limited experience may provide an imperfect view of GenAI's capabilities and how they may be effectively used in BI initiatives.

Technical proficiency was another notable limitation. Implementing and leveraging advanced GenAI tools required significant technical skills and understanding, which were not uniformly. This disparity in technical expertise impacted the scope of potential enhancements and innovations within the department. The effectiveness of GenAI applications was heavily reliant on the users' ability to operate these tools efficiently and accurately, meaning that any gaps in skills or knowledge hindered the overall success of GenAI integration.

Moreover, the single case study approach, while providing in-depth insights into a specific context, also limited the generalizability of the findings. This methodology focused intensively on the particular experiences and practices of Delaware Netherlands' Business and Analytics department, which may not be representative of other departments or organisations. The specific organizational culture, structure, and processes of Delaware Netherlands influenced the applicability of the results to different settings.

Potential biases were also created by the study's qualitative design, which was based on semi-structured interviews. The conclusions drawn from the data were dependent on the respondents' own perspectives and experiences. The data was influenced by individual biases and the unique context in which each respondent operated, resulting in variability due to these personal perspectives. The findings' dependability and consistency were impacted by this subjectivity.

Another constraint was the literature review. Even with a thorough review, there's a chance that important publications revealing important theories or discoveries were overlooked. This might imply that certain significant theoretical frameworks or empirical discoveries were overlooked, which could have an impact on how thorough the study's conclusions are.

6.3 Recommendations for Future Research

A number of suggestions for additional research are made in order to expand on the results of this study and overcome its shortcomings. First, broadening the scope of the study to incorporate more case studies from other departments and organisations will improve the findings' generalizability. Future research can capture a wider area of GenAI applications and their effects on BI processes by looking at a variety of scenarios. This will offer a more thorough understanding of the various scenarios in which GenAI can be effectively used.

Second, future research should focus on the technical skills and training required for effective GenAI adoption. It's essential to investigate the educational needs of BI professionals to ensure they are well-equipped to leverage these advanced tools. Developing training programs and guidelines can help professionals stay updated with the latest GenAI advancements and apply them effectively in their work.

Further research should also explore the ethical and security implications of GenAI in BI. As reliance on AI technologies grows, developing frameworks for ethical AI usage and robust security protocols becomes increasingly important. Ensuring that GenAI is used responsibly and securely will help mitigate potential risks and build trust in these technologies.

7. Conclusion

This research aimed to explore how the use of GenAI influences the BI project cycle. Through a literature study, an explorative single case study, and qualitative analysis, it provided insights into the usage of GenAI in BI processes, focusing on its applications and the challenges faced by professionals.

The findings reveal that GenAI significantly enhances various aspects of BI projects through the capabilities outlined in the literature study. For knowledge creation, GenAI supports innovation and decision-making by generating new ideas and processing large datasets. However, its application is limited by integration challenges and the need for validation, and there are concerns about spreading outdated practices. This capability is moderately supported. In knowledge sharing, GenAI improves documentation and reporting consistency but faces challenges in understanding context and avoiding over-reliance, highlighting the need for human oversight. This capability is also moderately supported. GenAI excels in organizing and retrieving information for knowledge storage and retrieval, streamlining workflows and improving accuracy. Nevertheless, concerns about data security and input quality limit its potential, making this capability moderately supported. Knowledge application is the most supported capability, with GenAI significantly improving efficiency, error detection, and decision support. However, concerns about job displacement and ethical implications remain.

Reflecting on the research process, it became evident that integrating GenAI into BI presents both opportunities and challenges. The qualitative approach, involving semi-structured interviews with BI professionals, provided a deep understanding of the practical applications and concerns associated with GenAI. This methodology effectively captured the diverse experiences and perspectives of respondents, highlighting both efficiency gains and areas needing caution. However, the study faced limitations due to the novelty of the case, which restricted respondent availability and historical data. The small scale of the department and varied technical proficiency among users also impacted the generalizability and effectiveness of GenAI tool use. Additionally, the single case study approach and qualitative nature introduced potential biases, and the literature review might have missed significant theories or findings, affecting the study's comprehensiveness.

Future research should broaden the scope by incorporating case studies from various departments and organizations to enhance the generalizability of findings. It should also focus on the technical skills and training required for effective GenAI adoption, developing programs to keep BI professionals updated with the latest advancements. Additionally, exploring the ethical and security implications of GenAI in BI is crucial, emphasizing the need for frameworks for ethical usage and robust security protocols to ensure responsible and secure implementation.

In conclusion, the integration of GenAI in BI projects offers significant potential for enhancing efficiency, decision-making, and innovation. However, realizing these benefits fully requires addressing ethical concerns, managing the balance between AI and human roles, and ensuring robust security measures. With ongoing research and thoughtful implementation, GenAI can significantly advance the field of Business Intelligence, paving the way for smarter, more efficient, and more innovative business processes.

References

- Adamson, J. (2015). Agile methodologies in BI projects. *Journal of Business Intelligence*, 5(3), 245-258.
- Alam, K., Kumar, A., & Samiullah, F. N. U. (2024). Prospectives and drawbacks of ChatGPT in healthcare and clinical medicine. *AI and Ethics*. <https://link.springer.com/article/10.1007/s43681-024-00434-5>
- Bâra, A., Botha, I., Diaconita, V., Lungu, I., Velicanu, A., & Velicanu, M. (2009). A model for Business Intelligence Systems' Development. *Informatica Economica*, 13(4).
- Başkarada, S. (2014). Qualitative Case Study Guidelines. *The Qualitative Report*, 19(40), 1-25.
- Beck, K., Beedle, M., van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., Grenning, J., Highsmith, J., Hunt, A., Jeffries, R., et al. (2001) Manifesto for Agile Software Development. <https://agilemanifesto.org/>
- Benbya, H., Strich, F., & Tamm, T. (2023). Navigating Generative Artificial Intelligence: Promises and Perils for Knowledge and Creative Work. *Journal of the Association for Information Systems*.
- Bharadiya, J. P. (2023). The Role of Machine Learning in Transforming Business Intelligence. *International Journal of Computing and Artificial Intelligence*, 4(1), 16-24. DOI: 10.33545/27076571.2023.v4.i1a.60
- Bologa, A. R., Bologa, R., & Bara, A. (2008). Technology vs Business Needs in Business Intelligence Projects. In *Proceedings of the International Conference on e-Business (ICE-B 2008)*, 26-29 July 2008, Porto, Portugal.
- Bose, M., Ye, L., & Zhuang, Y. (2024). How to Create a Fave and Catch the Fake: Generative Adversarial Networks in Marketing. In *The Impact of Digitalization on Current Marketing Strategies and Consumer Behaviors*. Emerald Publishing Limited. <https://www.emerald.com/insight/content/doi/10.1108/978-1-83753-686-320241003/full/html>
- Brachten, F., Werner, D., & Braun, L. (2021). Employees' Acceptance of AI-Based Chatbots in the Workplace. *Journal of Business Research*, 123(1), 261-276.

Brachten, F., Werner, D., & Braun, L. (2022). Factors Influencing the Adoption of AI Chatbots in Enterprises. European Conference on Information Systems.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>

Brynjolfsson, E., Li, D., & Lindsay, R. R. (2023). Generative AI at Work. NBER Working Paper, No. 31161. <https://www.nber.org/papers/w31161>

Clark, S. C. (2024). Can ChatGPT transform cardiac surgery and heart transplantation? *Journal of Cardiothoracic Surgery*, 19. <https://link.springer.com/article/10.1186/s13019-024-02541-0>

Cribben, J., & Zeinali, M. (2023). Generative AI in Modern Organisations. *Journal of Business Innovation*, 16(2), 89-104.

Davenport, T. H. (2005). Competing on analytics. *Harvard Business Review*.

Davenport, T. H. (2014). Big data @ work: Dispelling the myths, uncovering the opportunities. Harvard Business Review Press.

dv

Deng, Z., & Lin, Y. (2022). The role of AI in enhancing organizational productivity. *International Journal of Information Management*, 62, 102398.

Diaconita, V., Botha, I., Bâra, A., Lungu, I., & Velicanu, M. (2008). Two Integration Flavors in Public Institutions. *WSEAS Transactions on Information Science and Applications*, May 2008.

Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., Duan, Y., Dwivedi, R., Edwards, J. S., Eirug, A., Galanos, V., Ilavarasan, P. V., Janssen, M., Jones, P., Kar, A. K., Kizgin, H., Kronemann, B., Lal, B., Lucini, B., . . . Williams, M. D. (2021). Artificial Intelligence (AI): multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 57, 101994. <https://doi.org/10.1016/j.ijinfomgt.2019.08.002>

Dwivedi, Y. K., et al. (2023). "So what if ChatGPT wrote it? Multidisciplinary perspectives on opportunities, challenges, and implications of generative conversational AI for research, practice, and

policy." *International Journal of Information Management*, 71, 102642. DOI: 10.1016/j.ijinfomgt.2023.102642.

Eboigbe, E. O., Farayola, O. A., Olatoye, F. O., Nnabugwu, O. C., & Daraojimba, C. (2023). Business Intelligence Transformation Through AI and Data Analytics. *Engineering Science & Technology Journal*, 4(5), 285-307. DOI: 10.51594/estj.v4i5.616.

Elbashir, M. Z., Collier, P. A., & Davern, M. J. (2008). Measuring the effects of business intelligence systems: The relationship between business process and organizational performance. *International Journal of Accounting Information Systems*, 9(3), 135-153. <https://doi.org/10.1016/j.accinf.2008.03.001>

García-Peñalvo, F. J., & Vázquez-Ingelmo, A. (2023). What Do We Mean by GenAI? A Systematic Mapping of The Evolution Trends and Techniques Involved in GenAI. *International Journal of Interactive Multimedia and Artificial Intelligence*, 8(4). <https://doi.org/10.9781/ijimai.2023.07.006>

Giermindl, L. M., Strich, F., Christ, O., Leicht-Deobald, U., & Redzepi, A. (2022). The dark sides of people analytics: Reviewing the perils for organisations and employees. *European Journal of Information Systems*, 31(3), 410-435.

Gorry, G., & Scott-Morton, M. (1971). A framework for management information systems. *Sloan Management Review*, 13.

Gustafsson, J. (2017). Single case studies vs. multiple case studies: A comparative study. Halmstad University.

Hacker, P., Engel, A., & Mauer, M. (2023). Regulating ChatGPT and other Large GenAI Models. *ArXiv abs/2302.02337*.

Jarrahi, M. H., Möhlmann, M., & Lee, M. K. (2023). Algorithmic Management: The Role of AI in Managing Workforces. *MIT Sloan Management Review*, 64(3), 1-5.

Jovanovic, B., & Campbell, M. (2022). Generative AI and Its Applications. *AI & Society*, 37(2), 345-358.

Khan, S. (2023). How AI could save (not destroy) education [Video]. TED Conferences. https://www.ted.com/talks/sal_khan_how_ai_could_save_not_destroy_education

Keen, P. G. W., & Scott Morton, M. (1978). *Decision support systems: An organizational perspective*. Addison-Wesley Pub. Co. ISBN 9780201036671.

Larson, D. W. (2009). Data Warehousing in BI Projects. *International Journal of Information Management*, 29(5), 356-362.

Larson, D., & Chang, V. (2016). A review and future direction of agile business intelligence analytics and data science. *International Journal of Information Management*, 36(5), 700-710.
<https://doi.org/10.1016/j.ijinfomgt.2016.04.013>

Lee, J. S., Kim, J., & Kim, P. M. (2023). Score-based generative modelling for de novo protein design. *Nature Computational Science*.

Lewandowski, S., Schuetzler, R. M., & Grimes, G. M. (2021). Acceptance of AI Chatbots: A Cross-Organizational Study. *Journal of Business Research*, 124, 451-463.

Lungu, I., & Bara, A. (2007). *Executive Information Systems*. ASE Printing House Bucharest.

Mayer, A. S., Strich, F., & Fiedler, M. (2020). Unintended consequences of introducing AI systems for decision making. *MIS Quarterly Executive*, 19(4), 239-257.

Moss, L., & Atre, S. (2004). *Business Intelligence Roadmap – The Complete Project Lifecycle for Decision-Support Applications*. Addison-Wesley.

Negash, S. (2004). Business intelligence. *Communications of the Association for Information Systems*, 13, Article 15. Available at: <https://aisel.aisnet.org/cais/vol13/iss1/15/>

Oracle. (2020). *As Uncertainty Remains, Anxiety and Stress Reach a Tipping Point at Work (AI@Work Study Issue)*. <https://www.oracle.com/a/ocom/docs/oracle-hcm-ai-at-work.pdf>

Popović, A., Turk, T., & Jaklič, J. (2010). Conceptual model of business value of business intelligence systems. *Management: Journal of Contemporary Management Issues*, 15(1), 5-29. Available at: <https://hrcak.srce.hr/53604>

Raimundo, L., & Rosário, L. (2021). Business Intelligence in Organizations. *Journal of Information Systems*, 35(1), 67-84.

Schade, M. (2023). How ChatGPT and our language models are developed. OpenAI Help Center.

Sharda, R., Delen, D., & Turban, E. (2013). *Business Intelligence and Analytics: Systems for Decision Support* (10th ed.). Pearson.

Smith, J., & Doe, A. (2023). Strategic Implications of Generative AI. *Strategic Management Journal*, 44(2), 351-375.

Strich, F., Mayer, A.-S., & Fiedler, M. (2021). What Do I Do in a World of Artificial Intelligence? Investigating the Impact of Substitutive Decision-Making AI Systems on Employees' Professional Role Identity. *Journal of the Association for Information Systems*, 22(2), 304-324.

Susarla, A., Gopal, R., Thatcher, J. B., & Sarker, S. (2023). The Janus effect of GenAI: Charting the path for responsible conduct of scholarly activities in information systems. *Information Systems Research*, 34(2), 399-408.

Tarafdar, M., Page, X., & Marabelli, M. (2023). Algorithms as co-workers: Human algorithm role interactions in algorithmic work. *Information Systems Journal*, 33(2), 232-367.

Vujović, D. (2024). GenAI: Riding the new general purpose technology storm. *Ekonomika preduzeća*. <https://scindeks.ceon.rs/article.aspx?artid=0353-443X2401125V>

Waizenegger, L., Seeber, I., Dawson, G., & Desouza, K. (2020). Conversational agents-exploring generative mechanisms and second-hand effects of actualized technology affordances. *Proceedings of the 53rd Hawaii International Conference on System Sciences*.

Wang, Y., Wang, Y., & Yuen, K. F. (2022). Enhancing Customer Service with AI Chatbots. *Journal of Retailing and Consumer Services*, 64, 102849.

Yin, R. K. (2003). *Case study research: Design and methods*. Sage Publications.

Zhang, Y., Li, Y., & Chen, H. (2024). Transforming Workflows with Generative AI. *Journal of Business Innovation*, 17(1), 101-115.

Appendices

Appendix 1: Session BI Methodology with Expert 1

In the presentation given by Expert 1, the project approach was discussed in detail, aligning with a structured, step-by-step methodology. The steps, translated from Dutch, include Scope, Architecture & Infrastructure, Realization Infrastructure, Information Analysis, Source Analysis, Output Analysis, Design and Modelling, Backend Realization, Frontend Realization, and Implementation.

Expert 1's remarks suggest that this methodology is dynamic, adaptable to various project sizes and types, and can incrementally deliver project components. There was a focus on beginning with a comprehensive scope or 'blueprint' phase, which sets the expectations and framework for subsequent stages. Architectural and infrastructural considerations follow, ensuring the technical foundation is robust and scalable.

As the project progresses into analysis phases, there is an emphasis on dissecting information and source data to ensure the output aligns with business requirements. The design and modelling stage are vital for creating a visual representation of the end product, which can include mock-ups for client review. Backend and frontend realizations are executed with an understanding of their overlapping nature and the iterative process involved. Throughout the project lifecycle, agile principles are applied to allow flexibility and continuous improvement. Although Expert 1 mentioned that their team does not strictly adhere to Scrum or other agile methodologies, they embrace an iterative approach that is incrementally built upon.

The "Compass" methodology discussed appears to be a guiding framework for the execution of projects within the organisation. Although not officially documented as the current methodology used at Delaware Netherlands, Expert 1's comments imply that this approach is indeed in practice. His insights from the presentation reveal a pragmatic and adaptable project management style, influenced by his experience and possibly integrated from his previous employer. Notably, this approach aligns with the project lifecycle model described by Larson, D., & Chang, V. (2016), emphasizing its practical value. Consequently, this methodology has been considered, if not officially documented, as part of the current operational framework at Delaware Netherlands.

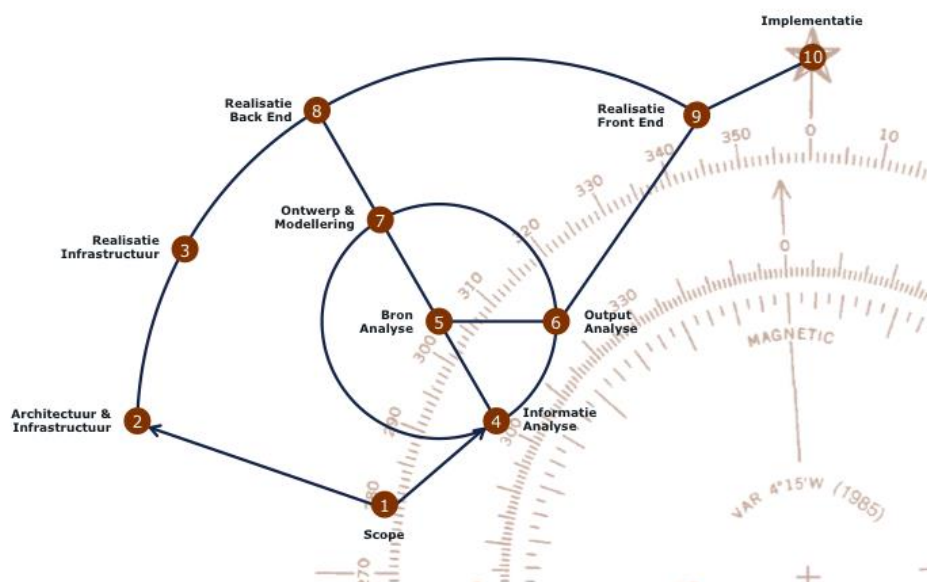


Figure 3 - BI Project Compass

The "Compass" BI project approach, shown in Figure 3, developed by QNH Business Integration includes standard steps and templates designed to support the success of BI projects by ensuring they meet desired outcomes, timings, and budgets (Hobo, S., 2012). This approach is built on years of

experience and supports incremental progress, starting small but always with an eye on the bigger picture. Key steps in the project approach include:

Scope:

The scope step focuses on understanding the bigger picture while initiating a manageable project. This ensures a clear understanding of the overall goals while concentrating efforts on a specific, achievable part of the project, thereby facilitating an incremental and focused progression.

Architecture & Infrastructure:

This stage involves the planning and development of a solid foundation of architecture and infrastructure required for the BI project. The infrastructure must support the project's scope and future expansion, considering factors like performance requirements and technical constraints.

Realization of Infrastructure:

This process involves implementing the planned infrastructure. It is crucial to ensure that the infrastructure not only meets the current project needs but is also scalable for future requirements and is aligned with the overall IT strategy of the organisation.

Information Analysis:

Information analysis is the cornerstone of BI projects, where you define the business rules, set common business language, and structure the information. This step ensures that data is uniform, comprehensive, and aligns with the business needs and quality standards.

Source Analysis:

The source analysis phase assesses the availability and quality of the data. It checks for completeness, frequency, history, quality, accessibility, and the possibility of integrating data from various sources, setting the stage for a robust BI data repository.

Output Analysis:

In this step, the definition of the presentation layer occurs, determining the structure and definitions of the reports, including the desired formats, whether it's via a portal, print, email, or SMS. The aim is to establish requirements for query speed, user convenience, structured data representation, and the flexibility of the reporting system.

Design and Modelling:

This entails the creation of data models within the BI environment. It includes designing the transformation processes that turn raw data into actionable insights and establishing the rules for data aggregation, calculation, and the timeliness of data updates.

Backend Realization:

Realization of the back end involves actual creation and implementation of the database along with the ETL processes. The data must be accurate, consistent, and timely, ensuring that the backend supports the informational needs of the BI project effectively.

Frontend Realization:

This phase focuses on the development of the front-end aspects of the BI project, which includes the user interface and user experience aspects. The goal is to ensure that the data is presented in an accessible, understandable, and actionable format for the business users.

Implementation:

The final step ensures that the BI project is not only completed but also fully integrated into the organisation's workflow. This includes user training, documentation, and support systems to facilitate the adoption and ongoing management of the BI solution.

Appendix 2: Semi-Structured Interview

Introduction to the Interview

Explaining the Purpose:

"Thank you for participating in this interview. The purpose of my thesis is to explore the integration of GenAI within the various phases of Business Intelligence projects. Your specific experiences and insights are crucial to understanding the practical implementation and impact of these technologies."

Exploration of the Role and Expertise of the Interviewee

Determining the Area of Expertise:

"To make our conversation as relevant and informative as possible, I would like to start by gaining a better understanding of the activities you are most involved in within your role related to BI. Could you describe which tasks are at the core of your responsibilities?"

"Before we begin, I would like to briefly explain what we mean by GenAI. These are technologies that can generate new data and insights by analysing and interpreting existing information. Do you have experience with this technology, or is it a new area for you?"

Discussion on GenAI Capabilities

After identifying the interviewee's core activities, I introduce each GenAI capability and ask how it could be relevant to the specific tasks and projects they work on.

1. **Knowledge Creation:** "GenAI can come up with new ideas, insights, or data that didn't exist before. Imagine it like a brainstorming partner that can analyse vast amounts of information and suggest new concepts, solutions, or innovations. For example, it can read through scientific papers and suggest a new compound that could be developed into a medication, or it can come up with a new design for a website based on trends it has learned from analysing current designs."
 - "Given your role in [specific task/project], how do you see the potential for using GenAI for knowledge creation within this context? What potential benefits or challenges do you foresee?"
2. **Knowledge Storage and Retrieval:** "This capability is about how GenAI can help keep information organised and make it easy to find what you need, when you need it. Think of it as a super-smart librarian that not only knows where every piece of information is stored but can also understand and interpret complex inquiries to find exactly what you're looking for. So, if you're searching for specific data across thousands of documents, GenAI can quickly fetch the most relevant information for you."
 - "With regard to your involvement in [specific task/project], how could GenAI help improve knowledge storage and retrieval? Can you suggest possible applications or obstacles?"
3. **Knowledge Sharing:** "GenAI facilitates the distribution of knowledge in a way that's tailored to the learner's needs. It's like having a personalised teacher that knows what you need to learn, how you learn best, and provides you with information in the most effective way. Whether it's through visual aids, simplified explanations, or interactive sessions, GenAI can adapt to offer the most suitable learning experience. This capability is especially useful in educational settings or for professional development within organisations."
 - "Can you think of ways in which GenAI could facilitate knowledge sharing, specifically related to the activities you are most involved in? What are the expected benefits or

possible issues?"

4. **Knowledge Application:** "This refers to GenAI's ability to put information into action to solve problems or improve processes. Imagine a tool that not only gives you advice on how to do your job better but can also automate certain tasks to make you more efficient. For instance, it could help a novice programmer write high-quality code by suggesting improvements or automating routine parts of the coding process. In a business context, it might analyse data to make accurate forecasts that help in decision-making."
 - "How could the application of GenAI affect your work, especially considering the projects you are working on? Are there specific applications of GenAI that you would find useful or not useful?"

General Open Question:

"Are there any other thoughts you have about the usage of GenAI in Business Intelligence that we have not yet discussed?"

Conclusion and Follow-Up

Summary and Validation:

"I greatly appreciate your time and insights. I will summarise the key points from our conversation and send you an overview for review. Please let me know if anything is missing or needs to be adjusted."

Appendix 3: Interview Reports

Respondent 1

Respondent 1 is currently active as a data consultant/analyst and is involved in BI projects within Delaware. Their work involves significant interaction with both the IT department and the business side, often bridging the gap between technical terms and business needs. Their tasks vary depending on the project's phase. Example tasks include gathering requirements, presenting KPIs in the front end, delving into the back end to gather information, and more.

Experiences with GenAI

Respondent 1 acknowledges the potential of GenAI to enhance efficiency in their work, particularly through automating data processing and generating new insights that can aid in faster and more accurate reporting processes. They view GenAI as a tool that can contribute to all phases of BI projects.

Applications of GenAI

Respondent 1 sees various possibilities for deploying GenAI in different phases of business intelligence projects.

- Automatic Code Generation:

Respondent 1 mentioned that GenAI is used for generating code, such as quickly producing DAX formulas or SQL queries. This simplifies the process and saves time.

"I can quickly generate a DAX formula or something similar without having to construct it entirely by myself, giving me a head start and saving time in creating these formulas."

- Document Generation and Summarization:

Respondent 1 noted that GenAI can help automatically generate and summarize documents and reports. For example, it can draft requirements based on conversational input.

"GenAI helps me by automatically generating the documentation required for project compliance and consistency, summarizing key points from dense documents without manual effort."

- Error Detection and Troubleshooting:

Respondent 1 discussed the use of GenAI to identify and diagnose errors in code or other technical systems, contributing to more efficient troubleshooting processes.

"If I run into a major error or bug, I can input it into the system, and it helps find the error for me and possibly suggest a solution, which saves a lot of time understanding and fixing these errors."

- Data Extraction:

Respondent 1 highlighted the deployment of GenAI for extracting specific information from large datasets or documents, similar to advanced searches that go beyond standard functions like 'Control-F'.

"By using GenAI, I can extract specific values or add new fields in SQL Server, which really assists in front-end reporting through tools like Power BI."

- Data Analysis:

Respondent 1 mentioned using GenAI for analysing data and providing insights that can aid in decision-making, particularly in evaluating business processes and strategies.

"GenAI analyses data and provides insights that assist in decision-making, particularly in evaluating business processes and strategies."

- Customer Interaction:

Respondent 1 indicated that GenAI can be deployed to enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots.

Other Remarks

Respondent 1 is optimistic about the integration of AI in BI but emphasizes the importance of ethical considerations and data security. They believe AI is a valuable tool that can support and accelerate human tasks, especially repetitive ones, but it is not a replacement for human expertise.

Respondent 2

Respondent 2 recently transitioned to the IT sector after a career in skin therapy, which was interrupted by the pandemic. They retrained and started at Achmea, gaining experience in testing and later development within SAP environments. Following their experience at Achmea, Respondent 2 chose to enter consultancy, which provided the opportunity to observe and learn how various companies solve their systems and problems. This experience has helped them develop a broad perspective on the use of BI tools and addressing client-specific challenges.

Respondent 2 has worked on building and adapting BI reports. This began with validating outdated analyses and collaborating with end users to ensure the reports remained relevant and applicable. Initially straightforward, this work became more complex due to additional requirements.

After delivering a basic report (a BW query), Respondent 2 assists business users in building their own reports on top of this foundation. They support users with data-related questions, providing not only technical assistance but also clarifying data inconsistencies and guiding users on how to perform their own analyses.

Currently, Respondent 2 is involved in completing a project where they primarily provide 'hypercare' services—post-implementation activities that ensure all systems continue to function well after going live. They are curious about what the future holds after this project.

Applications with GenAI

Respondent 2 has occasionally used GenAI for automation tasks, such as generating SQL/DAX code for BI applications. They sometimes leverage AI tools to work more efficiently, although they acknowledge that it is often necessary to manually fine-tune the output, which in their view, can be time-consuming.

GenAI Possibilities

- Automatic Code Generation:

Respondent 2 uses GenAI to generate code for specific database objects, which helps to start programming faster. They stated:

"I have used GenAI for automation tasks such as generating SQL/DAX code for BI applications".

- Document Generation and Summarization:

GenAI can help automatically generate and summarize documents and reports. For example, it can draft requirements based on conversational input. Respondent 2 mentioned:

"AI can be used for generating and summarizing documents, such as creating requirements from conversation input".

- Error Detection and Troubleshooting:

The use of GenAI to identify and diagnose errors in code or other technical systems contributes to more efficient troubleshooting processes. Respondent 2 highlighted:

"AI has the potential to identify and resolve errors based on error codes, which can help solve problems faster and improve overall efficiency".

- Data Definition and Analysis:

AI can be used for validating and analysing data, ensuring that reports and analyses are accurate. It helps define certain terms. Respondent 2 explained:

"We often have discussions about what we are actually comparing. AI can help by defining overarching terms clearly, which can be very handy".

- Decision Support:

GenAI can analyse data and provide insights that aid in decision-making, particularly in evaluating business processes and strategies.

- Customer Interaction and Service Improvement:

GenAI can enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots.

Negative remarks

- Output Reliability:

Respondent 2 pointed out that AI-generated outputs often need manual fine-tuning, which can be time-consuming:

"Sometimes, cleaning up the code generated by AI takes more time than writing the code yourself".

- Complexity and Accuracy:

There are concerns about the complexity and accuracy of AI outputs. Respondent 2 mentioned:

"I think a lot of things still don't work perfectly, like with transcripts where you have to go back and adjust a lot yourself because the technology isn't quite there yet".

- Ethical Considerations and Data Security:

Respondent 2 expressed caution about the ethical use and security of AI:

"It's crucial to remain critical of AI output and maintain human oversight in AI processes. The ethical boundaries of AI use are also a significant concern".

- Dependence on Data Quality:

The effectiveness of AI is heavily dependent on the quality of input data. If the data fed into the AI is not accurate, the output will also be flawed:

"If the input isn't good, the output won't be good either. This is true for most things, not just AI".

- Job Displacement Concerns:

Respondent 2 expressed concerns about job displacement due to AI, although they believe that humans will adapt:

"If we are all eventually replaced by AI, we'll just have to find something else to do. Humans are inventive enough to come up with new roles".

Respondent 3

Respondent 3 has extensive experience in business intelligence and currently works as a BI consultant. Their expertise lies in bridging the gap between technical BI tools and business processes, focusing on delivering insights that help companies make better-informed decisions. Their vision of BI is that it's important to combine the entire BI package (requirements, back-end and front-end, analyses) with a helicopter view, considering various situations.

Experiences with GenAI

Respondent 3 uses GenAI to automate and improve various tasks. They have specific experience using AI for code generation and troubleshooting existing scripts.

Applications of GenAI

- Coding Assistance:

Respondent 3 uses AI tools to generate code for database management and reporting. This accelerates development and reduces errors during coding.

"So I talk in the form of a scenario, and I get code output that are technically sound. For example, if you need to create a measure in Power BI, you ask a question, and it tells you to right-click, create a new measure, and write this. "

- Error Detection: They employ AI to identify and correct problems in code, leading to more efficient troubleshooting processes.

"For example, if I have a piece of code that doesn't work, I can ask it to make it work."

- Data Visualization:

AI helps in creating and improving data visualizations and dashboards.

Quote: "You could say you need a chart, for example, and want it grouped by product."

Negative Aspects

- Job Displacement Anxiety:

Respondent 3 expresses concern about AI potentially taking over jobs.

Quote: "But if you take my job, then you are also my enemy on the other side."

- Ethical Concerns:

He worries about AI becoming too autonomous and making critical decisions independently.

Quote: "No matter how good the computing power of AI is, it should always remain under your control at all times."

- Dependence on Quality Input:

Respondent 3 emphasizes the importance of high-quality input for obtaining valuable outputs from AI.

Quote: "So we should not become complacent and happy in this regard."

- Fear of Rapid Development:

The rapid development of AI technology is seen as both an opportunity and a concern.

Quote: "On one hand, it is worrying, but on the other hand, it is good."

Other Remarks

Respondent 3 is positive about the future integration of AI in BI but cautions about the need for careful management and ethical considerations. They see AI as a tool that complements human capability, not as a replacement. R3: "If something goes wrong, I can take over control immediately, so it's under my control at all times, even though it's flying fully automatically." They emphasize the importance of managing AI applications carefully to ensure that AI technologies remain supportive and do not make autonomous decisions beyond human control. Respondent 3 stated, "If this becomes a Terminator story, I'm John Connor who will destroy AI."

Respondent 4

Respondent 4 is an experienced contractor in the IT sector, specialising in SAP Business Intelligence since the year 2000. With a background in various BI technologies and a focus on SAP BW 4/HANA and SAP databases, he has developed extensive knowledge, including OLAP and back-end systems.

Respondent 4 works as a data engineer and has worked for numerous companies over the years, applying not only technical skills but also fulfilling leadership roles as a team leader. His expertise extends to solving complex architectural issues, providing him with a holistic view of the integration of technologies within business processes. Respondent 4's extensive experience and his ability to apply advanced AI solutions enable him to advise organisations on optimising their BI strategies and processes.

GenAI Applications

- Automation of SQL Code Generation:

Respondent 4 sees significant potential in using GenAI for automatically generating SQL code to solve specific data issues. This would not only increase the efficiency of data analysis processes but also improve the accuracy of data extraction from formalised databases.

"So what I see in this respect at the moment, given the state of technology, is that maybe in 4 or 5 years it will be completely different or further expanded. But on the one hand, you have the generation of SQL to retrieve data from a formalised database."

- Advanced Data Analysis and Visualisation:

Another area where he sees potential is in using natural language processing to pose complex data analysis questions in natural language. Here, GenAI can interpret the query and generate the necessary visualisations, simplifying and accelerating interaction with BI tools.

"Another possibility I see is that once you have made data available from a large dataset and turned it into information, then you also often see, increasingly in your reporting tools, that a person can ask questions in natural language. For example, 'Give me a timeline with these revenue figures, these profit figures and compare it to last year'."

- Technical Documentation Generation:

Respondent 4 also discusses the potential of GenAI to automatically generate technical documentation from development objects. This would not only save time but also improve the consistency of documentation.

"So what I foresee is a personal frustration. I am always lax in creating technical documentation. Technical documentation can be generated from your development object with GenAI".

- Data Definition:

He sees opportunities for GenAI to function as an interactive question-and-answer system, where AI can provide detailed explanations of technical aspects, such as the origins of specific data fields in reports (data lineage).

"I can imagine GenAI functioning as a question-and-answer system, where AI provides detailed explanations of technical aspects, such as the origin of specific data fields in reports (data lineage).

Negative Points

- Dependence on Input Quality:

Quote: "It's true, if I ask a bad question to... GPT, it also gives a bad answer. I have experienced this; I can ask bad questions, but then it turns out to be less applicable. You need to go back to the question and improve it for a better answer."

- Security and Data Exposure Risks:

Quote: "There are business risks attached. Suppose you expose your business processes entirely to a

GenAI application, which then forms its own interpretation. Companies need to ask if they are willing to allow this."

- Technology Availability:

Quote: "Technology is not always available where you need it. If you work with an on-premises environment, you cannot simply connect it to a GenAI application that operates outside the company."

- Over-Reliance on AI without Adequate Oversight:

Quote: "While GenAI offers significant benefits, the quality of the output is highly dependent on the input. Poorly formulated questions can lead to inaccurate answers, requiring additional review and adjustment."

General Comments

Respondent 4 acknowledges that, while GenAI can offer significant benefits, the quality of the output is highly dependent on the input. Poorly formulated questions can lead to inaccurate answers, requiring additional review and adjustment. He warns against over-reliance on AI without adequate oversight, particularly in environments requiring strict security, such as large technology companies or businesses dealing with sensitive information.

Respondent 5

Respondent 5 is an experienced Full Stack Developer who has recently been promoted to Senior Consultant. They are actively involved in various BI projects from the presales phase to the final implementation. Their role includes implementing data products and guiding junior team members throughout the entire process.

Experiences with GenAI:

Respondent 5 has extensive experience with GenAI tools such as ChatGPT and GitHub Copilot, primarily for automating code generation. They regularly use these technologies for writing SQL and DAX, languages that are crucial in the context of Power BI.

Applications of GenAI

- Generating Code:

Respondent 5 extensively uses GenAI for generating code, particularly in SQL and DAX programming languages. This can significantly speed up the development process by providing quick solutions and examples.

Quote: "You use it almost daily for generating code."

- Information Retrieval:

GenAI is valuable for quickly retrieving specific information from various systems, making it a handy tool for developers dealing with multiple data sources.

Quote: "What I sometimes look for is to ask where I can find sales orders within that source system."

- Generating Presentations:

Quote: "I would like to use it more in a pre-sales process, for gathering requirements and generating presentations or collecting feedback."

- Gathering Feedback:

Quote: "I would like to use it more in a pre-sales process, for gathering requirements and generating presentations or collecting feedback."

- Summarizing Meetings:

Quote: "I would like to use it more in a pre-sales process, for gathering requirements and generating presentations or collecting feedback."

- Data Transformation and Modelling:

During the implementation of data platforms, GenAI can help in transforming and modelling data, ensuring a streamlined process from infrastructure setup to data integration.

Quote: "Once the infrastructure is in place, we move towards what I usually call the data structure, which involves retrieving the necessary tables and fields from the source system to transform and model them."

- Bug Fixing and Error Resolution:

GenAI tools like Copilot can provide quick summaries of potential causes for errors, which can save time compared to traditional internet searches.

Quote: "The nice thing about Copilot is that it sifts through the internet and immediately gives a summary of multiple potential causes."

Negative remarks

- Quality of Output:

The quality of the output from GenAI can sometimes be unreliable, requiring significant time for verification and correction.

Quote: "No matter how iterative it is, you can keep providing it with more information, but it can just end up leading nowhere, and you eventually have to look for another solution or think for yourself."

- Dependence on Human Input:

Effective use of GenAI requires clear and precise input from humans, which can be challenging for inexperienced users.

Quote: "If you don't know how to ask your question, it will be difficult for the system to provide a good answer."

- Risk of Over-reliance:

There's a risk that new developers may over-rely on GenAI without fully understanding the underlying principles, which can be detrimental to their skill development.

Quote: "What I see going wrong a lot in the BI world is that new people come in who want to become BI developers and they are too quick to use ChatGPT or Copilot to generate their code."

- Contextual Understanding:

GenAI lacks the nuanced understanding that human expertise provides, which is crucial in complex data environments.

Quote: "At the moment, I don't see GenAI setting up a fully functional data platform."

Other Remarks

Respondent 5 is positive about the integration of AI within the BI sector and sees significant potential for improving business processes. They emphasise that AI should be seen as a tool rather than a replacement for human effort. Respondent 5 believes that, as long as AI is managed ethically and carefully, it can support professionals to work more efficiently and effectively. They do not see AI as a threat to jobs but rather as an enhancement of employees' existing capabilities.

Appendix 4: Thematic Analysis

Theme 1: GenAI Applications		
Sub-theme	Initial Code	Quote
Code Generation	Automatic Code Generation	"I can quickly generate a DAX formula or something similar without having to construct it entirely by myself, giving me a head start and saving time in creating these formulas." (Respondent 1)
Code Generation	Automatic Code Generation	"I have used GenAI for automation tasks such as generating SQL/DAX code for BI applications." (Respondent 2)
Code Generation	Automation of SQL Code Generation	"So what I see in this respect at the moment, given the state of technology, is that maybe in 4 or 5 years it will be completely different or further expanded. But on the one hand, you have the generation of SQL to retrieve data from a formalized database." (Respondent 4)
Code Generation	Coding Assistance	"So I talk in the form of a scenario, and I get code output that are technically sound. For example, if you need to create a measure in Power BI, you ask a question, and it tells you to right-click, create a new measure, and write this." (Respondent 3)
Code Generation	Generating Code	"You use it almost daily for generating code." (Respondent 5)
Documentation and Reporting	Document Generation and Summarization	"GenAI helps me by automatically generating the documentation required for project compliance and consistency, summarizing key points from dense documents without manual effort." (Respondent 1)
Documentation and Reporting	Document Generation and Summarization	"AI can be used for generating and summarizing documents, such as creating requirements from conversation input." (Respondent 2)
Documentation and Reporting	Technical Documentation Generation	"So what I foresee is a personal frustration. I am always lax in creating technical documentation. Technical documentation can be generated from your development object with GenAI." (Respondent 4)
Documentation and Reporting	Generating Presentations	"I would like to use it more in a pre-sales process, for gathering requirements and generating presentations or collecting feedback." (Respondent 5)
Documentation and Reporting	Gathering Feedback	"I would like to use it more in a pre-sales process, for gathering requirements and generating presentations or collecting feedback." (Respondent 5)

Documentation and Reporting	Summarizing Meetings	"I would like to use it more in a pre-sales process, for gathering requirements and generating presentations or collecting feedback." (Respondent 5)
Error Handling	Error Detection and Troubleshooting	"If I run into a major error or bug, I can input it into the system, and it helps find the error for me and possibly suggest a solution, which saves a lot of time understanding and fixing these errors." (Respondent 1)
Error Handling	Error Detection and Troubleshooting	"AI has the potential to identify and resolve errors based on error codes, which can help solve problems faster and improve overall efficiency." (Respondent 2)
Error Handling	Error Detection	"For example, if I have a piece of code that doesn't work, I can ask it to make it work." (Respondent 3)
Error Handling	Bug Fixing and Error Resolution	"The nice thing about Copilot is that it sifts through the internet and immediately gives a summary of multiple potential causes." (Respondent 5)
Data Management	Data Extraction	"By using GenAI, I can extract specific values or add new fields in SQL Server, which really assists in front-end reporting through tools like Power BI." (Respondent 1)
Data Management	Data Transformation and Modelling	"Once the infrastructure is in place, we move towards what I usually call the data structure, which involves retrieving the necessary tables and fields from the source system to transform and model them." (Respondent 5)
Data Management	Data Definition	"I can imagine GenAI functioning as a question-and-answer system, where AI provides detailed explanations of technical aspects, such as the origin of specific data fields in reports (data lineage)." (Respondent 4)
Data Management	Information Retrieval	"What I sometimes look for is to ask where I can find sales orders within that source system." (Respondent 5)
Data Analysis	Data Analysis	"GenAI analyses data and provides insights that assist in decision-making, particularly in evaluating business processes and strategies." (Respondent 1)
Data Analysis	Decision Support	"GenAI can analyse data and provide insights that aid in decision-making, particularly in evaluating business processes and strategies." (Respondent 2)
Data Analysis	Advanced Data Analysis and Visualization	"Another possibility I see is that once you have made data available from a large dataset and turned it into information, then you also often see, increasingly in your reporting tools, that a person can ask questions in natural language. For example, 'Give me a timeline with these revenue figures, these profit figures and compare it to last year'." (Respondent 4)

Data Analysis	Data Visualization	"You could say you need a chart, for example, and want it grouped by product." (Respondent 3)
Customer Interaction	Customer Interaction	"GenAI can be deployed to enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots." (Respondent 1)
Customer Interaction	Customer Interaction and Service Improvement	"GenAI can enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots." (Respondent 2)

Theme 2: Concerns		
Sub-theme	Initial Code	Quote
Output Quality and Reliability	Output Reliability	"Sometimes, cleaning up the code generated by AI takes more time than writing the code yourself." (Respondent 2)
	Output Reliability	"No matter how iterative it is, you can keep providing it with more information, but it can just end up leading nowhere, and you eventually have to look for another solution or think for yourself." (Respondent 5)
	Complexity and Accuracy	"I think a lot of things still don't work perfectly, like with transcripts where you have to go back and adjust a lot yourself because the technology isn't quite there yet." (Respondent 2)
	Quality of Output	"No matter how iterative it is, you can keep providing it with more information, but it can just end up leading nowhere, and you eventually have to look for another solution or

		think for yourself." (Respondent 5)
Data Quality and Input	Dependence on Data Quality	"If the input isn't good, the output won't be good either. This is true for most things, not just AI." (Respondent 2)
	Dependence on Data Quality	"While GenAI offers significant benefits, the quality of the output is highly dependent on the input. Poorly formulated questions can lead to inaccurate answers, requiring additional review and adjustment." (Respondent 4)
	Dependence on Input Quality	"It's true, if I ask a bad question to... GPT, it also gives a bad answer. I have experienced this; I can ask bad questions, but then it turns out to be less applicable. You need to go back to the question and improve it for a better answer." (Respondent 4)
	Dependence on Input	"GenAI can offer significant benefits, but the quality of the output is highly dependent on the input." (Respondent 4)
	Dependence on Human Input	"If you don't know how to ask your question, it will be difficult for the system to provide a good answer." (Respondent 5)
Ethical and Security Concerns	Ethical Considerations and Data Security	"It's crucial to remain critical of AI output and maintain human oversight in AI processes. The ethical boundaries of AI use are also a significant concern." (Respondent 2)
	Security and Data Exposure Risks	"There are business risks attached. Suppose you expose your business processes entirely to a GenAI application, which then forms its own interpretation. Companies need to ask if they are willing to allow this." (Respondent 4)
	Over-Reliance on AI without Adequate Oversight	"While GenAI offers significant benefits, the quality of the output is highly dependent on the input. Poorly formulated questions can lead to inaccurate answers, requiring additional review and adjustment." (Respondent 4)
	Ethical Concerns	"No matter how good the computing power of AI is, it should always remain under your control at all times." (Respondent 3)
Job Security and Roles	Job Displacement Concerns	"If we are all eventually replaced by AI, we'll just have to find something else to do. Humans are inventive enough to come up with new roles." (Respondent 2)
	Job Displacement Anxiety	"But if you take my job, then you are also my enemy on the other side." (Respondent 3)
Over-Reliance	Risk of Over-reliance	"What I see going wrong a lot in the BI world is that new people come in who want to become BI developers and they are too quick to use ChatGPT or Copilot to generate their code." (Respondent 5)

Technical Limitations	Technology Availability	"Technology is not always available where you need it. If you work with an on-premises environment, you cannot simply connect it to a GenAI application that operates outside the company." (Respondent 4)
	Contextual Understanding	"At the moment, I don't see GenAI setting up a fully functional data platform." (Respondent 5)

Theme 3: Other Remarks		
Sub-theme	Initial Code	Quote
Other Remarks	Human Inventiveness	"Humans are inventive enough to come up with new roles if AI displaces current jobs." (Respondent 2)
Other Remarks	Integration and Ethics	"Respondent 1 is optimistic about the integration of AI in BI, emphasizing the importance of ethical considerations and data security." (Respondent 1)
Other Remarks	Support and Not Replacement	"AI is a valuable tool that can support and accelerate human tasks, especially repetitive ones, but it is not a replacement for human expertise." (Respondent 1)
Other Remarks	Support and Not Replacement	"Companies need to ensure that AI technologies remain supportive and do not make autonomous decisions beyond human control." (Respondent 3)
Other Remarks	Support and Not Replacement	"If something goes wrong, I can take over control immediately, so it's under my control at all times, even though it's flying fully automatically." (Respondent 3)
Other Remarks	Support and Not Replacement	"They emphasize the importance of managing AI applications carefully to ensure that AI technologies remain supportive and do not make autonomous decisions beyond human control." (Respondent 3)
Other Remarks	Support and Not Replacement	"They see AI as a tool that complements human capability, not as a replacement." (Respondent 3)

Appendix 5: Validation E-Mail with Results

Goedemiddag,

Hierbij meer informatie over de validatie.

Samenvatting van de thesis:

Mijn onderzoek richt zich op het onderzoeken van de invloed van Generative AI (GenAI) op de Business Intelligence projectcyclus. Hoewel veel onderzoeken de voordelen van GenAI benadrukken, is er weinig bekend over hoe deze technologie daadwerkelijk kan worden toegepast binnen BI-projecten. Het doel van mijn exploratief onderzoek is om op basis van bestaande literatuur inzicht te krijgen in de capaciteiten van GenAI en de toepassingsmogelijkheden en zorgen zoals benoemd door geïnterviewden binnen de afdeling Business and Analytics van delaware Netherlands.

De belangrijkste punten van mijn onderzoek zijn:

- GenAI kan de efficiëntie en besluitvormingscapaciteit in BI-projecten verbeteren.
- De huidige onderzoeksfocus ligt op het verzamelen van inzichten uit de literatuur en interviews met BI Consultants binnen de afdeling.
- Er wordt een extra controleslag uitgevoerd door experts om de bevindingen te valideren en eventuele ontbrekende toepassingen te identificeren.

Capaciteiten van GenAI uit literatuur:

1. Kenniscreatie: GenAI kan nieuwe ideeën, inzichten of data bedenken die voorheen niet bestonden. Stel je het voor als een brainstormpartner die enorme hoeveelheden informatie kan analyseren en nieuwe concepten, oplossingen of innovaties kan voorstellen
2. Kennisopslag en -terugwinning: Deze capaciteit gaat over hoe GenAI kan helpen informatie georganiseerd te houden en gemakkelijk vindbaar te maken wanneer je het nodig hebt. Denk aan een superslimme bibliothecaris die niet alleen weet waar elk stukje informatie is opgeslagen, maar ook complexe vragen kan begrijpen en interpreteren om precies te vinden wat je zoekt. Dus als je op zoek bent naar specifieke data in duizenden documenten, kan GenAI snel de meest relevante informatie voor je ophalen.
3. Kennisdeling: GenAI faciliteert het delen van kennis op een manier die is afgestemd op de behoeften van de gebruiker.

Het is als een systeem dat weet wat je moet weten, hoe je het beste leert, en je de informatie op de meest effectieve manier geeft. Of het nu gaat om visuele hulpmiddelen, vereenvoudigde uitleg of interactieve sessies, GenAI kan zich aanpassen om de meest geschikte leerervaring te bieden. Deze capaciteit is

vooral nuttig in onderwijsomgevingen of voor professionele ontwikkeling binnen organisaties.

4. Kennisapplicatie: Dit verwijst naar GenAI's vermogen om informatie in de praktijk te brengen om problemen op te lossen of processen te verbeteren. Stel je een hulpmiddel voor dat je niet alleen advies geeft over hoe je je werk beter kunt doen, maar ook bepaalde taken kan automatiseren om je efficiënter te maken. Bijvoorbeeld, het kan een beginnende programmeur helpen om hoogwaardige code te schrijven door verbeteringen voor te stellen of routinematige onderdelen van het programmeerproces te automatiseren. In een zakelijke context kan het data analyseren om nauwkeurige voorspellingen te doen die helpen bij de besluitvorming.

Bijgevoegd in de mail staan in de tabellen van de resultaten van de interviews met een korte uitleg. Tabellen 3,4, 9 en 11 zijn het belangrijkste voor de meeting. De overige tabellen bevatten de quotes van de geïnterviewden dat als bewijs dient. Graag zou ik in de meeting willen bespreken of je het hiermee eens bent, en nog potentiële aanvullingen hebt of opmerkingen hebt.

Best regards - Vriendelijke groeten
Dennis Wartenberg

Interview Results

4.1 Respondent Overview

Table 1 presents a summary of the roles and responsibilities of five respondents in the field of Business Intelligence, highlighting their varying levels of experience and specific functions within their organisations. This information is crucial as it provides a contextual understanding of the diverse expertise and responsibilities of each respondent.

Respondent	Function	Years of Experience	Summary of Responsibilities
1	Data Analyst	2,5	Involved in BI projects within Delaware, bridging the gap between technical terms and business needs, gathering requirements, presenting KPIs, and handling backend tasks.
2	SAP-BI Consultant	2	Works on building and adapting BI reports, validating analyses, and providing aftercare services.
3	BI Consultant	9	Bridges the gap between technical BI tools and business processes, delivering insights for better decision-making, and combining requirements, backend, and frontend analyses.
4	Senior BI-Consultant	24	Specializes in SAP BI, solves complex architectural issues, and advises on optimizing BI strategies and processes, and guides junior team members.
5	Senior BI-Consultant	7	Involved in various BI projects from presales to implementation, implements data products, and guides junior team members.

Table 7 - Overview of Respondents

4.2 Tasks

After the conducted semi-structured interviews, a report was constructed for each respondent that described the key points of the interview, including answers to the agenda points shown in Appendix 2, supported by relevant quotes. These reports, based on the transcriptions, are shown in Appendix 3.

Task	Description	R1	R2	R3	R4	R5	Total
Automatic Code Generation	Generating DAX formulas or SQL queries quickly to save time and simplify programming.	X	X	X	X	X	5
Error Detection and Troubleshooting	Identifying and diagnosing errors in code or technical systems, providing summaries of potential causes for errors.	X	X	X		X	4
Document Generation and Summarization	Automatically generating and summarizing documents, reports, and technical documentation.	X	X		X		3
Data Analysis	Analysing data to provide insights that aid decision-making and evaluating business processes and strategies.	X	X		X		3
Data Definition and Quality Assurance	Validating and analysing data, defining overarching terms, and providing detailed explanations of technical aspects.		X		X		2
Data Extractions	Extracting specific information from large datasets or documents.	X				X	2
Data Visualization	Creating and improving data visualizations and dashboards, using natural language processing to generate visualizations.			X	X		2
Customer Interaction and Service Improvement	Enhancing customer service with automated systems like chatbots.	X	X				2
Data Transformation and Modelling	Transforming and modelling data during data platform implementation.					X	1
Generating Presentations	Creating presentations to support business processes.					X	1
Gathering Feedback	Collecting feedback from various sources.					X	1
Information Retrieval	Quickly retrieving specific information from various systems.					X	1
Summarizing Meetings	Summarizing key points from meetings.					X	1

Table 8 - Mentioned Tasks

Table 3 shows a list of the tasks that generative AI can perform or support, derived from the interview

reports of the respondents. Each task listed is associated with a description of how GenAI contributes to that particular function within the context of Business Intelligence and related areas. The table also identifies which respondents mentioned each task with an ‘x’, while using numbers to maintain their anonymity. This format helps to illustrate the range of applications that professionals in the field believe GenAI can support—from automating code generation to enhancing customer interactions and supporting decision-making processes. The inclusion of respondents next to each task highlights the diversity of tasks among the respondents, as well as areas of consensus where multiple respondents recognize the same benefits of GenAI. By organizing this information into a table, the data is made accessible for quick reference, offering a clear view of how GenAI technologies are perceived to impact various aspects of business intelligence and IT operations. A ‘total’ column is included to illustrate the popularity of each task among the respondents.

4.2.1 Task Alignment

Based on the conducted literature study, the capabilities were defined into four main areas: Knowledge Creation, Knowledge Storage and Retrieval, Knowledge Sharing, and Knowledge Application. These categories help us understand how each task supported by Generative AI aligns with these capabilities. Table 4 shows how the tasks correspond to each of these capabilities, followed by an explanation for each task's alignment, based on the explanation of the capabilities in the literature study and the suggestions from the respondents. Finally, a total is included which indicates the frequency of each capability.

Task	Knowledge Creation	Knowledge Storage and Retrieval	Knowledge Sharing	Knowledge Application
Automatic Code Generation	X			X
Error Detection and Troubleshooting	X			X
Document Generation and Summarization	X	X	X	
Data Analysis	X	X		X
Data Definition and Quality Assurance	X	X		
Data Extraction	X	X		
Data Visualization	X			X
Customer Interaction and Service Improvement	X		X	X
Data Transformation and Modelling	X			X
Generating Presentations	X		X	
Gathering Feedback	X		X	
Information Retrieval	X	X		
Summarizing Meetings	X	X	X	
Total	13	7	5	6

Table 9 - Aligning tasks to GenAI Capabilities

Explanation

Automatic Code Generation fits within *knowledge creation* as it synthesizes existing data to produce new code efficiently, streamlining programming tasks and reducing time investment. It also aligns with *knowledge application*, enhancing productivity by enabling quick and accurate code generation.

Error Detection and Troubleshooting supports *knowledge creation* by identifying patterns and anomalies in code, facilitating innovative problem-solving. It also fits within *knowledge application* by improving efficiency in troubleshooting processes, thus reducing downtime and errors.

Document Generation and Summarization aligns with *knowledge creation* by generating new content from existing data. It supports *knowledge storage and retrieval* by organizing information into accessible documents and summaries. Additionally, it aids *knowledge sharing* by distributing well-organized information within the organisation.

Data Analysis is integral to *knowledge creation* as it processes and interprets data to generate insights. It also supports *knowledge storage and retrieval* by organizing data into actionable insights and fits within *knowledge application* by informing decision-making processes.

Data Definition and Quality Assurance aligns with *knowledge creation* by ensuring accurate definitions and data quality, which are foundational for generating new insights. It also supports *knowledge storage and retrieval* by maintaining high-quality data standards.

Data Extraction fits within *knowledge creation* as it extracts meaningful data from large datasets, uncovering hidden patterns. It also supports *knowledge storage and retrieval* by organizing and making data accessible for further use.

Data Visualization aligns with *knowledge creation* by presenting data in new, insightful ways. It supports *knowledge application* by enhancing understanding and interpretation through visual representations.

Customer Interaction and Service Improvement fits within *knowledge creation* by generating new, responsive content for customer interactions. It aids *knowledge sharing* by disseminating information effectively and supports *knowledge application* by improving service efficiency and customer satisfaction.

Data Transformation and Modelling aligns with *knowledge creation* by transforming raw data into structured models, facilitating new insights. It supports *knowledge application* by improving data handling and integration processes.

Generating Presentations fits within *knowledge creation* by producing new content for presentations. It aids *knowledge sharing* by effectively communicating information within the organisation.

Gathering Feedback supports *knowledge creation* by collecting and synthesizing feedback into actionable insights. It aligns with *knowledge sharing* by distributing feedback throughout the organisation.

Information Retrieval fits within *knowledge creation* by uncovering specific information from vast datasets. It supports *knowledge storage and retrieval* by enhancing access to relevant data.

Summarizing Meetings aligns with *knowledge creation* by generating concise summaries of discussions. It supports *knowledge storage and retrieval* by organizing meeting information into easily accessible formats and aids *knowledge sharing* by distributing summaries within the organisation.

4.3 Quotes

Each table categorizes tasks linked to GenAI capabilities, as well as the hypotheses, as identified in the literature study. For every task, relevant quotes from the respondents are showed, each marked with a "+" or "-" to signify a positive effect or negative effect. These quotes demonstrate real-world uses and benefits of GenAI, offering a clear picture of its impact across various professional settings. This organized presentation ensures a concise yet comprehensive view of how GenAI capabilities are practically applied and valued by industry professionals.

4.3.1 H1: Knowledge Creation enhances the BI project cycle.

Table 5 presents quotes from respondents that align with the capability of knowledge creation in GenAI. Each task is supported by relevant quotes, indicating which respondent mentioned them. This table demonstrates how GenAI can enhance knowledge creation by generating new content, insights, and innovations across various tasks.

Task	Quote	Respondent	Influence
Automatic Code Generation	"I can quickly generate a DAX formula or something similar without having to construct it entirely by myself."	R1	+
	"I have used generative AI for automation tasks such as generating SQL/DAX code for BI applications."	R2	+
	"So I talk in the form of a scenario and I get code output that are technically sound."	R3	+
	"So what I see in this respect at the moment given the state of technology is that maybe in 4 or 5 years it will be different or further expanded. But on the one hand you have the generation of SQL to retrieve data from a formalized database."	R4	+
	"You use it almost daily for generating code."	R5	+
Error Detection and Troubleshooting	"If I run into a major error or bug, I can input it into the system and it helps find the error for me and possibly suggest a solution."	R1	+
	"AI has the potential to identify and resolve errors based on error codes which can help solve problems faster and improve overall efficiency."	R2	+
	"For example, if I have a piece of code that doesn't work, I can ask it to make it work."	R3	+
	"The nice thing about Copilot is that it sifts through the internet and immediately gives a summary of multiple potential causes."	R5	+
Document Generation and Summarization	"GenAI helps me by automatically generating the documentation required for project compliance and consistency, summarizing key points from dense documents without manual effort."	R1	+

	"AI can be used for generating and summarizing documents such as creating requirements from conversation input."	R2	+
	"So what I foresee is a personal frustration. I am always lax in creating technical documentation. Technical documentation can be generated from your development object with GenAI."	R4	+
Data Analysis	"GenAI analyses data and provides insights that assist in decision-making, particularly in evaluating business processes and strategies."	R1	+
	"We often have discussions about what we are actually comparing. AI can help by defining overarching terms clearly which can be very handy."	R2	+
	"Another possibility I see is that once you have made data available from a large dataset and turned it into information then you also often see increasingly in your reporting tools that a person can ask questions in natural language."	R4	+
Data Definition and Quality Assurance	"We often have discussions about what we are actually comparing. AI can help by defining overarching terms clearly which can be very handy."	R2	+
	"I can imagine GenAI functioning as a question-and-answer system where AI provides detailed explanations of technical aspects such as the origin of specific data fields in reports (data lineage)."	R4	+
Data Extraction	"By using GenAI I can extract specific values or add new fields in SQL Server which really assists in front-end reporting through tools like Power BI."	R1	+
	"What I sometimes look for is to ask where I can find sales orders within that source system."	R5	+
Data Visualization	"You could say you need a chart, for example, and want it grouped by product."	R3	+
	"Another possibility I see is that once you have made data available from a large dataset and turned it into information then you also often see increasingly in your reporting tools that a person can ask questions in natural language."	R4	+
Customer Interaction and Service Improvement	"GenAI can be deployed to enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots."	R1	+
	"GenAI can enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots."	R2	+
Data Transformation and Modelling	"Once the infrastructure is in place, we move towards what I usually call the data structure which involves retrieving the necessary tables and fields from the source system to transform and model them."	R5	+
Generating Presentations	"I would like to use it more in a pre-sales process for gathering requirements and generating presentations or collecting feedback."	R5	+
Gathering Feedback	"I would like to use it more in a pre-sales process for gathering requirements and generating presentations or collecting feedback."	R5	+
Information Retrieval	"What I sometimes look for is to ask where I can find sales orders within that source system."	R5	+
Summarizing Meetings	"I would like to use it more in a pre-sales process for gathering requirements and generating presentations or collecting feedback."	R5	+

Table 10 - Quotes for Knowledge Creation

4.3.2 H2: Knowledge Sharing enhances the BI project cycle.

Table 6 lists quotes from respondents that relate to the capability of knowledge sharing in GenAI. It covers tasks where GenAI facilitates the distribution of information and collaboration among individuals. This table showcases how GenAI can enhance communication and learning by making information more accessible and understandable.

Task	Quote	Respondent	Influence
Document Generation and Summarization	"GenAI helps me by automatically generating the documentation required for project compliance and consistency, summarizing key points from dense documents without manual effort."	R1	+
	"AI can be used for generating and summarizing documents such as creating requirements from conversation input."	R2	+
	"So what I foresee is a personal frustration. I am always lax in creating technical documentation. Technical documentation can be generated from your development object with GenAI."	R4	+
Customer Interaction and Service Improvement	"GenAI can be deployed to enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots."	R1	+
	"GenAI can enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots."	R2	+
Generating Presentations	"I would like to use it more in a pre-sales process for gathering requirements and generating presentations or collecting feedback."	R5	+
Gathering Feedback	"I would like to use it more in a pre-sales process for gathering requirements and generating presentations or collecting feedback."	R5	+
Summarizing Meetings	"I would like to use it more in a pre-sales process for gathering requirements and generating presentations or collecting feedback."	R5	+

Table 11 - Quotes for Knowledge Sharing

4.3.3 H3: Knowledge Storage and Retrieval enhances the BI project cycle.

Table 7 summarizes quotes from respondents related to the capability of knowledge storage and retrieval in GenAI. It includes tasks that benefit from GenAI's ability to efficiently store, organize, and retrieve information. The table highlights the potential of GenAI to improve access to and management of data within organisations.

Task	Quote	Respondent	Influence
Document Generation and Summarization	"GenAI helps me by automatically generating the documentation required for project compliance and consistency, summarizing key points from dense documents without manual effort."	R1	+
	"AI can be used for generating and summarizing documents such as creating requirements from conversation input."	R2	+

	"So what I foresee is a personal frustration. I am always lax in creating technical documentation. Technical documentation can be generated from your development object with GenAI."	R4	+
Data Analysis	"GenAI analyses data and provides insights that assist in decision-making, particularly in evaluating business processes and strategies."	R1	+
	"We often have discussions about what we are actually comparing. AI can help by defining overarching terms clearly which can be very handy."	R2	+
	"Another possibility I see is that once you have made data available from a large dataset and turned it into information then you also often see increasingly in your reporting tools that a person can ask questions in natural language."	R4	+
Data Definition and Quality Assurance	"We often have discussions about what we are actually comparing. AI can help by defining overarching terms clearly which can be very handy."	R2	+
	"I can imagine GenAI functioning as a question-and-answer system where AI provides detailed explanations of technical aspects such as the origin of specific data fields in reports (data lineage)."	R4	+
Data Extraction	"By using GenAI I can extract specific values or add new fields in SQL Server which really assists in front-end reporting through tools like Power BI."	R1	+
	"What I sometimes look for is to ask where I can find sales orders within that source system."	R5	+
Information Retrieval	"What I sometimes look for is to ask where I can find sales orders within that source system."	R5	+
Summarizing Meetings	"I would like to use it more in a pre-sales process for gathering requirements and generating presentations or collecting feedback."	R5	+

Table 12 - Quotes for Knowledge Storage and Retrieval

4.3.4 H4: Knowledge Application enhances the BI project cycle.

Table 8 compiles quotes from respondents associated with the capability of knowledge application in GenAI. It includes tasks that demonstrate how GenAI can be applied to practical scenarios, improving efficiency and decision-making. This table underscores the practical benefits of GenAI in various business intelligence operations.

Task	Quote	Respondent	Influence
Automatic Code Generation	"I can quickly generate a DAX formula or something similar without having to construct it entirely by myself."	R1	+
	"I have used generative AI for automation tasks such as generating SQL/DAX code for BI applications."	R2	+
	"So I talk in the form of a scenario and I get code output that are technically sound."	R3	+
	"So what I see in this respect at the moment given the state of technology is that maybe in 4 or 5 years it will be different or further expanded. But on the one hand you have the generation of SQL to retrieve data from a formalized	R4	+

	database."		
	"You use it almost daily for generating code."	R5	+
Error Detection and Troubleshooting	"If I run into a major error or bug, I can input it into the system and it helps find the error for me and possibly suggest a solution."	R1	+
	"AI has the potential to identify and resolve errors based on error codes which can help solve problems faster and improve overall efficiency."	R2	+
	"For example, if I have a piece of code that doesn't work, I can ask it to make it work."	R3	+
	"The nice thing about Copilot is that it sifts through the internet and immediately gives a summary of multiple potential causes."	R5	+
Data Analysis	"GenAI analyses data and provides insights that assist in decision-making, particularly in evaluating business processes and strategies."	R1	+
	"We often have discussions about what we are actually comparing. GenAI can help by defining overarching terms clearly which can be very handy."	R2	+
	"Another possibility I see is that once you have made data available from a large dataset and turned it into information then you also often see increasingly in your reporting tools that a person can ask questions in natural language."	R4	+
Data Visualization	"You could say you need a chart, for example, and want it grouped by product."	R3	+
	"Another possibility I see is that once you have made data available from a large dataset and turned it into information then you also often see increasingly in your reporting tools that a person can ask questions in natural language."	R4	+
Customer Interaction and Service Improvement	"GenAI can be deployed to enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots."	R1	+
	"GenAI can enhance customer service by responding to customer inquiries more quickly and accurately, possibly through automated systems like chatbots."	R2	+
Data Transformation and Modelling	"Once the infrastructure is in place, we move towards what I usually call the data structure which involves retrieving the necessary tables and fields from the source system to transform and model them."	R5	+

Table 13 - Quotes for Knowledge Application

4.4 Concerns and Other Remarks

Besides the positive impacts mentioned in 4.2, which highlighted tasks that could be supported by GenAI, the respondents also indicated concerns about utilizing GenAI in general. This subchapter will show these concerns and remarks.

4.3.1 Concerns

Table 9 summarizes the concerns regarding the use of GenAI, as indicated by the respondents. The table lists each concern, provides a brief description, and indicates which respondents mentioned each concern.

Concern	Description	R1	R2	R3	R4	R5
Output Reliability	Issues with GenAI-generated outputs requiring significant time for verification and correction.		X			X
Complexity and Accuracy	Concerns about the complexity and accuracy of GenAI outputs.		X			
Dependence on Data Quality	The quality of GenAI output is heavily dependent on the quality of the input data.		X			
Dependence on Quality Input	High-quality input is crucial for valuable GenAI outputs; poorly formulated questions lead to poor answers.			X	X	
Ethical Considerations and Data Security	Concerns about ethical use, data security, and the need for human oversight in GenAI.		X		X	
Job Displacement	Concerns and Anxiety about job displacement due to GenAI adoption.		X	X		
Fear of Rapid Development	Worries about the rapid development of GenAI technology.			X		
Over-Reliance on GenAI without Adequate Oversight	Risks of over-relying on GenAI without sufficient human oversight.				X	

Table 14 - Concerns Across Respondents

Table 10 presents the specific concerns raised by respondents regarding the use of GenAI. Each concern is supported by direct quotes from the interviewees, highlighting various issues such as output reliability, complexity and accuracy, dependence on data quality, ethical considerations, data security, job displacement, rapid AI development, and the risks of over-relying on AI without sufficient human oversight. This table underscores the potential challenges and areas of caution that need to be addressed for effective and ethical implementation of GenAI technologies.

Concern	Quote	Respondent	Influence
Output Reliability	"Sometimes cleaning up the code generated by AI takes more time than writing the code yourself."	R2	-
	"No matter how iterative it is, you can keep providing it with more information, but it can just end up leading nowhere and you eventually have to look for another solution or think for yourself."	R5	-
Complexity and Accuracy	"I think a lot of things still don't work perfectly, like with transcripts where you have to go back and adjust a lot yourself because the technology isn't quite there yet."	R2	-

Dependence on Data Quality	"If the input isn't good, the output won't be good either. This is true for most things, not just AI."	R2	-
Dependence on Quality Input	"So we should not become complacent and happy in this regard."	R3	-
	"It's true if I ask a bad question to... GPT, it also gives a bad answer. I have experienced this; I can ask bad questions but then it turns out to be less applicable. You need to go back to the question and improve it for a better answer."	R4	-
Ethical Considerations and Data Security	"It's crucial to remain critical of AI output and maintain human oversight in AI processes. The ethical boundaries of AI use are also a significant concern."	R2	-
	"There are business risks attached. Suppose you expose your business processes entirely to a GenAI application which then forms its own interpretation. Companies need to ask if they are willing to allow this."	R4	-
Job Displacement Concerns	"If we are all eventually replaced by AI, we'll just have to find something else to do. Humans are inventive enough to come up with new roles."	R2	-
Job Displacement Anxiety	"But if you take my job then you are also my enemy on the other side."	R3	-
Fear of Rapid Development	"On one hand it is worrying but on the other hand it is good."	R3	-
Over-Reliance on AI without Adequate Oversight	"While GenAI offers significant benefits, the quality of the output is highly dependent on the input. Poorly formulated questions can lead to inaccurate answers requiring additional review and adjustment."	R4	-

Table 15 - Quotes for Concerns

4.3.2 Other Remarks

Table 11 summarizes the remarks regarding the use of GenAI, as indicated by the respondents. The table lists each remark, provides a brief description, and indicates which respondents mentioned each remark.

Remark	Description	R1	R2	R3	R4	R5
Optimism with Ethical Concerns	Optimism about GenAI integration with emphasis on ethical considerations and data security.	X		X	X	X
GenAI as a Tool, Not Replacement	Belief that GenAI complements human capability but should not replace human effort.			X		X
Importance of High-Quality Input	Emphasis on the need for high-quality input for valuable GenAI outputs.			X	X	
Managing GenAI Carefully	The need for careful management to ensure GenAI technologies remain supportive and do not make autonomous decisions.			X		

Table 16 - Other Remarks across Respondents

Table 12 shows additional remarks from respondents about the use of GenAI. This table provides a comprehensive view of the respondents' perspectives on GenAI, highlighting both the opportunities and considerations for its successful deployment.

Remark	Quote	Respondents
Optimism with Ethical Concerns	"AI is a valuable tool that can support and accelerate human tasks, especially repetitive ones, but it is not a replacement for human expertise."	R1
	"It's crucial to remain critical of AI output and maintain human oversight in AI processes. The ethical boundaries of AI use are also a significant concern."	R2
	"No matter how good the computing power of AI is, it should always remain under your control at all times."	R3
	"While GenAI offers significant benefits, the quality of the output is highly dependent on the input. Poorly formulated questions can lead to inaccurate answers requiring additional review and adjustment."	R4
AI as a Tool, Not Replacement	"AI complements human capability, not as a replacement. Emphasizes the importance of managing AI applications carefully to ensure that AI technologies remain supportive and do not make autonomous decisions beyond human control."	R3
	"AI should be seen as a tool rather than a replacement for human effort."	R5
Importance of High-Quality Input	"Emphasis on the need for high-quality input for valuable AI outputs."	R3
	"The quality of the output is highly dependent on the input."	R4
Managing AI Carefully	"The need for careful management to ensure AI technologies remain supportive and do not make autonomous decisions."	R3
	"Careful management and ethical considerations are crucial."	R4
Positive Integration	"Positive about the integration of AI within the BI sector and sees significant potential for improving business processes."	R5
	"AI can support professionals to work more efficiently and effectively."	R5

Table 17 - Quotes for Remarks

Appendix 6: Notes from Validation Sessions

Expert 1 Notes:

- **Relevance and Accuracy Confirmation:** confirms the findings' relevance and accuracy, specifically noting the widespread use of code generation tools and common error detection issues.
- **Quality of Outputs:** Emphasizes the need for high-quality outputs from document generation tools to minimize revisions.
- **Definitions and Quality Assurance:** Clarifies the importance of understanding technical aspects for maintaining document quality.
- **Data Visualization:** Acknowledges the potential of data visualization to enhance data presentation.
- **AI Tools Usefulness:** Observes that initial responses to AI tools are often the most accurate, with perceptions evolving over time.
- **Varying Perspectives:** Notes the varying perspectives of respondents regarding AI tools' usefulness and application.
- **Feedback on Findings:** Suggests splitting or joining findings into more coherent themes to enhance clarity and utility.
- **Data Security Concerns:** Raises concerns about handling sensitive information and the potential for job displacement due to AI tools.
- **Complexity and Accuracy of AI Outputs:** Highlights the need for attention to AI output complexity and accuracy to ensure reliability.
- **Next Steps:** Agrees on refining task descriptions and consolidating and splitting related sub-themes for better clarity. These revisions are to be integrated into Chapter 4 of the thesis.

Expert 2 Notes:

- **Validation of Findings:** Expert 2 confirms the relevance and accuracy of the results.
- **Impact of AI Tools:** Discusses the potential of AI tools in improving efficiency and productivity.
- **User Experience:** Highlights the importance of user-friendly interfaces for AI tools to enhance adoption.
- **Ethical Considerations:** Emphasizes the need to address ethical concerns related to AI, including bias and transparency.
- **Training and Education:** Suggests the importance of training and education to ensure users understand AI capabilities and limitations.
- **Integration with Existing Systems:** Discusses challenges and strategies for integrating AI tools with existing systems and workflows.

- **Long-term Implications:** Considers the long-term implications of AI adoption, including workforce changes and skill requirements.
- **Recommendations:** Provides recommendations for future research and development to address identified gaps and challenges.