UNIVERSITY OF TWENTE.

Faculty of Behavioral, Management & Social Sciences (BMS)

Master thesis Master of Science, Business Administration Digital Business & Analytics

The role of GenAI in data analysis for Dutch SMEs

Author:	Thijs Lenting
1 st supervisor:	prof Dr.Ir. A.A.M.Spil
2 nd supervisor:	prof Dr. M.L. Ehrenhard
Associated organization:	Mount Data B.V.
External supervisor:	M. Gerritsen
Date:	16-04-2025

Abstract

In the continuously evolving data analysis environment, Small and Medium-sized Enterprises (SMEs) face many challenges, mainly compared to bigger companies. Alongside this, the rise of AI, specifically GenAI, has the potential to drive significant changes in how business operates. The existing literature lacks a comprehensive overview of the use of data analysis and the role of GenAI within SMEs. Therefore, this article addresses how GenAI can support data analysis for SMEs. The study proposes a method of semi-structured interviews, conducted within SMEs in the Dutch production and trade sector and creates insights into the current use of data analysis, how different data analysis dimensions influence this, and goes into how GenAI can support the different data analysis levels.

The results show most of the companies are in the middle phase of data analysis, between diagnostic and predictive analysis. Most of the SMEs do have time, knowledge and/or capacity constraints to progress further, something that GenAI and consultancy can both support, although GenAI will reduce the need for consultancy. GenAI is a promising technology and proposes interesting cases like coding assistance, and GenAI as a creative assistant, which could partially allocate time, capacity and knowledge constraints. Where companies in the beginning phase of data analysis could mainly resist on coding and creative assistance, further on integration into systems and the use for efficiency purposes becomes more crucial. This changes the way how consultancy firms work and need to adapt their services.

Concluding, SMEs could use GenAI to progress further within data analysis, but need to be cautious and don't rely blindly on the output GenAI provides. The article provides a model that illustrates how GenAI could be used within companies possessing distinct phases of data analysis. These results have an impact on both theory and practice and have implications for both companies and consultancy firms.

Keywords

Data analysis, SMEs, GenAI, descriptive analysis, diagnostic analysis, predictive analysis, and prescriptive analysis.

Table of content

Abstract		2
1. Intro	duction	6
1.1	Introduction	6
1.2	Associated organization and demarcation	7
1.3	Thesis outline	8
2. Liter	ature review	9
2.1	Used method for literature review	9
2.2	Introduction to data analysis	12
2.3	Data Analysis and GenAI	13
Desc	riptive analysis	13
Diag	nostic analysis	13
Pred	ictive analysis	14
Prese	criptive analysis	14
Gene	erative AI	15
2.4	Dimensions of Data Analysis	18
2.5	Literature conclusion	19
3. Meth	10dology	21
3.1	Research design	21
3.2	Participant selection	21
3.3	Data collection	22
3.4	Data analysis	22
4. Resu	llts	23
4.1	Data analysis dimensions:	23
4.2	Levels of data analysis:	24
4.3	GenAI	25
5. Anal	ysis	26
6. Conclu	sion and discussion	30
6.1 Dis	cussion	30
6.2 Co	nclusion	31
6.3 Lin	nitations	32
6.4 Fur	ther research	32
Reference	25	33
Appendix		38
Append	dix A: Articles literature review	38
Append	dix B: Interview questions	41
Append	dix C: Full list of interview attendees	44

Figures

Figure 1, Different kinds of data analysis, value versus complexity, based on (Balali et al., 2020)	. 12
Figure 2, Different articles based on different subjects presented	. 20
Figure 3, Interview framework	. 21
Figure 4, Data analysis level of interviewed companies.	. 27
Figure 5, Levels of data analysis and relation with GenAI and data dimensions	. 29
Figure 6, Data structure	. 44
Figure 7, Illustrative quotes for the first-order concepts.	. 45
Figure 8, ChatGPT 4.0 suggestions for descriptive analysis.	. 49
Figure 9, Adjusted prompts based on the principles of Giray (2023)	. 50
Figure 10, Monthly sales trend	. 51
Figure 11, Interactive chart with monthly sales trends	. 51
Figure 12, Total number of sales per state	. 52
Figure 13, Total number of sales per state, x-axis changed	. 52
Figure 14, Top 10 number of states.	. 53
Figure 15, Diagnostic analysis, table of cancellation rates by category	. 54
Figure 16, Diagnostic analysis, visualization of cancellation rates by category	. 54
Figure 17, Diagnostic analysis, visualization of cancellation rates by category	. 55
Figure 18, Analysis code used for visualization	. 56
Figure 19, Forecast, predicted future sales by category	. 57
Figure 20, Prediction of cancellation probabilities	. 58
Figure 21, Growth opportunities for revenue.	. 59
Figure 22, Visualization, Growth opportunities for revenue.	. 60

Tables

Table 1, Article selection.	11
Table 2, Literature review articles reflected on the table of Inala (2024)	17
Table 3, Five common dimensions, directly extracted from Marohn & Li (2024)	18
Table 4, Different dimension levels (Hausladen & Schosser, 2019)	19
Table 5, Classification of different cases.	26
Table 6, Data analysis literature.	38
Table 7, Data analysis maturity literature	39
Table 8, Generative AI literature	40
Table 9, Overview of possibilities to deploy GenAI within different levels of data analysis	47

1. Introduction

1.1 Introduction

In this current era of big data, data-driven analysis is the way to go, mainly within big companies across logistics, marketing, IT and the manufacturing sector (McAleer et al., 2021). The digital transformation age provides several opportunities in data management and technologies that have changed business aspects, such as finance, accounting, commerce, marketing, command, and control. Data analysis could evaluate business strengths and weaknesses, track progress, and align business objectives and processes. Examples are predicting market opportunities, analyzing consumer preferences, and optimizing operations to take action and meet business goals (Okaily et al., 2023).

The discussion of data analysis capabilities nowadays goes beyond only the technical tools, where emphasis is placed on leadership, analytical skills and organizational culture (Król & Zdonek, 2020). Skills shortages and a lack of understanding within Small and Medium-sized Enterprises (SMEs) are frequently named challenges or barriers businesses face, where also resource constraints and perceived risks are named as important barriers (Perdana et al., 2021; Justy et al. 2023).In general, the smaller companies like SMEs have less data available compared to the bigger companies like multinationals. This is especially the case with "Big Data" (Müller, 2019).

The literature provides a lot of different data analysis maturity models, applicable in different sectors or company sizes, mostly focusing on maturity dimensions like IT Tools, Organizational structure, and IT architecture. However, models that focus on the various levels of data analysis, like descriptive and diagnostic analysis, are lacking. Thereby, many of the current frameworks focus on large enterprises, while others are too complex to be understandable or lack practical and actionable applications for business (Al-Sai et al., 2019). Consequently, there exists a gap in the availability of clear and applicable models for SMEs, as Bhardwaj et al. (2023) address: "While the range of topics is substantial, their depth is limited" (p. 3).

At the same time, the data analysis environment is constantly changing. Next to the digital transformation, Artificial Intelligence (further on AI), where computers or machines execute tasks that normally require human intelligence and problem-solving abilities (Shrivastava, 2024), arises and could drive significant positive changes in how businesses operate (Bruno, 2024). The use of AI gives humans and companies a lot of opportunities to automate routine processes or allows employees to focus on more strategic tasks (Nawaz & Shabir, 2024). "While large corporations often possess the resources to adapt to these technological changes swiftly, SMEs encounter a distinct set of challenges and opportunities in their quest to leverage these innovations" (Yusuf et al., 2024, p. 1-2).

However, the current revolutionization of generative AI (further on GenAI) could offer new opportunities through large language and multimodal models, also for SMEs (Inala et al., 2024). GenAI could be a breakthrough innovation for SMEs, as it "offers state-of-the-art capabilities that used to be reserved for the largest firms, thereby democratizing scalability and creativity (Rajaram & Tinguely, 2024, p. 2). These opportunities enable the development of tools that are both expressive and user-friendly (Inala et al., 2024), and propose opportunities for SMEs. Therefore, high-level user specifications could be transformed into low-level executable steps and reduce the user's need to learn new tools (Bubeck et al., 2023) and languages with foundations like ChatGPT, GPT-4 (Open AI, 2023), Claude (Anthropic, 2024) and Phi3 (Abdin et al., 2024). GenAI will disrupt how organizations operate, as it is the first technology in human history to generate its own content rather than disseminate or support content created by humans (Milmo, 2023).

The innovation of these new tools and technologies like ChatGPT could boost the possibility of leveraging entry-level AI tooling at a low cost. For example, employing GenAI could lower the abilities required to perform data analysis (Hassani & Silva, 2023).

Until now, general research on GenAI has been carried out. Rajaram & Tinguely (2024) go deeper into the possibilities and challenges of GenAI for SMEs, but stay very general and are insufficient in domain applications of GenAI. Therefore, further exploratory investigation in the domain of data analysis is needed, to understand how GenAI can support data analysis, particularly in the areas of SMEs.

The general research goal is to understand the current level of data analysis and how GenAI can support this within SMEs. The combination of a lacking overview of the state of data analysis within SMEs and the revolution of GenAI leads to the following research question:

How can GenAI support data analysis for SMEs?

The following sub-questions break down the research question:

- 1. How does the utilization of data analysis develop in SMEs?
- 2. How are different dimensions influencing SMEs' level of data analysis?
- 3. What are the key opportunities for SMEs to use GenAI for data analysis?

Data analysis, data analytics and business analysis are used interchangeably in literature and practice. To prevent misunderstanding, the definitions and the use of concepts will be explained now. In general, data analysis is described as an umbrella definition for any type of data use. Data analytics, therefore, is the science of analyzing heterogeneous data from various sources, identifying relationships, making predictions, and supporting decision-making processes based on insights gained from the data (Pratama et al., 2024). ""Business analysis" is considered the general term for any data analysis in business problems" (Duan & Xiong, 2015). In this research data analysis is used as an umbrella definition, encompassing both data analysis and business analysis.

1.2 Associated organization and demarcation

The research is performed in combination with a Dutch data analysis and reporting consultancy firm named Mount Data. Mount Data is a start-up consultancy firm that helps companies make an impact with data, in the form of reporting & data analysis (*Mount Data, Guide to Impact* | *Business & Data Analysis*, n.d.).

While Mount Data possesses extensive expertise in consulting primarily SMEs, they currently lack a good insight into the state of data analysis among SMEs. The (potential) customers of Mount Data are merely active in the Dutch trade or production sector, which lacks information about the state of data analysis. Thereby, these companies are operating in a rapidly evolving environment characterized by shifting market dynamics and ongoing technological advancements (Nag et al., 2007), which could change the data analysis landscape. For these reasons, and to demarcate the research, the focus will be on this group of companies.

Additionally, through the current GenAI revolution, Mount Data faces a knowledge gap regarding the possibilities and applications of GenAI within data analysis. Key questions in this context include the possibilities GenAI offers and how firms are using this. Based on this information, Mount Data can account for this development, leverage it directly and position itself better on the market. The questions Mount Data have been aligned with the research question of this article and highlight the opportunities for both organizations and consultancy firms to anticipate and leverage the challenges and opportunities GenAI gives.

However the research is performed in combination with Mount Data, the research could be read as independently conducted, with a broad scope of applications.

1.3 Thesis outline

The outline of the thesis is as follows. In Chapter 2, the most important literature is reviewed, and concepts are described. Following up, Chapter 3 describes the methods of the research, consisting of the methods used for research design, how participants are picked and how data is analyzed. The results section consists of the most important findings obtained from the research. In Chapter 5, the results are analyzed, which serves as the basis for the conclusions, including further research, limitations and the discussions in Chapter 6.

2. Literature review

As this research will tackle the underexplored research area of levels of data analysis and the use of GenAI within SMEs, this is the main focus of the literature review.

Paragraph 2.1 will go deeper into the covered method, paragraph 2.2. provides a bit of history and a brief introduction of data analysis. Furthermore, paragraph 2.3 provides an overview of the different levels of data analysis and the impact of GenAI. In paragraph 2.4, the influenced dimensions will be covered.

2.1 Used method for literature review

The first step to create a good literature foundation for the research is to analyze related literature. The paper of Wolfswinkel et al. (2011) gives the researcher a well-defined guidance to perform a systematic literature review. Wolfswinkel et al. (2011) presented a five-stage grounded-theory method for reviewing the literature in a specific area. This method proposes an iterative process, where steps are performed multiple times and papers and concepts are refined afterwards.

1.1 <u>Define:</u>

The first step is to define the criteria for inclusion/exclusion of research. The criteria used are:

- Date: The articles need to have preferably a publication date within the last 10 years. This will ensure the relevance and actuality of the fast-changing environment of data analysis and GenAI.
- The articles don't need to have a certain number of citations. The domain of GenAI is really new, and therefore almost every relevant article has been published in the last few years, which could lack the amount of citations.

1.2 Fields of research:

As the research focuses on data analysis and GenAI, this will be the most critical areas of research. As the research domain touches the domain of data analysis maturity dimensions, this will also be relevant for the research. To provide a comprehensive overview, data analysis, GenAI and the data analysis dimensions are included in the literature review.

1.3 Appropriate sources:

At the start of the literature review, Scopus is used to get controlled, peer-reviewed articles of a certain quality. However, the field of data analysis changes fast, and the domain of GenAI is new. Therefore, a lot of articles are not peer-reviewed and are really recent. For that reason, the research base is broadened to Google Scholar, Semantic Scholar and Science Direct.

1.4 Search terms:

The next step of the define or selection stage is to precisely formulate the possible search terms. As the research consists of multiple different relevant terms, the search terms are not combined as one search term, but into a few different combinations. Important search terms are:

Data analysis, data analysis maturity, data analysis, business analysis, SMEs, generative AI, GenAI.

2.1 Search:

Based on the defined criteria, a table with all the relevant articles could be created. Because the literature research reveals that data analysis, GenAI and data analysis dimensions are related, but

literature on the intersection of them is limited, the table is divided into three different tables, each with its subject and relevant research, presented in Appendix A.

3.1 Select and refine:

Based on the three different tables in Appendix A, the number of relevant articles could be refined to those that provide the backbone of the literature, Table 1.

In steps 4 and 5, the different articles are expected to be analyzed, coded, and presented. Because levels of data analysis, GenAI and data analysis dimensions are mostly handled individually in literature, further extended analysis with open, axial and selective coding to what concept a certain article consists, will lead to an unnecessary analysis, complexity and an information overload.

	Levels of dat	ta analysis				
Author, <i>Title</i>	Descriptive	Diagnostic	Predictive	Prescriptive	Data analysis dimensions	GenAI
(Morr & Ali- Hassan, 2019) "Descriptive, predictive, and prescriptive analysis"	X		X	X		
(Balali et al., 2020) "Data-intensive industrial asset management, IoT- based algorithms, and implementation"		X				
(Jeyanthi et al., 2021) "Decision intelligence analysis and the implementation of strategic business management"	X	X	X	X		
(McCarthy et al., 2019) "Applying predictive analysis"	X		X	X		
(Bayraktar et al., 2021) "Business Analysis Adoption and Technological Intensity: An Efficiency analysis."	X	X	X	X		
(Wolniak & Grebksi, 2023) "The application of business analysis in cost reduction."		X	X			

"Data Analysis in the Era of Generative AI" X Berr et al. (2024) "Educational data analysis using Generative AI" X
the Era of Generative AI" Berr et al. (2024) X "Educational data X analysis using Generative AI"
Generative AI" X Berr et al. (2024) X "Educational data analysis using X Generative AI" X
Berr et al. (2024) "Educational data analysis using Generative AL"
"Educational data analysis using Generative AI"
analysis using Generative 41"
Generative AI"
Rajaram & X
Tinguely (2024)
"Generative
artificial
intelligence in
small and medium
enterprises:
Navigating its
promises and
challenges"
DeJeu (2024) X
"Using Generative
<i>AI to Facilitate</i>
Data Analysis and
Visualization: A
Case Study of
Olympic Athletes"
(Marohn & Li, X
Data Analysis
Capability Maturity
Models for Small
ana Mealum
Enterprises – A
Literature Peniew"
(Muller & Hart, X
2016)
"Updating
Business
Intelligence (BI)
and Analysis
Maturity Models
for New
Developments"
(Hausladen & X
Schosser, 2019)
"Towards a
maturity model for
big data analysis in
airline network
planning."

Table 1, Article selection.

2.2 Introduction to data analysis

In the current era, data analysis is the way to go and could be used and have an impact in different areas of business, like finance, accounting, commerce, marketing and command and control (Al-Okaily et al., 2023). The evolution of computers and technologies has increased the amount of data generated daily (Hilbert & López, 2011). Computers introduce the possibilities for 'online' operations, for people and lead systems like Enterprise Resource Planning (ERP) and Material Resource Planning (MRP) (Li, 2024). The integration of both has led to a substantial growth in the amount of accessible data.

Consequently, data has become the most valuable asset for any company, seeking to gain a competitive advantage in the industry (Taranto-Vera et al., 2021; Harding et al., 2006). To leverage the data accessible, it is essential to analyze the data and employ the right forms of data analysis. Data analysis in general, could be categorized in four different levels; descriptive, diagnostic, predictive and prescriptive analysis (Balali et al., 2020).

Descriptive analysis answers types of questions about "what" happened in the past, predictive analysis goes deeper into what could happen in the future and with what certainty, as prescriptive analysis refers to what actions could be taken now to control events in the future (Morr & Ali-Hassan, 2019). Diagnostic analysis lies between descriptive and predictive analysis and addresses the question of "why" something has happened.

Each type of analysis has its value and complexity. If the various kinds of data analysis are plotted in a graph, the outcome is Figure 1. This graph opposes complexity on the x-axis and the value of the analysis on the y-axis (Figure 1).



Figure 1, Different kinds of data analysis, value versus complexity, based on (Balali et al., 2020).

In most research, AI is identified as the next step of analysis, plotted in the top right corner, as the most valuable but complex sort of analysis. However, AI could be used in this form, GenAI specifically presents opportunities to assist within the different forms of analysis. It could, for example, leverage low-code/no-code experiences, provide statistical assistance or domain knowledge support and tool copilots (Inala et al., 2024). In the next paragraph, the potential of GenAI within data analysis is expanded further.

2.3 Data Analysis and GenAI

In the paragraph before, a short introduction to the history of data analysis is given, whereas in this paragraph, the different levels will be explained further and the possibilities and impact of GenAI are highlighted.

Descriptive analysis

As handled, descriptive analysis goes into the details of "what" happened in the past and covers the perspective of understanding past data. It is used to describe a certain phenomenon (Jeyanthi et al., 2021) and is plotted at the left bottom of the graph (Balali et al., 2020). Descriptive analysis gives decision-makers a better understanding of a certain situation and could lead to better operational results (Bayraktar et al., 2023).

To simplify and break down the different parts of a descriptive analysis, the components Jeyanthi et al. (2021) described could be used. Jeyanthi et al. (2021) described three different components of descriptive analysis consists of, namely Mathematical & Statistical Concepts, Computing Software and Historical Data. Mathematical & Statistical Concepts are related to different concepts like mean, standard deviation, or modus. Computing software is used to digitally run descriptive analysis, as historical data is needed as input to perform descriptive analysis. These building blocks make up descriptive analysis and are the building blocks for descriptive analysis.

Descriptive analysis is mostly used within forms of business reporting, dashboards, scorecards and warehousing (Delen & Ram, 2018). Dashboards are a tool for the graphical visualization of data from Key Performance Indicators (KPIs) (Gröger et al., 2013) and allow decision-making to be sustained (Caldeira, 2010). This enables possibilities for organizations to make sustainable decision-making and helps monitor the process within a company within different areas.

As earlier research by Bayraktar et al. (2023) suggests, the adoption of different levels of data analysis depends on the level of technological advancement. SMEs particularly operate with limited technological resources, therefore tools like Excel, basic statistical analysis tools, or Google Analytics are expected to be used widely (Bayraktar et al., 2023). Tools like this enable monitoring KPIs via dashboards or could create a solid foundation for other kinds of analysis.

Thus, it is likely that descriptive analysis is a widely used and developed form of analysis. It provides a valuable step by having insights into "what" happened, and a strong foundation for other, more advanced and complex data analysis applications.

Diagnostic analysis

Diagnostic analysis focuses on the question of "why" something happened, to identify the root causes of events, and goes a step further than representing historical data visualized. In essence, diagnostic analysis takes input from descriptive analysis and applies a statistical methodology to find the reason "why" something has happened (Sharma et al., 2020).

Techniques within diagnostic analysis could be drill-down, data discovery, data mining, correlations, and root cause analysis (Wolniak & Grebksi, 2023). Diagnostic analysis has different applications and business areas where it could deliver value. For example, a retail company understands better why sales declined in a certain period (Sharma et al., 2020) or uses diagnostic analysis to optimize supply chain management or customer relations. The major takeaways pertain to getting valuable insights into the past and making informed decisions based on historical data to optimize operations.

While descriptive analysis focuses on summarizing and characterizing data, diagnostic analysis requires capabilities to detect patterns and determine root causes. This depends not only on the functionality of the software or tool, but also requires more of the capabilities of the personnel. Given

the fact that diagnostic analysis requires more from tools, software and employees involved, the use will probably be lower compared to descriptive analysis. Organizations probably prioritize understanding past trends beyond the underlying causes. Nonetheless, employing descriptive and diagnostic analysis can establish a strong foundation for predictive analysis, which will be covered in the next paragraph.

Predictive analysis

Predictive analysis goes a step further and relies on the goal of what will happen in the future (Jeyanthi et al., 2021). Predictive analysis makes use of statistical models or machine learning to predict future trends (Bayraktar, 2023). Within predictive analysis, there are different techniques to forecast future outcomes, trends, or predict performance. Data mining, statistics, or modeling are examples of these techniques and could support the end goal of improving the performance of the corporation (Davenport et al., 2019; Espadinha-Cruz et al., 2021).

In general, predictive analysis models could be divided into two types of models; classification models and regression models. Decision trees and neural networks are classified under the classification models and predict a class, thereby these classifications are discrete (McCarthy et al., 2019). Regression models instead, predict a certain number and are continuous.

According to Jeyanthi et al. (2021), predictive analysis models use the data of a certain set to train a model, which can be used to predict values for a new data set. For predictive models, especially when they become more and more complex, a good description of how the model is built and for what reason, is important to get the "desired" business value.

Within predictive analysis, it is important to determine the business problem and describe the hypothesis, cases are applicable for example, in finance, purchasing and sales. Next to these steps, you will collect data and analyze it. Following, the user chooses the correct model and technique and tries to optimize the model. Concluding, the model could be utilized and monitored in the last steps of choosing a predictive analysis model. An important point to mention is that this process is an iterative process, where the model is continuously monitored and adjusted could increase the outcome scores (McCarthy et al., 2019).

Predictive analysis is crucial in transforming raw data into meaningful information, extracting actionable insights and making informed decisions using vast data (Jangam & R. Deshpande, 2023). As earlier suggested, the level of data analysis levels depends on the level of technological advancement (Bayraktar et al., 2023). In general, firms with higher technological advancement are mostly active in technology or financial industries and probably have higher technological advancements. Considering that technical and employee capabilities need to be higher to perform predictive analysis and SMEs probably have less technical and employee capabilities, applications compared to the less complex forms of analysis, will likely be less widespread within SMEs.

Prescriptive analysis

The top level of data analysis is prescriptive analysis. In addition to predictive analysis, prescriptive analysis emphasizes both discovering the best way and stressing actionable insights based on the data available (Jeyanthi et al., 2021). Prescriptive analysis answers the questions about what we should do and why and needs a predictive model with actionable data and a feedback system that could track the results generated. Afterwards, the model suggests what act can be done to address upcoming problems or to refine and increase the outcome results. There are two possible levels of human interaction in prescriptive analysis; decision support and automation. Decision support gives the right recommendations based on the model and decision automation with regard to the implementation part of the prescribed action (Gartner, 2017). Prescriptive analysis gives insights into generating action-based recommendations, which could improve operational efficiency and strategic advantages.

Therefore, prescriptive analysis creates business value and supports decision-making on the next level (Y. Duan et al., 2020).

Consequently, prescriptive analysis could be executed with the use of many different methods. As prescriptive analysis focuses on discovering the best way and stresses actionable insights based on the data available, it is likely that prescriptive analysis goes a step further than predictive analysis and applications will be less frequent. However, based on earlier research, this doesn't have to be so. Prescriptive analysis is sometimes embedded directly into systems, for example, inventory management or planning operations. Consequently, it is difficult to determine the expected usage of prescriptive analysis in practice, but it should be near the same level as predictive analysis.

Generative AI

As GenAI falls under the AI umbrella and could be interpreted and used interchangeably with "normal" AI and predictive AI, definitions need to be clarified. In general, GenAI is trained based on large datasets containing much information, like the large language models of ChatGPT. Predictive AI, therefore, is much more focused on targeted datasets, and trained on specific datasets (Caballar, 2024).

The emergence of these large language and multimodal GenAI models presents new opportunities to develop tools that are both expressive and user-friendly (Inala et al., 2024). These models possess the ability to perform human-like reasoning and transform high-level user specifications into low-level executable steps (Bubeck et al., 2023). Consequently, GenAI allows leveraging different possibilities, also within the area of data analysis. GenAI in internal integration can help companies utilize technologies for data analysis supporting decision-making (Winkler, 2023), but also streamline internal operations (Kanbach et al., 2023). Applications could improve market responsiveness and operational efficiency, enhance entrepreneurial performance and could empower higher accuracy in decision-making for SMEs. Rajaram & Tinguely (2024) underline that SME leaders need to be flexible in implementing GenAI, emphasizing the need to work around talent capabilities and scarce resources.

Inala et al. (2024) outlined seven different steps within the field of data analysis. The insights go into the different steps of data analysis, where GenAI could be of assistance and how it plays a role and creates opportunities. The insights could become more interesting if you apply the table to the selected articles from the literature review in Table 1. This reflection creates Table 2, as presented below:

Step	GenAI	DeJeu (2024)	Berr et al. (2024)	Rajaram &
	Opportunities			Tinguely (2024)
Task	Helping people go	The author stated that	Berr et al. emphasize	Rajaram &
formulation	from fuzzy	GenAI tools can	the importance of	Tinguely propose
	specifications to	redefine tasks,	prompt engineering	that GenAI
	concrete,	questions, or prompts	and the difference	incorporates
	measurable tasks;	into more specific	between GenAI	domain-specific
	Adding domain	ones. Thereby, it is	tools. They also	knowledge and
	knowledge to task	possible to invent	underline further	therefore not only
	formulation;	domain-specific	room for prompt	clarifies tasks or
	Finding similar	prompts with the use	engineering in cases	prompts but also
	tasks and analyses.	of GenAI tools.	where LLM models	enhances domain-
			don't understand the	specific
			prompt right.	knowledge.
Data	Finding	DeJeu stated that	The authors use	Rajaram &
collection,	appropriate data	GenAI tools could	different GenAI	Tinguely does not
cleaning, and	from existing	help the user to	models to determine	directly go into
integration	sources; Extracting	determine analysis that	the performance of	this, however, it
	data from	might reveal intriguing	the models. The	signifies that
	unstructured	perceptions. Thereby,	authors suggest that	GenAI tooling

	documents or media; Executing extraction code from relevant databases/web; Automated and semi-automated cleaning or anomaly detection and integrating data from multiple sources.	it clarifies that GenAI tools suggest extra open source data in cases of limited data for analysis and proposes and instructs the user to add these data to the original data source.	fine prompting determines the performance of the model and determines directly the aptitude of data out of the sources. They also emphasize the role of preprocessed data and the model presentations.	can extract data from existing documents and sources.
Hypothesis exploration	Domain knowledge-based exploratory analysis; Appropriate statistical tests based on task and data.	DeJeu goes into the fact that ChatGPT can actively produce hypotheses but also perform statistical tests.	Berr et al do not go into the role of GenAI in generating hypotheses, but accentuate the role of ChatGPT to clarify the performed analysis.	In this paper, the authors do not directly discuss the possibility of generating hypotheses and statistical tests, however, they refer to the reference of McAfee et al. (2023) that GenAI offers these capacities.
Execution and authoring	Circumventing deep procedural knowledge required for the use of libraries and tools (e.g., Pandas, PowerData, etc.).	DeJeu stated the possibilities of creating visualizations or other forms of representation with the use of GenAI tooling.	Berr et al emphasize the role of GenAI tooling in execution and authoring in data analysis.	Rajaram & Tinguely did not specifically go into the use of GenAI tooling for execution of visualizations, but gave a few examples of possibilities for it.
Validation and insight generation	Automatic evaluation and repair of analysis; validating data analysis and assumptions with domain knowledge; multi- modal analysis to generate insights from data and charts, interpretable results.	The article stated that data validation and visualization creating are opportunities, however, they needed to be controlled by humans manually. The same is valid for automatic evaluations and the preparation of analysis and interpreting results.	Berr et al. underestimated how GenAI functions to fine-tune and concretize vague analysis and talks about the possibility of evaluating and preparing faults in analysis.	This articles states the possibilities of GenAI within small data teams and that employees need to learn and avoid direct outputs from GenAI tools because of hallucinations.
Report generation and communication	Interactive decision support, automatic recommendations based on analysis; customized	DeJeu stated that ChatGPT Plus can make suggestions for analysis and can support decision-	Berr et al. also stated that GenAI can make suggestions for analysis and imply that AI is the basis	However, Rajaram & Tinguely do not talk extensively about GenAI and

	representations for different presentations and audiences; dashboard generation; generating creative charts and infographics.	making. However, GenAI doesn't gives the possibility (at this moment) to create dashboards.	for dashboard functionalities, however, it doesn't discuss dashboard generations and presentations for different audiences precisely.	data analysis, however, they emphasize that GenAI can create customized reports.
Domain and analytical skills	Low/no code experiences; Offer domain knowledge support and statistical expertise; tool copilots for assistance.	The study of DeJeu stated that AI, or specifically GenAI, can function as a sort of assistant, and lower the barriers to data analysis for users with limited statistical and programmer knowledge.	Berr et al. stated that it is easier to perform data analysis and bridges the gap between domain experts and data scientists.	GenAi underestimates that it wouldn't replace domain knowledge, but would help companies and people to make data-driven decisions.

Table 2, Literature review articles reflected on the table of Inala (2024).

Translating this theory into practical applications, the opportunities could be divided into three broad categories; coding assistance, data assistance and task formulator.

DeJeu (2024), Berr et al. (2024), and Rajaram & Tinguely (2024) proposed that GenAI could facilitate different forms of task formulation, where problems need to be solved, questions need to be answered, and decisions need to be made. GenAI could help to redefine prompts or solve problems that need to be solved and possibly add domain-specific knowledge to certain tasks or problems (DeJeu, 2024; Rajaram & Tinguely, 2024). In essence, this provides different potentials and opportunities, an example is for identifying KPIs or metrics.

Regarding data assistance, GenAI can function as a supporting assistant as well as a self-directed data analyst. DeJeu (2024) and Berr et al. (2024) underline the possibilities of performing data analysis with the use of different tools and emphasize the fact that less statistical and programmer knowledge is needed. Thereby, Inala et al. (2024) and Berr et al. (2024) mentioned that GenAI could offer detailed insights into specific datasets and act as a sort of guidance to provide insights into those datasets. The possibilities of GenAI are underlined, but also the need for good prompt engineering (DeJeu, 2024; Berr et al., 2024). Using the right prompts can make the difference if an analysis proves the output that is wanted or not.

ChatGPT also offers the possibility to explain visualizations or analysis (DeJeu, 2024). "In addition to facilitating exploratory data analysis and data visualization, ChatGPT Plus explained its work, including the reasoning behind its choices and the steps involved in its analysis, and functions as an instructional tool" (DeJeu, 2024, p. 9). Therefore, tools like ChatGPT could also serve as a tool to explain analysis, instead of a tool only performing certain tasks or analysis.

Lastly, GenAI could assist in coding. This could be applicable in the form of tool copilots for assistance and possibly lowers the barriers to data analysis for users with less or limited statistical and programmer knowledge (DeJeu, 2024). Berr et al. (2024) indicate that it would be easier for starting data scientists to perform data analysis and achieve deeper insights into data analysis. And so, these articles imply that the bridge between data experts and beginners will be less.

As the paragraphs above go into the positive sides of GenAI, it could also have some downsides, think about the faults in the analysis or the possible biases GenAI could draw according to the data or

interactions with the users (Berr et al., 2024; DeJeu, 2024). The data quality and limited ability to fully understand complex contents and take into account the context of a certain case could be of importance.

The expectation is that the use of GenAI within data analysis for SMEs is minimal, because of the early stage GenAI is currently in. A recent report by McKinsey (2024) stated that around 40% of the SMEs currently are not using GenAI, where adoption hurdles are one of the six challenges for GenAI adoption mentioned (Rajaram & Tinguely, 2024).

However, GenAI and tools like ChatGPT need to be used to benefit of society at large. GenAI has the potential to revolutionize a world where not only trained analysts, but anyone could effortlessly analyze data to make informed decisions and could be a world with a decreased need for data scientists (Inala et al., 2024).

2.4 Dimensions of Data Analysis

In the paragraph before, the different levels of data analysis and the use of GenAI are discussed. Within most of the research, data analysis dimensions are not considered in the context of different levels of data analysis. However, to provide a complete overview, the relevant dimensions affecting the level of data analysis, like IT infrastructure, will be handled now.

The literature provides a lot of different dimensions, categorized into different models, with different focus areas. Some of the articles focus on more organizational dimensions (Bhardway et al., 2022), while more focused on data or IT infrastructure-related models (Aranachalam et al., 2017).

To get a good overview of different dimensions, the article of Marohn & Li (2024) is used, discussing 18 different articles and presenting a recent and comprehensive overview of the latest literature and theory. After analyzing the 18 different articles, they concluded five common dimensions. These dimensions are analytical operations, organization, infrastructure, data management and data governance, other dimensions could be mapped in these and represented in Table 3.

Dimensions	Descriptions
Analytic Operations	"Involves applying various analytical processes to derive insights that inform business decisions."
Organization	"Focus on aligning data analysis with business strategy and ensuring executive support."
Infrastructure	"Develop and maintain a robust and scalable infrastructure to support the entire analysis lifecycle."
Data management	"Focus on managing data throughout its lifecycle."
Data governance	"Emphasizes data availability, usability, integrity, and security."

Table 3, Five common dimensions, directly extracted from Marohn & Li (2024).

This model provides a clear overview of the most common dimensions, however, it lacks some depth into specific dimensions. It also doesn't reflect the impact of employee capacities. Muller & Hart (2016) ensured that underexposed dimensions, such as skills and knowledge, gained a more important role within data analysis earlier on and created a model with more importance on this. As their model is more comprehensive and emphasizes more on the technical sides and parts of data analysis.

However, while the model from Muller & Hart (2016) provides a clear and comprehensive overview, it lacks a deeper categorization in dimensions and subdimensions, something Hausladen & Schosser (2019) provided. The model from Hausladen & Schosser (2019) focuses on a model applicable to airplane transport network planning and is practically reviewed and verified. This model combines different dimensions and subdimensions into one model, which gives a clear and specific overview.

Subdimensions
Strategy
Culture
Organizational Structure
Employee Skills
Data Sources
Data Management
IT Architecture
IT Tools

Table 4, Different dimension levels (Hausladen & Schosser, 2019).

Consequently, the model from Marohn et Li (2024) doesn't include (employee) skills or experience and lacks depth about data sources in combination with IT Infrastructure, the model from Muller & Hart (2016) lacks categorization into dimensions and subdimensions. Hausladen & Schosser (2019) make a clear distinction between the used dimensions and subdimensions and focus on the complete overview, which could be suited, as it aligns well with the overall perspective this research aims to outline.

2.5 Literature conclusion

In the literature, the progression from descriptive until prescriptive analysis is discussed. As the literature describes the working of the different kinds of analysis, it lacks an overview of utilizing data analysis, mainly within SMEs in the production and trade sectors. Moreover, the dimensions influencing data analysis are not considered in the context of different levels of data analysis and the possibilities of GenAI aren't handled.

Since the research will not only focus on the dimensions but requires a broader perspective, the dimensions that have a lot of relation and overlap will be combined for interview purposes, and create a sort of own model in essence. The dimensions of Strategy, Culture and Structure are handled at once because these have a lot of overlap with each other. Therefore, Data sources and the IT Architecture are combined, because the data sources lead to and are an element of the IT Architecture. By defining the concepts, the literature conclusion can be made, where the most important insights are combined and lead to the suited method for the research.

In practice, probably most of the companies will focus on descriptive analysis, whereas some started with diagnostic and predictive analysis, as this requires more from the tools, systems and employees. The use of prescriptive analysis likely will be less, as this requires even more.

Within data analysis, GenAI offers a range of potential opportunities, with GenAI as a task formulator, coding assistant and data assistant being the most important ones. This study provides a model or tool how GenAI could be used within different levels of data analysis and how companies could progress further, something which is lacking in the current literature.

The expectation in practice is that some companies already using GenAI within data analysis, but minimal and within tasks like coding assistance or task formulator, something where possible the quickest gains are achievable. However, with the rise of GenAI and the possibilities it gives, it will create possibilities for companies and consultancy firms, but could also decrease the need for

consultancy firms. Therefore, it is important to address that we need to create a world where AI is used to augment intelligence as opposed to replacing human intelligence (Hassani & Silva, 2023)

The different subjects and concepts handled in the literature review, lead to Figure 2, where the different kinds of analysis are plotted on the arrow. GenAI could be used to assist data analysis, even as the dimensions are influencing the level of data analysis and are therefore illustrated as supporting elements and impacting data analysis.



Figure 2, Different articles based on different subjects presented.

Within the interview framework, the various dimensions will serve as an introduction, followed by a discussion of how data analysis is used, and closed with the possibilities of how GenAI could leverage data analysis. The following paragraph will discuss further on the methodology used for the research.

3. Methodology

3.1 Research design

The research is tackled from a qualitative insight and will focus on the trade and production sector. Qualitative interviews are held in the form of semi-structured interviews. This will create an insight into the current state of data analysis and the possibilities of GenAI. Interviews are suited for the indepth exploration of certain topics, providing qualitative insights. Thereby, semi-structured interviews provide the first insight structure, but also the possibility to go deeper into certain subjects and questions into interesting or indistinct areas (Adeoye-Olatunde & Olenik, 2021). Having the flexibility to adjust questions and go deeper into certain questions is important, primarily to highlight certain aspects, or to place more or less emphasis on others, particularly in the whole new field of GenAI.

The interview will be structured according to the literature review and cover the dimensions, different levels of data analysis and GenAI. The data analysis dimensions are addressed in accordance with the approach described in 2.4. The levels of data analysis are according to the different levels handled in 2.2. The different possibilities of GenAI are dealt with the opportunities outlined in the literature paragraph 2.3, with room for own, new insights of the interviewee. These subjects will create Figure 3, where the interview structure is outlined, with a few example questions. In Appendix B, the whole interview structure is given.

Subjects	Subjects	Example questions					
	IT Architecture/ Data sources	- How is the architecture configured and what different applications and data sources are used?					
Data analysis dimensions	Data quality and management	- How do you manage the data quality?					
	IT Tools (Data tools)	- What kind of IT/Data Tools or applications are used?					
	Strategy, structure and culture	- What is the companies' vision about data, for example in the Management Team/ Management Board?					
	Employee skills	 To go a little bit deeper into the applications, architecture, structure, what are employee skills needed to have? 					
	Descriptive analysis	- In what forms do you make use of descriptive analysis?					
Level of data analysis	Diagnostic analysis	- In what departments or for what functions do you make use of diagnostic analysis?					
	Predictive analysis	- Does predictive analysis gives insights in the future what you want?					
	Prescriptive analysis	- Is prescriptive analysis integrated in some systems you currently use as an organization?					
GenAI	Task formulator	- Do you make use of GenAI tools for idea generation or documentation?					
	Coding assistance	- In general, what works and what works not? Is this more in creating codes or generating codes?					
	Data assistance	- Is GenAI for example suitable for small and fast data analysis?					

Figure 3, Interview framework.

Additionally, next to the interview questions, a personal experience test, done by the researcher, is used to supplement the findings. Here, ChatGPT is used to perform a self-directed data analysis. While this is relevant, it deviates slightly from the core focus of the research. Given its supplementary nature, these findings will be documented separately and included in Appendix F to provide additional context and support the analysis.

3.2 Participant selection

As the research focuses on SMEs and the production and trade sector, participating companies are active in these sectors and have under 350 employees. In total, 8 interviews were carried out and performed until data saturation was reached. 7 interviews were completely carried out, one interview

was with a GenAI expert and went into the current developments of GenAI on data analysis in company settings. The Appendix will present the full list of interviewed employees and their functions and associated companies.

Convenience sampling is used, whereby people from the network of Mount Data and people via LinkedIn are recruited. This is an easy, fast and practical way to provide a suitable sample. The most important characteristics are, that the attendees are familiar with the subjects; dimensions of data analysis, level of data analysis and GenAI. Therefore, it is important to assess whether certain aspects are deployed within the company or not and give in-depth information about it.

The sample of companies is probably on a higher level of data analysis than the general sample of SMEs. Companies gathered from the network of Mount Data have (had) a data-related question, which has or is in the process of being handled. Companies recruited from LinkedIn will probably also be on a higher level than general, mainly because of the purpose search for suited companies with a data analyst or related role.

3.3 Data collection

The interviews will be held in person or via an online platform like Google Meet, Zoom, or MS Teams. In total, the interviews lasted somewhere around 45 minutes. The interview participants are asked for permission to record the interview, which will be done by informed consent and have the choice to give informed consent written or oral. A month after the completion of the study, all the recordings will be deleted. Company and person names will be anonymized within the research. As in total of 7 relevant interviews are held within 7 different companies, every different interview could be seen as a different case (Yin, 2017). (Multiple) case studies are suited for how or why questions and exploratory or descriptive research.

In the literature, there is a lot of discussion about how many data sources per case and interviews per case are sufficient to conclude. In general, most authors and literature argue for using several data sources (Triangulation), which gives more insights and perspectives, but also a higher quality of the results and deeper insights (Yin, 2017; Eisenhardt, 1989). However, in some cases with a light research, exploratory nature (Verschuren & Doorewaard, 2007), or within practical constraints (Rowley, 2002), one interview per case could be sufficient. In this case, the research is exploratory in nature, thereby, there aren't many people within the company, who have in-depth knowledge of this subject and can speak about it in detail, therefore, a single interview per case approach is chosen.

3.4 Data analysis

After conducting the interviews, the interviews are transcribed, and the coding process is started. Here, is chosen to use in-vivo codes to stay as close to the essence and wording of the interviewee. Thereby, deductive codes are used to apply the current theory available as a foundation for coding, and create new theories and insights based on that. New theoretical insights could supplement current literature and create new concepts. The analysis is done via Excel, aggregate dimensions and second-order themes are used to create structure in the parts of the result. Thereby, the most important first-order concepts are stored, related to the second-order themes.

After coding, a cross-case analysis is done to answer the research question. Cross-case analysis refers looking into similarities and differences between cases in selected categories or dimensions and the distinction of the data by the source (Eisenhardt, 1989). The theory of Yin (2017) is more focused on confirmation or conflicting results, as Eisenhardt (1989) places greater emphasis on creating new theories, insights and constructs. In this research, we'll use current theory and insights, but the main focus is on creating new theories, insights and constructs, where the method of Eisenhardt (1989) is more useful to choose. Therefore, the cross-case analysis provides similarities and differences between cases and develops new theories based on the results given.

4. Results

In this results section, the most important insights from the interviews and cases are discussed. In Chapter 5, a cross-case analysis is done, to draw the conclusions and answer the research question in Chapter 6. In the different sections, quotes will be given to illustrate the context of the interviews. The interviews are coded deductively and try to get new insights into current theories and create new theories. This created the aggregated dimensions of Data analysis and GenAI. Based on the dimensions, the second-order themes are created, according to the interview scheme. To illustrate the first-order concepts, one quote regarding to the first-order concepts is given, which is shown in Appendix D.

4.1 Data analysis dimensions:

In general, many different systems are used as data source. The ERP systems as core, in combination with a CRM system and online/ website data, for example Google Analytics or Google Ads. Excel files are used to cover things like budgeting.

In most of the time, the different data sources are extracted and combined into a data warehouse or data lake house, and afterwards the data is visualized, mostly with a BI Tool. Companies in a further state are already on, or switching into working in the cloud, where flexibility, user-friendly and scalability of the systems are the most important advantages related to working on-premise; "*Yes, we're working within the cloud, with the philosophy that everything needs to be as friendly as possible*".

There is a tendency to use Power BI as a BI tool. Other BI tools used are Looker, Click Sense or Tableau. For extraction and data engineering purposes, some are working on the cloud and choosing a product that favors that, others don't want to be too dependent on a certain tool and switch into multiple systems, and others are on an all-in-one platform like Microsoft Fabric. A quote that illustrates this is; "*All the systems will be separately loaded, first in the lake house, then we have different environments for them and then in a data warehouse if we talk about Microsoft Fabric*".

It's eccentric that the data quality and management still is an issue and hot topic within SMEs; *This is not that good occupied within our organization, this is a topic we'll focus on the upcoming months and years*". The one responsible for data analysis in general is responsible for the guidelines according to data management and data quality, however, the execution and input data are within the business departments or areas themselves.

The strategy, structure, and culture of organizations towards data is different. In general, there is someone responsible for the data engineering and visualization part. Most companies are working with a team of 1-4 employees, with some more related to the data engineering (Back-end) and others to the data visualization (Front-end) side.

Data becomes interesting when you're growing as an SME. You will run into some issues and would like to gain insights, usually from management perspectives. Managerial-related insights are also the biggest reasons to start within data analysis, most in the form of descriptive analysis. Parallel or afterward, also business departments came with demands for data-related insights.

Coding skills, writing formulas, the ETL process, and logical reasoning are the most important technical skills for a data-related person. Thereby, business-wise thinking and knowledge of the systems and tools is important; *"Estimating things really well but also asking what are requirements from the business?"*. Based on the size of the company and the structure of the data, the skills will change and grow towards the needs of the organization.

4.2 Levels of data analysis:

The second part of the results consists of the different levels of data analysis used within the companies. The different kinds of analysis will be handled according to the sequence of the least valuable and complex form of analysis according, to the most complex form of analysis (Balali et al., 2020).

Descriptive analysis is the least valuable and complex form of analysis and is used mostly in the form of KPIs or visualizations within dashboards or reports. The departments themselves, next to the management, decide what the important metrics they want to see. In general, descriptive analysis is at a solid level organizational-wide, where sales and logistics are the business departments where it is applied the most, next to purchasing and finance. Diagnostic analysis is more advanced than descriptive analysis. As in the literature, mostly statistical techniques like drill-downs or data discovery provide the insights, in practice, the interpretation of the user determines how the data is interpreted and answers the "how" question. In this case, the way of diagnostic analysis shifts and lies more on the employee. Only a few companies have some indexes or scores, which tell you as a user something about the data and the question "why" something happened. Examples are a customer performance score or a vitality index; "*Thereby we see how long a product is in the collection by how many customers, how many times is it purchased and which turnover does it have*".

Most companies are working in the manner of first-asked, first-served to get data analysis-related insights. Departments who screamed the hardest will get served the first here, because the capacity isn't unlimited; "Yes primarily yes, they're screaming the hardest or the loudest. But yes, they, in general have the most demand on insights, yes". Next to a first-asked, first-served principle, also working with a ticket system or ticket box was referenced as a way to handle with demanded data insights of different employees.

Predictive analysis goes way a step further. The difference in utilization of predictive analysis in practice really differs between companies. Some companies are not ready for it now, some are in the beginning phase and some have already implemented different models.

Companies that are in the beginning phase mainly focus on the sales and procurement department first. These departments require the most insights for daily operations, where the principle of first asked, first served also applies. Companies quite far with predictive analysis are extending their applications of predictive analysis, for example, customer segmentation on churn predictions. Examples are the RFM or CLV analysis; *"Then, we also have segmentation of customers, then you need to think of RFM, CLV, for predicting the total customer value. Take marketing actions based on that. However, this goes for most companies way too far".*

The last and most complex form of analysis is prescriptive analysis. Based on the 7 interviews, prescriptive analysis is clearly the least utilized form of analysis. Most companies are focusing on getting other forms of analysis in place, before focusing on prescriptive analysis. In the literature, Bayraktar et al. (2023) suggested prescriptive analysis sometimes is embedded within for example procurement systems or management operations and therefore, utilization could be higher. Some companies make intentional decisions to have a human in the loop and don't take automatic actions on prescriptive models; *"We always have a human in the loop, we don't have models that make decisions on its own"*. However, other interviewees mentioned for example procurement systems embedding some prescriptive models with mathematical power, the advantages taken of prescriptive analysis embedded lack; *"I don't know, I need to be fair, if Slim4 has this module to make automatically purchase orders.*"

4.3 GenAI

The first possible opportunity GenAI gives is GenAI as a task formulator. Inala (2024) describes GenAI could help to go from fuzzy specifications into concrete and measurable tasks and add domain knowledge to certain tasks. In practice, this is used in two different ways. The first one is GenAI for documentation purposes, as documentation is not the sexiest task and employees don't feel like documenting things really well. The other possibility that reappeared is the problem-solving power of GenAI. A few interviewees stated that GenAI proposes the opportunities to operate as an idea creator and problem solver, where this answers questions and solves problems related to a certain subject. A practical example of this is the within visualization or dashboard idea creation. If human capabilities are limited or employees are out of ideas, GenAI tooling is suited for idea creation; *"Yes, it's primarily, I get a question, we want to have insights in for example, how many warehouses will be directly delivered, so not directly via our head office, but how often directly and everything. And then I don't know how to visualize it, so I'll ask, what should be a good visualization?".*

Probably the most promising and applied use case of GenAI for data analysis is coding assistance. Based on the literature, coding assistance is appropriate in the form of tool copilots for assistance and possibly lowers the barriers for users having less or limited statistical and programmer knowledge (DeJeu, 2024). A lot of interviewees propose using tools like ChatGPT and Copilot for coding assistance. These applications are used in both the visualization part, as well as the engineering part. Some code languages work better than others, which could be different within a few months, years or within other models and tools. It is important to note that a clear understanding of the output and the ability to formulate certain codes or prompts remain essential.

GenAI as data assistance is used, but differs very significantly within the cases. Doing self-directed analysis is something in the children's shoes practical-wise. There were a few interviewees who tested with this functionality and uploaded, for example, a CSV or XLSX document to perform self-directed analysis. Nonetheless, the results are mixed; "No, I can only speak for myself. I've done some analysis with CSV uploading and asking questions. The first time it works, sometimes less. But yes, I mostly use it. And if it is ridiculous or nonsense, I'll do it myself. If it isn't nonsense, I've gathered one hour". Another application mentioned very often is the use of GenAI as a sparring partner to help with data analysis. When people are stuck in performing things or don't succeed in fixing certain tasks, GenAI could support them as a sparring partner; "Purely, on the moment that I don't come out with a certain thing, I use ChatGPT as a sparring partner or Copilot". This could be in the form of explaining visualization or explaining data, for example.

Lastly, a new second-order concept was observed, which is GenAI integrated. What's meant by this is the integration of GenAI within existing systems within the company, and has some overlap with other applications.

The use case of this is the integration of GenAI within BI or in general data analysis tooling. An example given often is the use of Copilot for Power BI. The meaning of this is helping to understand data, but also helps with performing analysis, for example, in-built models or making presentation slides with graphs and so on. The difference between this and the use of GenAI, for example in the form of ChatGPT or Copilot, is that by GenAI integration, the GenAI tool or model is integrated into the used system.

Ultimately, one of the companies interviewed, where outstanding in the use of data analysis and GenAI. The interviewee said that they were building an infrastructure around a language model and that the partnership with Google provides an experimental version of GenAI, to tune the model in the way you want. This provides the company the possibility to experiment with GenAI and look into applications within different areas. However, this is currently not directly relevant and applicable within other SMEs, it could be an interesting use case in the future.

5. Analysis

In the previous paragraph, the results of the interviews were summarized. To get a comprehensive overview, and show the differences and comparisons, a cross-case analysis is used. Therefore, the different use cases will be contrasted and approached to answer the research question: "*How can GenAI support data analysis for SMEs*?".

In Table 5, the model represents an overview of the different cases and levels of data analysis, dimensions and use of GenAI is created. Each case represents a different column with a score of 0 (not using) to 4 (expert in using) belonging to the different categories. Based on the essence of this table, Figure 4 is made. This Figure shows how the different companies are located, related to the relationship between the complexity and value of different levels of data analysis. The companies are numbered randomly and represent the different companies interviewed. Data analysis is a continuous and evolving process, companies could be actively working on different levels of data analysis at the same time and evolving themselves in earlier, less complex forms of analysis.

	Case							
Categories	1	2	3	4	5	6	7	
Dimensions								
IT/Data sources	2	3	2	3	3	4	1	
IT/ Data Tooling	3	3	3	3	3	4	1	
Strategy, Structure, Culture	2	2	2	3	3	4	1	
Skills of employees	2	2	2	3	3	4	1	
Data management and quality	2	2	2	2	3	2	1	
Data analysis								
Descriptive analysis	3	3	3	3	4	4	2	
Diagnostic analysis	2	2	2	3	2	3	1	
Predictive analysis	1	1	1	2	3	3	0	
Prescriptive analysis	0	0	0	0	0	1	0	
GenAI								
Coding assistance	3	3	3	3	4	4	3	
Data assistance	1	0	1	0	3	2	0	
Task formulator	2	0	3	0	3	2	0	
GenAI integrated	1	0	0	1	1	3	0	

0 = Not using 1= Beginning, 2= Basic, 3= Advanced, 4= Expert

Table 5, Classification of different cases.



Figure 4, Data analysis level of interviewed companies.

Companies in the starting phase (Company Seven) typically use fewer data sources and have less advanced tooling, most in the form of Excel or starting with BI tooling. Most of the insights are ad-hoc and modified time by time, working in the manner of first first-asked, first-served principle. These kinds of companies are really restricted to answering questions on "what" has happened and historical values.

The real struggle within these companies are time, knowledge and capacity constraints, which is a general constraint within SMEs, but really come to the fact that less advanced companies have in most of the time one data analyst, fewer skills in house and lack a specific data strategy and data quality checks, which aren't incorporated.

With a single data analyst, versatility is key, handling diverse data tasks and including ad-hoc analysis. Essential skills include Excel, SQL, logical reasoning and business-wise thinking, to translate business questions into insights. The use of GenAI for data analysis purposes within companies like these is minimal and restricted to coding assistance or documentation purposes, but has potential for broader use and applications.

Additionally, the visualizations and examples generated by ChatGPT in the self-conducted tests presented in the Appendix serve as an illustrative example of the creative and problem-solving power of GenAI and how this could be leveraged.

In the era before GenAI, skills or capacity constraints were something consultancy firms could assist with; nowadays, a new situation has developed. Skills and capacity are something where GenAI could assist, but also creates an opportunity for consultancy firms, who need to shift their focus towards training people in the use of GenAI and support them in how to work with it.

To some extent, this will ensure that companies in the beginning phase can advance more easily to the following phase, make use of the possibilities of GenAI.

The majority of the companies are in the middle phase, between diagnostic and predictive analysis, which are the companies one up to and including company five. These companies combine more data sources, starting with a data warehouse or lakehouse, but the main differences are in the skills of employees and the way how a company looks at data and uses data.

Within diagnostic analysis, user interpretation remains the key. In these companies, which are more focused on diagnostic analysis, GenAI could play a crucial role in the basics of coding, generating code, and debugging, which can ease the transition into performing data analysis. At the same time, GenAI could be used for documentation purposes, as a creative assistant, or as a sparring partner, which simplifies data interpretation and requires less advanced skills to grasp key insights and identify useful analysis for progress. As a creative assistant, GenAI is mainly suited for BI and visualization purposes, helping them to translate and convert questions from the business into valuable data insights. Where the integration of GenAI tools like Copilot in Power BI could help streamline this process, improve the possibility and performance of diagnostic analysis and help companies to progress from one phase to the next one.

When companies in the middle segment progress further to predictive analysis, the insights from the business departments will grow and the phases of descriptive and diagnostic analysis will be enriched and deeper and more refined. Progressing further, companies require more advanced skills, infrastructure and organizational culture, like companies four and five. The differences between these and other companies are huge and the use of GenAI is more extensive. Companies in a more advancing phase, may utilize and will leverage GenAI for code efficiency and documentation, yet creative assistance to a lesser extent. Thereby, it can be utilized to assist in setting up predictive analysis and provide statistical assistance. Self-directed data analysis is nowadays a step too far, something which is represented well in the GenAI tests in the attachment. ChatGPT provides good visualizations and insights, but exist still of a lot of errors and is mainly useful to provide fast insights into data. This could be more useful when GenAI models improve themselves and make it possible to integrate this within business systems and tools.

Companies in the most advanced phase, approach prescriptive analysis and level multiple data sources within the company. These companies require more advanced data teams, a data-driven culture and making most decisions based on data. Therefore, GenAI is less about foundational data analysis, but about efficiency in coding and data interpretation and process optimization. With growing experience, they can integrate GenAI into their existing infrastructure or build an infrastructure around a model. Prescriptive models require advanced econometric skills and good data validation. Companies progressing in predictive analysis are beginning to explore prescriptive approaches, often keeping human oversights while incorporating business logic and automatic triggers to optimize decision processes. Therefore, in general, prescriptive analysis remains still a step too far. A human-in-the-loop approach may still be necessary or wanted to maintain oversight and control rather than fully automated decisions.

The analysis above leads to a general model, where the different data analysis levels could be reflected on the different dimensions and GenAI possibilities. The general model is illustrated in Figure 5 and contributes to understanding the relation between the dimensions of data analysis, levels of data analysis and GenAI. Table 9 in the Appendix represents the expanded model, with phases more refined and worked out. The model underlines which data dimensions are the most important in every phase of analysis and which forms of GenAI, discussed contribute to this. It is important to note that the data dimensions and forms of GenAI aren't limited to these applications, but applicable in other levels of data analysis mentioned above. After every arrow and step towards a new data analysis level, a specific term applies representing this area. Alignment presents aligning different people, for a collective culture, data sources and belonging to IT architecture and the skills of employees. In the professionalizing phase, companies not only work on past data, but also try to estimate the future and professionalize the dimensions mentioned before. In the automation phase, companies not only project the future, but also require automated actions based on the projections.



Figure 5, Levels of data analysis and relation with GenAI and data dimensions.

6. Conclusion and discussion

This study has proposed an overview of the utilization of data analysis within SMEs and what role GenAI could play in this. The study goes into levels of data analysis, underlying dimensions and opportunities of GenAI.

6.1 Discussion

The main goal of this study was to give an overview of the use of data analysis and how GenAI could assist with this. By studying how different SMEs within the production and trade sector utilize data analysis and GenAI, the different stages of data analysis and the impact of GenAI offer a guideline for scientists on what's used and for practitioners on how to implement data analysis and GenAI. Thereby, it underlines the relation between the different levels of data analysis and the role of GenAI.

Within the current theory, insights into the utilization of data analysis and opportunities of GenAI are scarce. Across GenAI for data analysis, the findings of this study correspond with the theory from Inala et al. (2024), Berr et al. (2024) and DeJeu (2024), however, it also proposes some new findings, in the form of creativity, problem-solving power of GenAI and the integration of GenAI. This creates a new opening in research and theoretical exploration within other areas.

Although, in the current literature, there is done into data analysis dimensions maturity, it doesn't explore the connection with the different levels of data analysis. The study bridges that gap and brings some first insights into the relation between data analysis dimensions and the levels of data analysis.

In practical applications, this creativity and problem-solving power is mainly suited for BI and visualization purposes, however, it could be interesting and deployed for other use cases and areas. In comparison with the expectations and the earlier research on the general use of GenAI, the use of GenAI for data analysis is quite high. Unless GenAI is a new technology with a lot of challenges, its value and potential are recognized.

Are the companies on the right track, or are they heading in a swamp? Currently, the companies are testing a lot with different GenAI functionalities. As GenAI, will reshape the future, also of data analysis, it is better to start now, than within a few months or years. If companies follow the different possibilities, like mentioned in Table 5, and know how GenAI works, how to prompt and what to do, they will be on the right track for the periods to come. When companies aren't on the right track, this creates space and something where consultancy firms can offer valuable assistance.

The expectation is, that the use of GenAI will rise and companies will easily increase the level of data analysis. This will create new theoretical insights and change the current literature about data analysis. GenAI will probably create extra possibilities and companies will evolve themselves in the use of it. The impact will especially be in coding assistance and the problem-solving power of GenAI. Beyond that, as self-directed analysis and the integration of GenAI within systems will rise, makes GenAI more accessible and integrated at every level, which will develop the theory and practice concerning to data analysis.

As GenAI offers numerous services for companies, consultancy firms must also adapt their services. On the one hand, GenAI will transform the way companies operate, also impacting consultancy firms themselves. On the other hand, this has also impacted on the way how to think and adapt our offerings. There should be an increasing focus on training on how to use GenAI and how to leverage it as assistance. An example here is the use of GenAI for diagnostic analysis and interpret something or to set up a predictive model. However, the revolution of GenAI goes fast and GenAI would help companies and employees within companies, GenAI wouldn't replace domain knowledge, as also mentioned by Rajaram & Tinguely (2024). (Gen) AI wouldn't replace you. A person using (Gen) AI would.

6.2 Conclusion

In the conclusion, the general research question and related sub-questions will be handled. The first research question goes into the utilization of data analysis development in SMEs. Notably, there is no clear separation between the different types of analysis, rather than data analysis is a continuous, evolving process and companies work to enrich and get deeper insights. What can be concluded is that SMEs in the trade and manufacturing industry mainly operate in the transition between diagnostic and predictive analysis, however, prescriptive analysis remains still a step too far.

The second research question goes into the different influencing dimensions that impact the different levels of data analysis. Ultimately, every dimension plays a, but different role in advancing data analysis. For companies in the beginning phase, starting with an IT structure and tooling, create a data team structure and work on your employee skills. For companies in the middle phase, the data strategy and data-related culture are dimensions with an underscored focus and need to work on data management and data quality. While more advanced analysis requires integrating different data sources, and utilizing IT and data to integrate and visualize it, it also requires a strong data culture and strategy to get everyone in the same direction, top-down and bottom-up.

Concluding, the IT architecture and IT/Data tooling are in most cases not the root problem and could be managed. However, the real challenges are in the skills of employees and a clear plan for data management, quality and a data strategy within the company.

The last sub-question aims at the opportunities GenAI provides. The first major advantage GenAI gives is coding assistance, in writing code and controlling code, error handling and debugging. Additionally, GenAI can serve as a task formulator, assisting in code documentation and acting as a creative assistant, or assisting as a data assistant, or performing self-directed analysis. Therefore, GenAI should have more value when integrating it into, for example, BI software, like Copilot within Power BI.

These three sub-questions help to answer the general research question of this thesis; "*How can GenAI support data analysis for SMEs*?". The question could be answered by reflecting on the different possibilities GenAI gives across the different forms of data analysis. Here, the model in Table 5 and Figure 4 could help to understand the situation.

Companies in the beginning phase could mainly rely on coding assistance, as documentation assistance, creative assistance, or as a sparring partner. Companies in a more advancing phase, could mainly leverage GenAI for code efficiency, documentation, and creative assistance to a lesser extent. Therefore, GenAI should have more value when integrating it into, for example, BI software, like Copilot within Power BI. This currently primarily helps users better understand and interact with data and makes it easier to start with diagnostic analysis, as it lowers the barrier to interpreting data and identifying patterns, and supports the possibility of starting with predictive analysis and replacing algorithms. Companies in the most advanced phase, could leverage the previously mentioned aspects, as well as integrate GenAI on a larger scale, by replacing traditional algorithms and building an infrastructure around GenAI. However, this can enhance a lot of value, it is only relevant for companies at more advanced infrastructure and analytical stages.

So concluding, companies in the beginning phase could mainly use GenAI mainly as a coding assistant and as a creative assistant with problem-solving power, which could partially allocate time, capacity and knowledge constraints. Companies further on, more for efficiency purposes and companies in an advanced phase for integration of GenAI and replacing traditional machine learning models. This changes the way how consultancy works and needs to adapt its services. There needs to

be more emphasis on data management and quality, with GenAI, what you put in, is what you get out, making data management and quality more critical in the long run.

6.3 Limitations

This explorative study gives an impression of the use of data analysis within SMEs in the trade and production sector and a first impression of the use of GenAI. The study provides a good overview of the whole situation, however, it sometimes lacks a little bit of depth and a deep and broad enough validation.

Based on a larger sample of interviews, there might be new insights, therefore, the largest number of attendees were active in the trade sector, making it difficult to determine if the results are representative of the production and trade sector. This also makes it more difficult to generalize the findings of the research to other sectors and what these results means for them. An important note to make is that, through the way of sampling, it could be possible that these companies are more advanced in data analysis regarding to the whole population. As a result, generalizing the research findings becomes more challenging to generalize the findings of the research.

Regarding GenAI, it is an emerging and rapidly evolving technology. By the newness and rapid changes it is difficult to make statements valid for a longer period. Thereby, due to the novelty, it is difficult to find many companies with the same approach, also because a lot of them are still in the testing phase. It also becomes more challenging to generalize the current situation and statement to multiple companies. Because all of these companies came out of the network of a consultancy club or were reached via purposive sampling on LinkedIn, the use of data analysis and GenAI for data analysis is probably could be higher.

6.4 Further research

For further research, it would be valuable to expand the scope of the current set of companies, including other industries. By analyzing more companies and different sectors, it could be possible to compare differences between industries, uncover new relations, patterns, insights and provide additional research evidence. Thereby, a long-term approach, examining developments over time, could offer a perspective on the evolution of how companies develop the use of data analysis and GenAI. A follow-up study based on the developments over time will be suggested.

Furthermore, this study focuses on the use of GenAI on data analysis, it could be interesting to investigate how GenAI makes an impact in other business areas, for example changing the job of a marketeer or photo shopper. By having insights into how GenAI is utilized in other areas, similarities and differences could be identified, lessons could be learned on how to use and implement this successfully in practice.

References

Abdin, M., Jacobs, S. A., Awan, A. A., Aneja, J., Awadallah, A., Awadalla, H., Bach, N., Bahree, A., Bakhtiari, A., Behl, H., Benhaim, A., Bilenko, M., Bjorck, J., Bubeck, S., Cai, M., Mendes, C. C. T., Chen, W., Chaudhary, V., Chopra, P., . . . Zhou, X. (2024). PHI-3 Technical Report: A highly capable language model locally on your phone. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2404.14219

Adeoye-Olatunde, O. A., & Olenik, N. L. (2021). Research and scholarly methods: Semi-structured interviews. *JACCP JOURNAL OF THE AMERICAN COLLEGE OF CLINICAL PHARMACY*, 4(10), 1358–1367. https://doi.org/10.1002/jac5.1441

Al-Okaily, A., Teoh, A. P., & Al-Okaily, M. (2023). Evaluation of data analytics-oriented business intelligence technology effectiveness: an enterprise-level analysis. *Business Process Management Journal*, *29*(3), 777–800. https://doi.org/10.1108/bpmj-10-2022-0546

Al-Sai, Z. A., Abdullah, R., & Husin, M. H. (2019). A review on big Data maturity Models. 2019 IEEE Jordan International Joint Conference on Electrical Engineering and Information Technology (JEEIT). https://doi.org/10.1109/jeeit.2019.8717398

Anthropic. (2024). The Claude 3 Model Family: Opus, Sonnet, Haiku: Claude-3 model card.

Arunachalam, D., Kumar, N., & Kawalek, J. P. (2017). Understanding big data analytics capabilities in supply chain management: Unravelling the issues, challenges and implications for practice. *Transportation Research Part E Logistics and Transportation Review*, *114*, 416–436. https://doi.org/10.1016/j.tre.2017.04.001

Baijens, J., Helms, R., & Bollen, L. (2022). *Data analytics and SMEs: how maturity improves performance*. https://doi.org/10.1109/cbi54897.2022.00011

Balali, F., Nouri, J., Nasiri, A., & Zhao, T. (2020). Data-intensive industrial asset management, IoT-based algorithms and implementation. In *Springer eBooks*. https://doi.org/10.1007/978-3-030-35930-0

Bayraktar, E., Tatoglu, E., Aydiner, A. S., & Delen, D. (2023). Business Analytics Adoption and Technological Intensity: An Efficiency analysis. *Information Systems Frontiers*, *26*(4), 1509–1526. https://doi.org/10.1007/s10796-023-10424-3

Berr, A., Leelaluk, S., Tang, C., Chen, L., Okubo, F., & Shimada, A. (2024). *Educational data analysis using Generative AI*.

Bhardwaj, S. (2022). Data Analytics in small and medium enterprises (SME). *Information Resources Management Journal*, 35(2), 1–18. https://doi.org/10.4018/irmj.291691

Bhardwaj, S., Behl, A., & Pereira, V. (2023). Proposing an integrative data analytics framework for micro, small and medium enterprises: a systematic review substantiated by evidence from two case studies. *Annals of Operations Research*. https://doi.org/10.1007/s10479-023-05186-9

Bruno, Z. (2024). The impact of artificial intelligence on business operations. *Global Journal of Management and Business Research*, 1–8. https://doi.org/10.34257/gjmbrdvol24is1pg1

Bubeck, S., Chandrasekaran, V., Eldan, R., Gehrke, J., Horvitz, E., Kamar, E., Lee, P., Lee, Y. T., Li, Y., Lundberg, S., Nori, H., Palangi, H., Ribeiro, M. T., & Zhang, Y. (2023). Sparks of Artificial General Intelligence: Early experiments with GPT-4. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2303.12712

Caballar, R. (2024, August 12). *Generative AI vs. predictive AI: What's the difference?* IBM Blog. https://www.ibm.com/blog/generative-ai-vs-predictive-ai-whats-the-difference/

Caldeira. (2010). Dashboards - Comunicar Eficazmente a Informação de Gestão. Edições Almedina, Coimbra.

Cao, L. (2017). Data science. ACM Computing Surveys, 50(3), 1-42. https://doi.org/10.1145/3076253

Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2019, October 10). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science*, *48*(1), 24–42. https://doi.org/10.1007/s11747-019-00696-0

Delen, D., & Ram, S. (2018). Research challenges and opportunities in business analytics. *Journal of Business Analytics*, 1(1), 2–12. https://doi.org/10.1080/2573234x.2018.1507324

Duan, L., & Xiong, Y. (2015). Big data analytics and business analytics. *Journal of Management Analytics*, 2(1), 1–21. https://doi.org/10.1080/23270012.2015.1020891

Duan, Y., Cao, G., & Edwards, J. S. (2020). Understanding the impact of business analytics on innovation. *European Journal of Operational Research*, 281(3), 673–686. https://doi.org/10.1016/j.ejor.2018.06.021

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *Academy of Management Review*, 14(4), 532. https://doi.org/10.2307/258557

Espadinha-Cruz, P., Godina, R., & Rodrigues, E. M. G. (2021). A review of data mining applications in semiconductor Manufacturing. *Processes*, 9(2), 305. https://doi.org/10.3390/pr9020305

Gartner. (2017). *Planning Guide for Data and Analytics*. Retrieved November 20, 2024, from https://www.gartner.com/en/documents/3471553

Giray, L. (2023). Prompt Engineering with ChatGPT: A guide for academic writers. *Annals of Biomedical Engineering*. https://doi.org/10.1007/s10439-023-03272-4

Gröger, C., Hillmann, M., Hahn, F., Mitschang, B., & Westkämper, E. (2013). The Operational Process Dashboard for manufacturing. *Procedia CIRP*, *7*, 205–210. https://doi.org/10.1016/j.procir.2013.05.035

Gudivada, V., Irfan, M., Fathi, E., & Rao, D. (2016). Cognitive Analytics. In *Handbook of statistics* (pp. 169–205). https://doi.org/10.1016/bs.host.2016.07.010

Gupta, V. (2024). An Empirical Evaluation of a Generative Artificial Intelligence Technology Adoption Model from Entrepreneurs' Perspectives. *Systems*, *12*(3), 103. https://doi.org/10.3390/systems12030103

Harding, J. A., Shahbaz, M., & Kusiak, A. (2006). Data Mining in Manufacturing: A review. *The American Society of Mechanical Engineers*. https://doi.org/10.1115/1.2194554

Hassani, H., & Silva, E. S. (2023). The role of ChatGPT in Data Science: How AI-Assisted conversational Interfaces are revolutionizing the field. *Big Data and Cognitive Computing*, 7(2), 62. https://doi.org/10.3390/bdcc7020062

Hausladen, I., & Schosser, M. (2019). Towards a maturity model for big data analytics in airline network planning. *Journal of Air Transport Management*, 82, 101721. https://doi.org/10.1016/j.jairtraman.2019.101721

Hilbert, M., & López, P. (2011). The world's technological capacity to store, communicate, and compute information. *Science*, *332*(6025), 60–65. https://doi.org/10.1126/science.1200970

Inala, J. P., Wang, C., Drucker, S., Ramos, G., Dibia, V., Riche, N., Brown, D., Marshall, D., & Gao, J. (2024). Data analysis in the era of generative AI. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2409.18475

Jangam, D. S., & R. Deshpande, Dr. A. (2023). Business Analytics Using Predictive Algorithms. *International Journal on Innovation and Recent Trends in Computing and Communication*.

Jeyanthi, P. M., Choudhury, T., Hack-Polay, D., Singh, T. P., & Abujar, S. (2021). Decision intelligence analytics and the implementation of strategic business management. In *EAI/Springer Innovations in Communication and Computing*. https://doi.org/10.1007/978-3-030-82763-2

Justy, T., Pellegrin-Boucher, E., Lescop, D., Granata, J., & Gupta, S. (2023). On the edge of Big Data: Drivers and barriers to data analytics adoption in SMEs. *Technovation*, *127*, 102850. https://doi.org/10.1016/j.technovation.2023.102850

Kanbach, D. K., Heiduk, L., Blueher, G., Schreiter, M., & Lahmann, A. (2023). The GenAI is out of the bottle: Generative artificial intelligence from a business model innovation perspective. *Review of Managerial Science*, *18*(4), 1189–1220. https://doi.org/10.1007/s11846-023-00696-z

Król, K., & Zdonek, D. (2020). Analytics Maturity Models: An Overview. *Information*, *11*(3), 142. https://doi.org/10.3390/info11030142

Li, J. (2024). The past, present and future of Enterprise Resource Planning. *Journal of Enterprise and Business Intelligence*, 32–41. https://doi.org/10.53759/5181/jebi202404004

Marohn, R. K., & Li, Y. (Eds.). (2024). Data Analytics Capability Maturity Models for Small and Medium Enterprises – A Systematic Literature review [Article]. *ResearchGate*.

Mcaleer, M., Chang, C., Wing, A., Wong, K., Tiwari, A., Moslehpour, M., Pan, V. S., Lee, C., Yeng, P., & Cheang, S. (2021). Predictive Analytics in Business Analytics: Decision tree. *Advances in Decision Sciences*, *26*(1), 1–30. https://doi.org/10.47654/v26y2022i1p1-30

McCarthy, R. V., McCarthy, M. M., Ceccucci, W., & Halawi, L. (2019). Applying predictive analytics. In *Springer eBooks*. https://doi.org/10.1007/978-3-030-14038-0

McKinsey. (2024, November 27). *Capturing the generative AI opportunity for the Dutch labor market*. McKinsey & Company. https://www.mckinsey.com/capabilities/quantumblack/our-insights/capturing-the-generative-ai-opportunity-for-the-dutch-labor-market

Morr, C. E., & Ali-Hassan, H. (2019). Descriptive, predictive, and prescriptive analytics. In *SpringerBriefs in health care management and economics* (pp. 31–55). https://doi.org/10.1007/978-3-030-04506-7_3

Mount Data, guide to impact | *Business & Data Analytics*. (n.d.). Mount Data. https://www.mountdata.nl/

Müller, J. (2019, January 1). How SMEs can participate in the potential of big data within Industry 4.0. In *International Conference on Information Systems 2019 Special Interest Group on Big Data Proceedings*. https://aisel.aisnet.org/sigbd2019/1/

Muller, L., & Hart, M. (2016). Updating business intelligence and analytics maturity models for new developments. In *Lecture notes in business information processing* (pp. 137–151). https://doi.org/10.1007/978-3-319-32877-5_11

Nag, R., Hambrick, D. C., & Chen, M. (2007). What is strategic management, really? Inductive derivation of a consensus definition of the field. *Strategic Management Journal*, *28*(9), 935–955. https://doi.org/10.1002/smj.615 Nawaz, A., & Shabir, G. (2024). Transforming Work Performance: The Role of Artificial Intelligence in Job Enhancement. *ResearchGate.net*. https://doi.org/10.13140/RG.2.2.11699.85287

Ojiako, U., Chipulu, M., Karatas-Ozkan, M., Siao, M., & Maguire, S. (2015). Intelligence management opportunities for SMEs. *Journal of Small Business and Enterprise Development*, 22(4), 698–715. https://doi.org/10.1108/jsbed-02-2012-0030

OpenAI. (2023). GPT-4 Technical Report. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2303.08774

Perdana, A., Lee, H. H., Koh, S., & Arisandi, D. (2021). Data analytics in small and mid-size enterprises: Enablers and inhibitors for business value and firm performance. *International Journal of Accounting Information Systems*, *44*, 100547. https://doi.org/10.1016/j.accinf.2021.100547

Pratama, M. R., Alfiana, M. U., & Muttaqin, M. F. (2024). Smart Urban Mobility: transport planning in the age of big data and digital twins. *European Planning Studies*, 1–2. https://doi.org/10.1080/09654313.2024.2353671

Rajaram, K., & Tinguely, P. N. (2024). Generative artificial intelligence in small and medium enterprises: Navigating its promises and challenges. *Business Horizons*, 67(5), 629–648. https://doi.org/10.1016/j.bushor.2024.05.008

Rowley, J. (2002). Using case studies in research. *Management Research News*, 25(1), 16–27. https://doi.org/10.1108/01409170210782990

Sarker, I. H. (2021). Data Science and Analytics: An Overview from Data-Driven Smart Computing, Decision-Making and Applications Perspective. *SN Computer Science*, *2*(5). https://doi.org/10.1007/s42979-021-00765-8

Sharma, H. K., Patni, J., Ahlawat, P., & Biswas, S. S. (2020). Sensors based smart healthcare framework using Internet of Things (IOT). *International Journal of Scientific and Technology Research*, *9*(2), 1228–1234. https://www.ijstr.org/final-print/feb2020/Sensors-Based-Smart-Healthcare-Framework-Using-Internet-Of-Things-iot.pdf

Shrivastava, A. (2024). Artificial intelligence (AI): evolution, methodologies, and applications. *International Journal for Research in Applied Science and Engineering Technology*, *12*(4), 5501–5505. https://doi.org/10.22214/ijraset.2024.61241

Taranto-Vera, Galindo-Villardón, & Salazar-Villalva, V. (2021). Algorithms and software for data mining and machine learning: A critical comparative view from a systematic review of the literature. *The Journal of Supercomputing*, *77*, 11481–11513. https://doi.org/10.1007/s11227-021-03708-5

Van Tonder, C., Bossink, B., Schachtebeck, C., & Nieuwenhuizen, C. (2024). Key dimensions that measure the digital maturity levels of Small and Medium-Sized Enterprises (SMEs). *Journal of Technology Management & Innovation*, *19*(1), 110–130. https://doi.org/10.4067/s0718-27242024000100110

Verschuren, P. J. M., & Doorewaard, H. (2007). Het ontwerpen van een onderzoek. In *Den Haag : Lemma eBooks*. https://lib.ugent.be/nl/catalog/rug01:001272143

Vijayarani, S., Ilamathi, J., & Nithya. (2015). Preprocessing techniques for text mining - An overview. *International Journal of Computer Science & Communication Networks*.

Winkler, C., Hammoda, B., Noyes, E., & Van Gelderen, M. (2023). Entrepreneurship Education at the dawn of generative artificial Intelligence. *Entrepreneurship Education and Pedagogy*, *6*(4), 579–589. https://doi.org/10.1177/25151274231198799
Wolfswinkel, J. F., Furtmueller, E., & Wilderom, C. P. M. (2011). Using grounded theory as a method for rigorously reviewing literature. *European Journal of Information Systems*, *22*(1), 45–55. https://doi.org/10.1057/ejis.2011.51

Wolniak, R., & Grebski, W. (2023). The application of business analytics in cost reduction. *Scientific Papers of Silesian University of Technology Organization and Management Series*, 2023(184). https://doi.org/10.29119/1641-3466.2023.184.36

Yin, R. K. (2017). *Case Study Research and Applications: Design and methods*. http://cds.cern.ch/record/2634179

Yusuf, N. S. O., Durodola, N. R. L., Ocran, N. G., Abubakar, N. J. E., Echere, N. a. Z., & Paul-Adeleye, N. a. H. (2024). Challenges and opportunities in AI and digital transformation for SMEs: A cross-continental perspective. *World Journal of Advanced Research and Reviews*, *23*(3), 668–678. https://doi.org/10.30574/wjarr.2024.23.3.2511

Appendix

Appendix A: Articles literature review <u>Data analysis</u>

Authors & Title	Scope of the article and papers
Autors & The	Scope of the article and papers
(Al-Okaily et al., 2023).	Al-Okaily et al. (2023) analyze the impact of
<i>"Evaluation of data analysis-oriented business"</i>	business intelligence on enterprise-level. They
intelligence technology effectiveness: an	also describe extensively what impact business
enterprise-level analysis."	intelligence and data analysis could have on
	different areas within an organization.
(Morr & Ali-Hassan, 2019)	The book of Morr and Ali-Hassan (2009) goes
"Descriptive, predictive, and prescriptive	into the use of analysis, specifically in healthcare
analysis"	analysis. However, the book addresses
	applications and use cases of different kinds of
	analysis in practical sense, also relevant for this
	research.
(Balali et al., 2020)	The book goes into the use of IoT- algorithms and
"Data- intensive industrial asset management.	implementation within industrial asset
IoT-based algorithms, and implementation"	environments. A few Chapters provides into
	various data analysis applications, creating
	awareness on practical use cases
(Jeyanthi et al., 2021)	Jeyanthi et al. (2021) describe the role and
"Decision intelligence analysis and the	applications of business analysis and data analysis
implementation of strategic business	within strategic business management, also
management"	providing valuable insights into applications at a
	lower organizational level.
(Delen & Ram, 2018).	Delen & Ram (2028) cover the most important
"Research challenges and opportunities in	research challenges and opportunities in business
business analysis. "	analysis within business analysis. They provide an
	emphasis on the use of prescriptive and predictive
	analysis.
(Sarker, 2021).	The article by Sarker et al. (2021) provides an
"Data Science and Analysis: An Overview from	overview of the science of data analysis and the
Data-Driven Smart Computing, Decision-Making	current challenges, applications and impact on
and Applications Perspective."	computing and decision-making.
(McCarthy et al., 2019)	This article goes deeper into the applications of
"Applying predictive analysis"	predictive analysis. The article covers a guide on
	how to perform predictive analysis, also
	applicable on other kinds of analysis.
(Jangam & R. Deshpande, 2023)	Jangam & R. Deshpande (2023) go deeper into
"Business Analysis Using Predictive Algorithms."	the use cases of predictive algorithms, but also
	what's needed for that.

Table 6, Data analysis literature.

Data analysis maturity

Authors & Title	Scope of the article and papers
(Bhardwaj, 2022) "Data Analysis in small and medium enterprises (SME)"	Bhardwaj (2022) focused on how SMEs apply data analysis, including the drivers, challenges and impact of the organization. The article is specifically interesting for addressing the gaps in current data analysis literature.
Arunachalam et al., 2017) "Understanding big data analysis capabilities in supply chain management: Unravelling the issues, challenges and implications for practice."	This paper goes into the way how big data analysis support and improve the supply chain. It is focused specifically on the supply chain of certain forms and includes issues, challenges and implications for practical applications.
(Marohn & Li, 2024) "Data Analysis Capability Maturity Models for Small and Medium Enterprises – A Systematic Literature Review"	The literature review from Marohn & Li (2024) identified 18 articles about data analysis capability maturity models. It provided the most important dimensions examined in different articles addressing the data analysis literature. This paper is the backbone and start of literature review part 3.3.
(Hausladen & Schosser, 2019) "Towards a maturity model for big data analysis in airline network planning."	This article from Hausladen & Schosser (2019) goes deeper into the maturity model within airline network planning. However, this is executed within the airline network planning, dimensions and the structure of the dimensions could also be useful for this research.
(Van Tonder et al., 2024) "Key dimensions that measure the digital maturity levels of Small and Medium-Sized Enterprises (SMEs)."	Van Tonder et al. (2024) elaborate more on the general digital maturity level of a business instead of only data analysis maturity. In this case, digital maturity is measured more from an organizational perspective.
(Muller & Hart, 2016) "Updating Business Intelligence and Analysis Maturity Models for New Developments"	The article from Muller & Hart (2016) is important in creating insights in updating maturity models alongside developments in technologies and applications. Although the article is from 2016, the approach used in the research could create useable insights for this research.
(Baijens et al., 2022) "Data analysis and SMEs: how maturity improves performance."	The last article from Baijens et al. (2022) expands on the perspective of delving deeper into the relationship between maturity and performance within data analysis.

Table 7, Data analysis maturity literature

Generative AI

Authors & Title	Scope of the article and papers
Inala et al. (2024)	The paper explores the potential of Generative Ai-
Data Analysis in the Era of Generative AI	powered tools to support and reshape data analysis
	and focusses on design considerations and
	challenges. I his article is one of the few articles in
	the scarce literature that combines GenAI and data
(Hassani & Silva (2023)	This paper explores the role of Generative Al
"The Role of ChatGPT in Data Science: How	(Specifically ChatGPT) in Data Science and
AI-Assisted Conversational Interfaces Are	discusses the consequences and possibilities of it, like
Revolutionizing the Field"	the reducing needs of Data Scientists.
DeJeu (2024)	This article presents a study into the use of ChatGPT
"Using Generative AI to Facilitate Data	for data analysis. It describes the possibilities
Analysis and Visualization: A Case Study of	ChatGPT gives, advantages and disadvantages of it.
Olympic Athletes"	This article could provide useful insights into how to
	perform a data analysis with ChatGPT and what
	possibilities it gives.
Berr et al. (2024)	In this paper, the authors deep-dive into the
"Educational data analysis using Generative	possibilities of different Generative AI tools for data
AI"	analysis. This creates valuable insights into the
	possibilities of GenAi and data analysis.
Rajaram & Tinguely (2024	This paper goes into the use of GenAi within SMEs.
"Generative artificial intelligence in small	It lights out the promises and challenges for GenAI
and medium enterprises: Navigating its	within SMEs and names out examples within data
promises and challenges"	analysis.
Liu & Wang (2024)	This paper goes into the entrepreneurial and
<i>"Generative artificial intelligence (GenAI)</i>	organizational impact GenAI could have. It
and entrepreneurial performance:	establishes the entrepreneurial performance and
implications for entrepreneurs"	internal integration and external collaboration as
	mediating roles.

Table 8, Generative AI literature

Appendix B: Interview questions

1. Introduction and general information \rightarrow 5 minutes

First of all, thank you and your organization X for participating in this interview. <u>Explain goal of this</u> <u>interview and research</u>. Data is used for research purposes only and names/ company names will be anonymized. Only the size and the sector of the company will be revealed and is relevant for the research.

Possibility to sign informed consent paper.

- What is your current role in the organization?
- What is the current size and market the company is in?
- In what sense do you have to do with data/ data analysis or things related to this within the organization?

2. Dimensions \rightarrow 10 minutes

We'll start the interview with some dimensions that influence the level of data analysis, afterwards data analysis on different levels: descriptive, diagnostic, predictive and prescriptive analysis will be handled. The interview is closed with the influence and possibilities of Generative AI.

IT Architecture and data sources

- How is the architecture conFigured and what different applications and data sources are used?
- How are these different applications integrated?
- What where the reasons to do this like this?

IT Tools (Data tools)

- What kind of IT/Data Tools or applications are used?
- How is this process guaranteed?

Data management/ quality

- How is data management organized? Who's responsible for this process?
- How do you manage the data quality?
- Are there certain checks to check the data, for example missing data or data not in the right format?

Strategy, structure, culture

- What is the companies vision about data, for example in the Management Team/ Management Board?
- Is there an IT/data strategy that is worked out and how/ what role does different departments have in his?

Employee Skills

- To go a little bit deeper into the applications, architecture, structure, what are employee skills needed to have?
- What are skills you missing/ need to have to improve data analysis or get a step further?
- Is there a consultancy or second party who've helped you with anything of the thins mentioned above? In what ways?

3. Descriptive, diagnostic, predictive and prescriptive analysis \rightarrow 10/15 minutes

Now, I'll handle the different levels of data analysis, going deeper into descriptive, diagnostic, predictive and prescriptive analysis.

Descriptive analysis:

Descriptive analysis is about the use of data to answers questions about what's happened. Think about KPIs or key Figures in the form of dashboards.

- In what forms do you make use of descriptive analysis?
- In what departments or for what functions do you make use of descriptive analysis?
- Why do you make use of descriptive analysis in these departments? What does it delivers you?

Diagnostic analysis:

Diagnostic analysis is about the use of data to answers questions about why something has happened. An example could be that the turnover has increased, diagnostic analysis gives insights into why the turnover has increased, for example in introducing a new product or getting extra sales from a customer.

- In what forms do you make use of diagnostic analysis?
- In what departments or for what functions do you make use of diagnostic analysis?
- What relation does diagnostic analysis have with descriptive analysis in your case and what is the extra value it gives?

Predictive analysis:

Predictive analysis goes a step further and goes beyond the question of what will happen in the future and delves into forecasting outcomes and adapting business operations accordingly to this.

- Do you make use of predictive analysis and in what forms?
- In what departments do you make use of predictive analysis and for what specific insights?
- Does predictive analysis gives insights in the future what you want?

Prescriptive analysis:

Prescriptive analysis, lastly, goes one more step further and will also recommend some actions regarding to predictive analysis. An example could be when is expected the sales will rise and a certain product will run out of stock, an recommend action to purchase a certain product is done.

- Do you make use of prescriptive analysis and in what forms?
- What departments do you make use of prescriptive analysis?
- Is prescriptive analysis integrated in some systems you currently use as an organization?
- Lastly, what forms of data analysis would you further invest in the future and for what reasons?

4. Generative AI 10/15 minutes

- Currently there is a big boom of (Gen) AI, with the rise of different applications like ChatGPT, Copilot and Gemini. How do you see the role of Generative AI within data analysis?
- Do you make use of Generative AI Tools (Like ChatGPT or Copilot) for any kinds of data analysis related tasks?

Generative AI tools could offer different opportunities and assist within data analysis like idea generation, cleaning data, creating missing data, assist within coding and making visualizations. We'll address the most important opportunities right now:

Task formulator

- Do you make use of GenAI tools for idea generation or documentation?
- Could you give some examples?
- What do you think of the role of GenAI within idea generation or documentation, also for the future?

Coding assisting

- Do you make use of GenAI tools in the form of coding assisting?
- What do you think of the role of GenAI within this?
- In general, what works and what works not? Is this more in creating codes or generating codes?

Data assistance

- Do you make use of GenAI tools in the form of self-directed data analysis?
- What do you think of the role of GenAI within this?
- Is GenAI for example suitable for small and fast data analysis?

Other applications

- Are there other applications or ways you use GenAI currently? Can you explain these?
- What are the major cons of GenAI?

Future:

- If you think about Generative AI, could this possibly address underlying skills that are missing?
- How do you see the vision of Generative AI in the future towards your own company (SMEs)?
- And for other companies/ sectors?

Appendix C: Full list of interview attendees

Interview participants:

- Business Intelligence Specialist in a trade company
- Data Analyst in trade company
- Manager Data & Analysis in trade company
- Marketing Lead in business analysis and data driven marketing in trade company (business telephony)
- Machine Learning Engineer in trade company
- Data and Business Analyst production company
- Data Analyst in a production company
- GenAI Specialist in a trade company

Appendix D: Data structure and illustrative quotes



Figure 6, data structure.

First-order concept	Quote
1.1 IT Architecture and data sources	"The ERP system covers the most, this is naturally everything what has to do with the transactions and order liens etcetera".
1.2 IT Tools / Data Tools	"We are current busy with outfasing Click Sense and investing in Power BI".
1.3 Data management and quality	"This is not that good occupied within our organization, this is a topic we'll focus on the upcoming months and years".
1.4 Strategy, structure and culture	"I think this has two sides, firstly from the management there was asked to monitor on KPI's, think on a certain lead time that needs to be gathered, on reporting sides, how are we doing it in the organisation".
1.5 Skills of employees	"Of course, you need to be inquisitive, you need to like the puzzle. Figuratively speaking, every data question is a puzzle that we need to solve. Inquisitive, the drive and passion, the will to do it every time better".
2.1 "What" has happened?	"We genuinely make use of descriptive analysis, that's the main part. And then, we're mainly talking about sales and logistics".
3.1 "Why" something has happened?	"We deliver onto the business what's descriptive, and they need with their own knowledge interpret things".
4.1 What will happen in the future?	"And, that's a step where we really busy with, but where I see we don't have the capacity and time, that both sides of the medallion are to scarce".
5.1 What will happen and what should we do in the future?	"I don't know, I need to be fairly, if Slim4 has these module to make automatically purchase orders. "Yes, that's Slim4 where that's in".
First-order concept	Quote
6.1 Writing code	"For my work, within executing tasks I use it a lot, think about Dax measures, purely Syntax, SQL".
6.2 Controlling code	"Yes, for us, simply said, where is for us the most added value of GenAi in data area. Then, for us, this is mainly on formulas, error handling, that kind of things. That's what I see as most important".
7.1 Documentation	"I'm not a star in formatting, fortunately, this doesn't need to, so write documentation around it, check that documentation and then you'll have all the comments around it and top, then I'll work in general very secure".
7.2 Visualisation idea creation (Problem solving)	"So I'll ask what should be a good visualisation? And then he also comes sometimes with a picture or so".
8.1 Sparring partner	"Purely, on the moment that I don't come out a certain thing, I use ChatGPT as sparrings partner or Copilot."
8.2 Doing data analysis	"No, I only can speak for myself. I've done some analysis with CSV uploading and asking questions. The first time it works, sometimes less. But yess, I mostly use it. And if it is ridiculous or nonsense I'll do it myself. If it isn't nonsense, I've gathered one hour".
9.1 Copilot integrated	"The idea is to use Copilot in Power BI, to use it with the data which is in Power BI and based on that they can do fast analysis. But they also needs to be trained on, and we need to have a look how we can deal with security related things"

"We're building an infrastructure around a language model. In this case is that Gemini, because we're partner from Google".

Figure 7, illustrative quotes for first-order concepts.

9.2 Replacing algorithms

Appendix E: Overview of GenAI possibilities in different levels data analysis.

	Beginning	Basic	Advanced	Expert
Dimensions	Descriptive	Diagnostic	Predictive	Prescriptive
IT/Data sources	 One or a few source(s) ERP system Excels 	 Different sources (ERP, CRM, online/website data) Company specific systems Excels for budgeting 	 Multiple sources (ERP, CRM, online website data) Company specific systems Excel for budgeting 	 Mostly all possible sources Company specific systems Excel for budgeting
IT/ Data Tooling	 Excel, starting with power BI No data warehouse/lake house 	 BI tooling (Power BI, Tableau) Beginning phase with data warehouse/lakehouse 	 BI Tooling (Power BI, Tableau) Central data warehouse/ lakehouse 	 BI Tooling (Power BI, Tableau) Central data warehouse/ lakehouse or in the cloud
Strategy, Structure, Culture	 One data analyst Insufficient strategy Less data-oriented as company 	 One or a few employees in team More data- orientated 	 Small data team Data- orientated culture and management 	 Small data team Data orientated- culture Use all data possible
Skills of employees	 SQL, DAX Logical reasoning Business wise thinking System/ tool knowledge Ad-hoc data analysis 	 SQL, Python, Dax Logical reasoning Business wise thinking System/ tool knowledge Backend and frontend skills 	 SQL, Python, Dax Logical reasoning Business wise thinking System/ tool knowledge Backend or front-end skills More complex and statistical analysis 	 SQL, Python, Dax Logical reasoning Business wise thinking System/ tool knowledge Backend or front- end skills Complex and statistical analysis and models Econometric skills
Data management and quality	 No/ less data checks No clear view of who's responsible for data input 	 Some checks (Data is valid and logical) User is responsible for data input 	 More checks (Data is valid and logical) User is responsible for data input 	 More checks (Data is valid and logical) User is responsible for data input
Coding assistance	- Basics of coding - Help Debugging	- More advanced coding. - Help Debugging	 More advanced coding Help Debugging Setting up predictive models Statistical assistance 	 More advanced coding. Code efficiency Help Debugging
Data assistance	 Self-directed analysis Get the essence of a dataset 	Self-directed analysisGet the essence of a dataset	 Self-directed analysis Use as sparring partner 	 Self-directed analysis Use as sparring partner

	- Use as sparring	- Help with		
	partner	diagnostic analysis		
Task	- Documentation	- Documentation	- Documentation	- Documentation
formulator	- Idea creation	- Idea creation	- Domain-knowledge	- Domain-
	- Domain knowledge	- Domain-knowledge		knowledge
GenAI		- GenAI within BI	- GenAI within BI (Copilot)	- GenAI within BI
integrated		(Copilot)		(Copilot)
_				- Infrastructure
				around GenAI
				models
				- Replace traditional
				machine learning
				models

Table 9, Overview of possibilities to deploy GenAI within different levels of data analysis.

Appendix F: Test Cases GenAI. Self-experience test with GenAI and data analysis:

Overview of dataset

Dataset: Sales data of Amazon Web Store

Number of rows: 18.326

Source: Kaggle

To conduct the analysis, a dataset that represents the sales data of a shop on the Amazon Web Store is chosen. The dataset is found on Kaggle which is world's largest data science community and consists of a lot of diverse and quality datasets. The dataset contains different columns with order ID, sales data and details about the SKU and customer. In total, 18.326 rows representing a different purchase on SKU level. The dataset is chosen, because it could represent the sales data of a SME, for example an e-commerce store on a specific sales platform like Amazon. The dataset is large enough and easy to understand. The cases will be analysed on the different levels of data analysis, like Berr et al. (2024) also did. They divided their analysis into three different levels, from less complex to most complex. Level 1 was focused on reading interaction analysis, level 2 on the factors influencing a dependent variable and level 3 on prediction analysis. In this case, the different prompts could be designed based on the different levels of analysis; descriptive, diagnostic, predictive and prescriptive analysis. For every level, around 10 different prompts will be categorized based on the datasets. The prompts needed to consist of the following elements; an instruction, context, input data and an output indicator (Giray, 2023). Thereby, iterative prompting will be used to improve outcomes (DeJeu, 2024). The focus of the tests is on functionality and support offered by GenAi, the accuracy/correctness of a GenAI tool and possible time gains of using GenAI. The results could support the literature and explorative results gathered from the semi-structured interviews.

Prompt generation

To start the analysis, the data is loaded into ChatGPT's 4.0 model and ChatGPT got a general description about the dataset and a prompt to provide an analysis based on the dataset imported. Thereby, is instructed to provide 10 different prompts for descriptive, diagnostic, predictive and prescriptive analysis, presented in Figure 8. Based on these 10 different prompts, the most suited prompts are used an the most important insights based on these prompts will be presented.

No, I want to start with the descriptive part. However, I want you to create in total 10 possible prompts for descriptive analysis and I will deliver you the prompts for the descriptive analysis afterwards

Bere are 10 potential prompts for descriptive analysis based on the dataset:

- 1. Sales Trends:
 - Analyze monthly or weekly sales trends over time. Identify peaks and dips in sales activity.
- 2. Category Performance:
 - Identify the top-performing product categories by revenue and order count.
- 3. Order Status Distribution:
 - Determine the proportion of orders that fall under each status (e.g., shipped, delivered, cancelled).
- 4. Revenue by Fulfillment Method:
 - Compare total revenue generated by different fulfillment methods (e.g., Merchant vs. Amazon).
- 6. Shipping Insights:
 - Analyze the most common shipping service levels (e.g., Standard, Expedited) and their impact on order outcomes.
- 7. Customer Buying Patterns:
 - Identify the most frequent product styles purchased by customers and their associated revenues.
- 8. Return and Cancellation Trends:
 - Assess patterns in returned or cancelled orders, including their frequency and monetary impact.
- 9. Promotional Effectiveness:
 - Examine how promotions (e.g., specific promotion IDs) influence sales and order volumes.
- 10. Currency and Pricing Trends:
- Investigate the average order value and its variations across different order attributes, such as
 product categories or shipping methods.

You can select any of these prompts, or modify them as needed, and I'll carry out the analysis for the descriptive part! Let me know which ones you'd like to proceed with.

Figure 8, ChatGPT 4.0 suggestions for descriptive analysis.

In general, ChatGPT generated useful ideas, thereby the prompts were proportionally divided over the different features and proposed realistic insights. However, the prompts were missing specific instructions regarding input features and for instance the output visualization. According to Giray (2023), prompts also needed to be set up with a clear instruction, context of the data and the specific input and output. Therefore, instruction was given to adjust prompts according to the principles Giray (2023) mentioned. This gave the following results:

 Total Sales and Orders by Product Category Analyze total sales and order count for each category using category. Amount , and order ID to identify revenue and popularity by category. Output a table with categories, sales, and order counts. 	6. Top-Selling Product Styles Identify top product styles by sales using Style and Amount to reveal customer preferences. Output a ranked list of styles with sales figures.
2. Monthly Sales Trends	7. Sales Contribution by Shipping States
Aggregate sales by month using Date and Amount to detect trends or seasonal patterns. Output a	Calculate total sales for each state using ship-state and amount to identify high-revenue regions.
line chart displaying monthly sales trends.	Output a map or table of sales by state.
3. Top 10 Cities by Total Sales	8. Average Order Value (AOV) by Category
Rank cities based on total sales using <u>ship-city</u> and <u>Amount</u> to determine revenue contributions by	Compute the average order value for each category using category and amount to find high-value
city. Output a bar chart or table of the top 10 cities.	categories. Output a table with categories and their AOV.
4. Order Status Breakdown	9. Shipping Method Preferences
Count orders by status using the <u>status</u> column to understand order outcome distribution. Output	Analyze order counts by shipping method using ship-service-level and order ID to understand
a pie chart or table showing status breakdown.	customer preferences. Output a bar chart or table of shipping method preferences.
 Fulfillment Channel Sales Contribution Analyze total sales and orders by fulfillment channel using <u>Fulfilment</u>, <u>Amount</u>, and <u>Order ID</u> to assess performance by channel. Output a table of sales and orders by channel. 	10. Cancellation Rate by Product Category Calculate cancellation rates by category using <u>category</u> and <u>Status</u> to identify frequently canceled categories. Output a table with categories and cancellation rates.

Figure 91, Adjusted prompts based on the principles of Giray (2023).

After the stage of prompt generation, the analysis was started. It began with the simplest and least complex form of analysis, descriptive analysis and ended with the most complex form, namely prescriptive analysis. Based on every level of analysis, the most important and insightful findings are discussed.

Descriptive analysis:

The analysis was started with descriptive analysis, where ChatGPT in general demonstrated very strong visualization capabilities, including new options like interactive charts.

There is started with analysing the monthly sales trends, where ChatGPT shows decent results. However it visualizes the monthly sales trends as expected, it doesn't considered the starting data of a certain dataset. Therefore he now starts with starting data 2022-03-01 and a total number of sales of 0 on that moment.





Thereby, ChatGPT gives the option to show an interactive chart, with tooltips and a hover over option. This interactive chart provides an extra insight into the visualization chart where can be zoomed into a specific date and number of sales



Figure 113, Interactive chart with monthly sales trends.

Another example is the total sales per state, where ChatGPT generated the following Figure 12. As this visualization is not directly clear, due to the high amount of different states, the GPT needed to adapt some things. First of all, changing axes, Figure 13. Thereby, it could be helpful to get only insights into the top ten number of states (Or lowest ten number of states), which provides the following insights, Figure 14.



Here is the bar chart showing total sales by state. The states are ranked in descending order of revenue to highlight the top-performing regions. Let me know if you'd like additional insights or a different type of visualization! [-.]

000000

Figure 12, Total number of sales per state.



Could you also make a visualization by states in the x-axis and order count and revenue on the y-axis?

Here is the visualization with states on the x-axis and both total sales (bar chart) and order counts (line chart) on the y-axis. It provides a clear view of how sales and order volumes vary across different states. Let me know if you'd like to explore this further! [9-] (Ψ)



In this case, ChatGPT shows its adjustable capacity to change visualizations and according to the wishes of the user.



Figure 14, Top 10 number of states.

Diagnostic Analysis:

The next step of analysis is diagnostic analysis. In the prompt generation part, ChatGPT gave in some situations, almost the same results as descriptive analysis, which could been of the similarity of the two kinds of analysis, but also the weakness of the tool. A good and representative prompt for diagnostic analysis is the analysis of cancellation rates in Figure 15. First of all, the GPT gave a table with returns per category, afterwards a visualization in the form of a bar chart and later on a detailed breakdown of the different categories.

Thanks, can you go on with cancellation rates. Analyze cancellation rates for each category using Category and Status to identify problematic categories. Output a table showing categories and their cancellation rates.

\$

Ca	ancellation Rates By (Category		<u>↓</u> ⊮ [⋊]
		Category	Total_Orders	Cancelle
1	5	Set	50284	7337
2	8	kurta	49877	7255
3	7	Western Dress	15500	2122
4	1	Bottom	440	60
5	4	Saree	164	21
6	n	RIQUER	926	116

I have provided a table showing the total orders, canceled orders, and cancellation rates for each category, sorted by the highest cancellation rates. Let me know if you need further insights or a visualization of this data! [-]

Figure 15, Diagnostic analysis, table of cancellation rates by category.



Figure 16, Diagnostic analysis, visualization of cancellation rates by category.

Compare cancellation rates across fulfillment channels using Fulfilment and Status to assess channel-specific issues. Output a table showing cancellation rates by channel. Give also a visualization



Figure 174, Diagnostic analysis, visualization of cancellation rates by category

This analysis shows the adjustable capability of ChatGPT and GenAI, by doing diagnostic analysis, show why something has happened and further drilldown and breakdown the different parts of a dataset. Thereby, ChatGPT offers the possibility to show all the code used to make this visualization. The standard format is within Python code, but it offers that it is also possible to produce and change the codes into other formats like Pyspark or SQL format. This ensures these visualizations and code are easily applicable in other proprietary systems and environments of the company it selves.

```
Analyse
python
# Calculate total order: Altijd details weergeven 🕥 🗌
                                                                                                                                                                                                                                                                                                                    🗗 Kopiëren
                                                                                                                                                                                                                                                                                                                                                                                         q
return_cancel_rates = data.groupby('Category').agg(
                         Total_Orders=('Status', 'count'),
                         Returns=('Status', lambda x: (x.str.contains('returned')).
                         Cancellations=('Status', lambda x: (x.str.contains('cancel
)
# Add separate rates for returns and cancellations
return_cancel_rates['Return_Rate'] = (return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_cancel_rates['Return_c
return_cancel_rates['Cancellation_Rate'] = (return_cancel_rates)
# Sort by return rate (or any other column of interest)
return_cancel_rates = return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates</preturn_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rates.sort_values(by='Return_cancel_rat
# Display the resulting table to the user
tools.display_dataframe_to_user(name="Amazon Sales Return and
# Create a visualization
plt.figure(figsize=(12, 6))
# Bar chart for return and cancellation rates
```

Figure 18, Analysis code used for visualization.

However, the GPT gives a lot of possibilities and advantages, it also has some downsides. ChatGPT has some issues with the environment and shuts down a few times. Therefore, it gave as output that the execution environment has been reset, and the context previously given was no longer available. When reloading the file, it still gave an issue with attempting to read the file. Therefore, a new environment needed to be setted up to complete the analysis.

Predictive analysis:

Predictive analysis goes a step further than diagnostic analysis, increasing in complexity, which is reflected in ChatGPT's output. In general, the output wasn't that useful, which will be presented with two different examples.

The first one is sales forecasting. ChatGPT is asked to perform a predictive analysis by predicting future sales by category. The GPT analysis the dataset and predicted the future sales, which generates the following results:

Fo	precasted Sales By	Category (SARIMAX)		<u></u> π ₂
	Date	Forecasted_Sales	Category	
1	2022-07-31	102750.28999999 998	Blouse	
2	2022-08-31	102750.28999999 998	Blouse	
3	2022-09-30	102750.28999999 998	Blouse	
4	2022-10-31	102750.28999999 998	Blouse	
5	2022-11-30	102750.28999999 998	Blouse	
6	2022-12-31	102750.28999999 998	Blouse	



Figure 19, Forecast, predicted future sales by category.

Two things are remarkable. First the constant predicted sales from end 2022 until April 2023, second is the very sharp peak from April 2024.

A second example is the prediction of cancellations. Here the GPT is asked to predict future cancellations based on category, fulfilment and ship-service-level, where the prompt was as follows;

Predict Cancellations: Analyze order data to predict cancellations using features like Category, Fulfilment, and Ship-service-level. Output cancellation probabilities and influential predictors.



Figure 20, Prediction of cancellation probabilities.

In this case, it looks the GPT provides better results. It provides the amount is the important indicator and the largest distribution of cancellation probabilities are between 0.0 and 0.2. It looks the GPT provides better results here, predicting the low-risks and high- risks problems, in combination with the features.

Therefore, it is difficult to say if ChatGPT is suited for this kind of analysis. The GPT provided two completely different outcomes. The one worse result, the other probably better. The reasons for this, could be different. First of all, the general dataset, and mainly the timespan could be too small, therefore the GPT relies to only have (sales) data over a few months. Thereby the GPT is not aware of the context of the dataset and doesn't take into account starting dates, but also seasonal sales could be

a problem. If the dataset would be bigger, the GPT aware the context of the dataset better, the results would probably also better.

Prescriptive analysis:

As prescriptive analysis stresses actionable insights, based on the predictive model used. As the results based on predictive analysis are really different, sometimes it seems right, sometimes it doesn't, it difficult to test the reliability of the results. An example is to analyse the growth opportunities.

Revenue Growth Opportunities: Predict high-growth Categories or products using sales trends. Output a ranked list of growth opportunities with actionable insights.

To predict high-growth categories or products, I'll perform the following steps:

Steps:

- 1. Analyze Historical Sales Trends:
 - Aggregate sales by category and sкu over time.
 - Identify growth trends (e.g., linear regression slope, percentage growth).
- 2. Forecast Growth:
 - Use trend data to predict future revenue for each category or product.
 - Rank categories/products by their projected growth.

3. Output:

- A ranked list of high-growth categories/products.
- Actionable insights based on sales trends.

Let me proceed with the analysis.

High	-Growth Cat	egories And	Products			<u>↓</u> μ ^η
		Category	SKU	Growth_R	R-Squared	Significanc
1	213	Set	J0229- SKD-XX L	1245.0	1.0	0.0
2	161	Set	J0078- SET-XX XL	947.0	1.0	0.0
3	207	Set	J0226- SKD-XX	749.5	0.749999 99999999	0.3333333 3333
4	564	Set	SET204 -KR-DP T-M	666.0 V	1.0	0.0

Figure 21, Growth opportunities for revenue.

It looks like the model comes with an overview of high-growing categories and products and stresses insights within these products to have more sales. However, it is difficult to determine it this is reliable, having no insights into the business.

Ø Give visualizations within the future



Figure 22, Visualization, Growth opportunities for revenue.

Conclusions

In the end, there could be concluded, ChatGPT provides powerful capabilities when it comes to data analysis. It shows strong visualization skills, for clear and interactive charts, thereby it could provide actionable insights and have a strong problem-solving power. The results for descriptive and diagnostic analysis, the results were good. Thereby, one of ChatGPT's biggest strengths is the flexibility and adaptability. It could easily adapt visualizations and analysis based on the input from the user, for example analysis, but also generate relevant prompts, assisting in break down large datasets or write code.

This makes ChatGPT in this form a valuable tool for people working with data and need assisting in understand the essence of the datasets, inspirations for visualization of analysis, or assisting in coding, as ChatGPT provides the possibilities to show codes used for the analysis or visualization. However, the results for descriptive and diagnostic analysis were good, doing predictive and prescriptive analysis is less suited. As it comes to the more complex analysis, ChatGPT mainly misses to understand the context of the dataset, which provides some strange outcomes. However, it lacks in context understanding, it could provide actionable insights, or help with generate models, methods and techniques to perform these models. In practice, ChatGPT could help in performing descriptive and diagnostic analysis, it could mainly serve as sparrings partner, providing help within generate models, methods and techniques. However, as most companies are actively working with privacy secure and customer data, the usage will depend onto what extent this can be done safely and anonymized.

Appendix F: Coded interviews

Labels	Descriptions
	"We are using an ERP system, a PIM system (Product Information management system), a
Data	CRM system like Salesforce. We also use Excel files with for example budgeting.
sources	Warehouse management systems is also loaded".
IT	"Some systems are integrated around the outside of the data lakehouse, for example the
architecture	PIM system and the ERP system".
IT	"All the systems will be separately loaded, first in the lakehouse, than we have different
architecture	environments for them and then in a data warehouse if we talk about Microsoft Fabric".
IT/ Data tooling	"We are current busy with outfacing Click Sense and investing in Power BI" .
Strategy.	"Visualisation I'm (Business Intelligence Specialist) responsible for, desires are from the
culture	whole organization and trough exchange ideas with the people who wants the dashboard".
Data	"Data quality is an hot issue, we're working with a new ERP system within two years and
quality	data quality is not vet well established within our organisation".
	"That is also something that belongs to me (Business Intelligence Specialist), that's the
Data	part how to measure the data quality, think for example about data management
quality	dashboards, we're we ensure validations".
Data	"The person that is responsible for the input data, that is within the business areas
quality	themselves, within the business".
	"I think this has two sides, firstly from the management there was asked to monitor on
Strategy,	KPIs, think on a certain lead time that needs to be gathered, on reporting sides, how are we
culture	doing it in the organisation".
	"But on the other side, there're wishes from the organisation, people from bottom up are
Strategy,	asking; I want to see which customers are buying which collection, where do we've
culture	potential to do more, for a certain growth".
Strategy,	"Also from a area like engineering, a product management which wants to go more into
culture	market trends, where can we launch more?".
Strategy,	"We want to work this year on a data strategy, I wouldn't say this have never been here,
culture	but not written down or so".
Skills of employees	"Knowledge of the tools, knowledge of the systems, logical reasoning".
Skills of employees	"Estimating things really well, but also asking what are requirements from the business?"
Skills of	"You need to know what is dimensional modelling, for example the Kin material, how an
employees	ETL process works, how data flows are working and how Dax is working".
Descriptive	"For the biggest part right now sales, what's our revenue, what's our turnover, what's the
analysis	margin per county, per sales, per account manager".
Descriptive	"A part within logistic are we working on, what are our lead times, how's our stock
analysis	utilization".
Descriptive	"How fast is our stock purchased again turnover rate for stock"
analysis	now last is our stock purchased again, turnover rate for stock .
Descriptive	"I think that's the area with the most potential, for example sales there's a bonus system.
analysis	You want to know what each sales representative, account manager does".
	"Within the WMS (Warehouse Management System), what's our lead performance, in the
Descriptive	end, everything has to with are we reaching our budget, how good are we for the
analysis	customers, say customer experience".
Descriptive analysis	"In the end, when we've a better lead performance, we've less complaints".
Descriptive analysis	"Complaints we also have in our dashboard".

Diagnostic analysis	"Yes, this is really the interpretation of the business itself".
Diagnostic	"We deliver onto the business what's descriptive, and they need with their own knowledge interpret things"
Diagnostic	"We've a dashboard with a sort of performance score, think about a customer score as
analysis	example".
Diagnostic	"We judge if the customer has a better revenue or better turnover than last year, what's the
analysis	marge, then they get a score from 1 to 10, in that way we can see what has happened".
	"Thereby, we've for articles a sort of vitality index. Thereby we see how long a product is
Diagnostic analysis	in collection by how many customers, how many times is it purchased and which turnover does it have".
Diagnostic	
analysis	"Therefore, we can see if we are going to fase out a certain product, for example".
Predictive	"We've on AI engineer who wants to be busy with that"
analysis	we ve an AI engineer who wants to be busy with that .
Predictive	"We've Slim4 data in a nurchase system, this does a certain forecast"
analysis	we ve binny data in a parenase system, uns does a certain forecast .
Predictive analysis	"Thereby, we make a sales forecast, but this is purely done manually".
Predictive analysis	"Time and also knowledge".
Predictive	"The knowledge is for example by our AI engineer, but I think she firstly needs a good
analysis	data quality, then visualizing and after these two steps, you go to predictive analysis".
Prescriptive	"I don't know, I need to be fairly, if Slim4 has these module to make automatically
analysis	purchase orders".
Predictive analysis	"We're working on predictive analysis, we've taken over another business company".
. J	
	"We look based on the data on what's their stock currently, what's their average sales
Predictive	"We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the
Predictive analysis	"We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock".
Predictive analysis	"We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly
Predictive analysis Predictive	"We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've
Predictive analysis Predictive analysis	"We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more".
Predictive analysis Predictive analysis Predictive	"We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies".
Predictive analysis Predictive analysis Predictive analysis	"We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other"
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better. 3 is where we want to go to"
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis Predictive analysis GenAI as	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more". "Then, we're starting with 3, to extend that and start with triggers".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis GenAI as coding	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more". "Currently, we or I use in an executing way a lot ChatGPT, but not directly in the combination of data analysis for the business".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis GenAI as coding assistant	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more". "Currently, we or I use in an executing way a lot ChatGPT, but not directly in the combination of data analysis for the business".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis Prescriptive analysis GenAI as coding assistant GenAI	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more". "Then, we're starting with 3, to extend that and start with triggers". "Currently, we or I use in an executing way a lot ChatGPT, but not directly in the combination of data analysis for the business". "It is the idea to use in the future Copilot to ask questions, to ask for example what's there
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis Prescriptive analysis GenAI as coding assistant GenAI integrated	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more". "Currently, we or I use in an executing way a lot ChatGPT, but not directly in the combination of data analysis for the business". "It is the idea to use in the future Copilot to ask questions, to ask for example what's there in Power BI".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis Predictive analysis GenAI as coding assistant GenAI as integrated GenAI as	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more". "Then, we're starting with 3, to extend that and start with triggers". "It is the idea to use in an executing way a lot ChatGPT, but not directly in the combination of data analysis for the business". "It is the idea to use in the future Copilot to ask questions, to ask for example what's there in Power BI".
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis GenAI as coding assistant GenAI as coding	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more". "Currently, we or I use in an executing way a lot ChatGPT, but not directly in the combination of data analysis for the business". "It is the idea to use in the future Copilot to ask questions, to ask for example what's there in Power BI". "For my work, within executing tasks I use it a lot, think about Dax measure, Purely Syntax ,SQL."
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis Prescriptive analysis GenAI as coding assistant GenAI as coding assistant	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more". "Currently, we or I use in an executing way a lot ChatGPT, but not directly in the combination of data analysis for the business". "It is the idea to use in the future Copilot to ask questions, to ask for example what's there in Power BI". "For my work, within executing tasks I use it a lot, think about Dax measure, Purely Syntax ,SQL."
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis Prescriptive analysis GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more". "Currently, we or I use in an executing way a lot ChatGPT, but not directly in the combination of data analysis for the business". "It is the idea to use in the future Copilot to ask questions, to ask for example what's there in Power BI". "For my work, within executing tasks I use it a lot, think about Dax measure, Purely Syntax ,SQL."
Predictive analysis Predictive analysis Predictive analysis Descriptive analysis Descriptive analysis Predictive analysis Predictive analysis Prescriptive analysis GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We look based on the data on what's their stock currently, what's their average sales volume per week and than we look back 6 months ago. Based on that, we calculate the EMA (Exponential Moving Average), and say that they need four weeks of stock". "And then, based on 4 weeks, how far are we away of this line, so in this way monthly predicting. Based on this, this needed to be the stock, this is the stock. For example, we've less, we need to purchase more". "I think this is more the case within production companies". "I think in the end, in all 4 kinds of analysis, because they're all a sort of complementary to each other". "We're good with step 1, 2 is what we teach them, in 1 is where we can extend, in to we can train better, 3 is where we want to go to". "At the time the data quality is better, but that needs to be done firstly in step 1 and 2, in data management, data quality dashboards, optimising this more". "Then, we're starting with 3, to extend that and start with triggers". "Currently, we or I use in an executing way a lot ChatGPT, but not directly in the combination of data analysis for the business". "It is the idea to use in the future Copilot to ask questions, to ask for example what's there in Power BI". "For my work, within executing tasks I use it a lot, think about Dax measure, Purely Syntax ,SQL."

GenAI as data assistant	"Purely, on the moment that I don't come out a certain thing, I use ChatGPT as sparring partner, or Copilot".
GenAI as data assistant	"At the moment, I've certain data and I think, how could I visualize this".
GenAI as task formulator	"Other people using other dashboards in Click Sense, but I also look what's the best way to do it also".
GenAI as task formulator	"I think in documentation, he performs quite well, in improving the Syntax from SQL, if I've a syntax fault, also really well".
GenAI as coding assistant	"I need to say, in Dax formula's not always top".
GenAI integrated	"The idea is to use Copilot in Power BI, to use it with the data which is in Power BI and based on that they can do fast analysis. But they also needs to be trained on, and we need to have a look how we can deal with security related things".
GenAI integrated	"I think you'll be more flexible in what you can find in reports. Because for example now, I make the reports for everyone".
GenAI integrated	"It would be fine, if for fast overviews, you don't need specifically a report to be made".
GenAI integrated	"Now we've a self service page, so that people can build with a lot of columns their own reports, but it is secured that I give them restricted data".
GenAI as coding assistant	"I think within the future, you don't need to perform specifically Dax, you need to read it, but I don't think you needs to be able to write it actually".
GenAI integrated	"But it is always the question, how do you interpret something".

Labels	
Strategy,	
culture,	
structure	"If you need to define my role, 50% data engineer, 50% data analyst".
	"On an ERP system all of the transactions and what's on with that. Our machines are
Data sources	running on a scada system, that's what you can program and read data".
Data sources	"Yes, and then you've an HR and Office. That kind of things".
	"Yes, the data comes in het end almost all in the ERP system. Based on Scada, their will be
Data sources	loaded a few tables into the ERP, and based on the ERP, in a datawarehouse".
IT	
architecture	"With procedures and pipelines".
IT/ Data	
tooling	"Yes, the visual peel is Power BI. With dataflows".
Data sources	"Yes, also for us, we're a small company".
Strategy,	
culture,	"Mainly the buttons, processes and things like that. The one part is with the another part.
structure	We've also engineers who're busy with our machines and that's written in Python".
Strategy,	
culture,	"Yes, the main part of the employees are working in production, and ther are only a few
structure	employees who're busy with data input".

IT	
architecture	"They're doing it with datalinks etc".
Data quality	"The input based on that is quite low".
	"If we're doing something wrong, for example in the sales price, that's all integrated with
Data quality	indexes and based on that we're purchasing, so we're controlling the price constantly".
Data quality	"That's what is needed more"
Data quality	"Ves and mainly with defining question, which setting the queries"
Data quanty	Yes there is a wiging that where it is nearly large to be automatically filtered and
Data mality	Yes, there is a vision that where it is possible, data needs to be automatically intered out
Data quality	the systems, and that we re trying to work with machine learning algorithms based on that
Data quality	"But, yes, this year the strategy or the focus is mainly on the data quality".
	"It is for us as company, mainy is also unexpected. We can't deepdive in every data. Many
	was manually inputted in the systems. That's difficult to estimate what are the possibilities
Data quality	with data".
G1 '11 C	"Yes the main skill I need to have is to be analytical minded. But I think, mainly within a
Skills of	small company is that everyone has feeling with the business. That we can ask things to
employees	eachother".
Skills of	"Because you're really dependent on your own. Because you're on your own, because you
employees	need to be curious".
Skills of	"Yes, then you also need to have certain networkcapabilities. And, yes there is also a
employees	consultancy party that helped is with a few things".
Skills of	"Because there are a few data analists and data engineer who are in a same company as me,
employees	so it is important to network a little bit".
Skills of	
employees	"So, that we've updated our knowledge and have training opportunities".
Descriptive	
analysis	"KPI's are formulated organisational wide. A few departments do have specific KPI's".
Descriptive	
analysis	"And there we've budgets and things".
Descriptive	
analysis	Y es that's exactly what we're doing".
Descriptive	"And then we've the dashboards, we're trying to automatically load in the data and consider
analysis	this against the KPTs".
Descriptive	"And then we've our normal financial reports. As production companies is that also suited
	and enough".
Diagnostic	"Was the last thing"
Diagramatia	Yes, the last thing .
Diagnostic	Yes, on data, for us it is really important now a batch is produced. And that are we
Diagnostia	analysing and presenting in dashooards.
	"That's what we are trying to do. That's also what we consider"
Diagnostia	"Indis what we are trying to do. That's also what we consider .
Diagnostic	when we haven t produced And now many it is, that we will improve our cyclus,
Diagnostia	"Was we've for every la lealers and coincre. The question what I do as turneyon that's
Diagnostic	steen alw related with the nener mice and that's also completed with the system of
Diagnostia	strongly related with the paper price and that's also correlated with the customer.
	so, we re looking now many squares we ve sold and now many machine nours. And that's what sales is researching also themselves"
Dradiative	What sales is rescaled thing also themselves .
redictive	i es, we re strongly driven on linancial reports and that's also 6 weeks later based on what
Dradiatizza	Inappendu . Il Then over data minalings, that's a most vibore walks trains to accolorate here fact material trains
redictive	to produce"
Dradiative	
rredictive	"And most to that walks a farm other was data measured back that the set of a second second
anaiysis	"And, next to that we've a few other models running, but that's not enourmous".

	"Sales wise, we're trygin to work with a model, based on daily bases and what's the impact
Predictive	within a year. And we're looking what's the difference with the years before, if that really
analysis	differs, we'll go to the model and adjust that".
	"Now, we're working more on weekly basis, firstly we're working on monthly basis, so
Predictive	now the demand is to take for examle into account the working days, instead of the whole
analysis	week".
Predictive	
analysis	"So, it is an ongoing process, it's not you put in a model and it's clear".
Predictive	
analysis	"Yes, before it was divided into months".
Predictive	"I am working here a month right now, so I've done it one period, and I've introduced that
analysis	model. It is not that you can relate it to the years before".
Predictive	"And, now we've more a model that is based on Random Forest and takes out anonomalies
analysis	and so".
Predictive	"Based on the system forecast, there is generated a certain demand to paper, and based on
analysis	that we'll make orders and so".
Predictive	"That is something we're working on right now, to put in more datapoints in our data
analysis	warehosue".
Predictive	
analysis	"So, we're hoping to have live our first machine learning model this year".
Predictive	
analysis	"It's also a part the organization".
Predictive	"Look, if you've for example statistical wise 95% of the time have something right, you'll
analysis	always see that there is one employee who's the other 5%".
Predictive	
analysis	"In the end, we also need to understand it".
GenAI as	
coding	
assistent	"Mainly, in the data engineering part. To help the person who's in their, with knowledge".
GenAI as task	"I think, for the regular employees, you're really dependent on what a ERP relation is
formulator	adding to his stack".
GenAI as data	"Another model that we've in production is the quality model, that's a model that we've a
assistent	long time now and there are so much moments there is taken a picture and analyzing that.
GenAI	"Yes, the version that nowadays is in Power BI, is not that good. It has any analytical
integrated	power".
GenAI as data	
assistent	"I also didn't expect, AI would taken this route".
	"If there are models, that are open for everyone, and people can read them and understand
	them. Then it could go very fast I think".
	"And, I think that I now something more than the average collegeau, not that I know
	everything, but I think the general colleague doesn't exactly know what's happening, let
	alone based on that take decisions".
GenAl as	
coding	"I'll use the whole day GenAI, so personally I do this". So that's what I am doing
assistent	constantly, but going through the business is difficult in general".
GenAI as	
coding	"So, it requires also a lot of questions. But ChatGPT is very cool for working out different
assistent	things". "Yes, it goes really fast, so based on that you can go further".
	"Yes, within our areas it is always a little bit difficult, within our areas it is always really
GenAI as task	logical. You'll sell a certain part of machines, for the rest it is more sure how to predict
formulator	what's going to happen".
GenAI as task	
formulator	"Yes, it is really context dependent, that's difficult".

GenAI as task	"It is really mega relaxed, if that you working something out and will check if something is
formulator	right, a good thing about that is that you've nothing to do later on that".
GenAI as task	"Yes, when you'll do something in and it will come in the wrong hands, this would be not
formulator	good and for example concurrents".
GenAI as	
coding	
assistent	"There are repetative task, that's the moment to work it out, you need to take that change".
GenAI as	"Yes, that's were we are, not that far. I don't know how far are people within the
coding	organization with it, but I can imagine when you'll need to translate at once, it is very
assistent	valid".

Labels	
	"This is the most important, We're using Salesforce as CRM, Afas as HR, Ridder IQ for our
IT	fabric in Zeewolde, we use Microsoft Dynamics 365, therefore we've the finance and operations
architecture	module and SharePoint for Excel". documents".
IT	"We're using Google Analysis, that's a big one and they're a few extra systems that are there
architecture	throughout the years".
IT	
architecture	"As what we use for tooling as ingestion is Azure Data Factory".
IT	"For every system we've an pipeline, and every night we import all the data, on 12 Pm, then we
architecture	copy all the data and we write it to the Azure Data Lake Storage".
IT	"Out of that, we make models in DBT, so we make connection with the raw storage, and
architecture	consequently we're going to make models of it. We do that based on bronze, silver, gold".
IT	
architecture	"The normalisation in bronze, than silver, we've dimensions and facts, in the silver layer".
IT	
architecture	"In data bricks, we've an workflow what's says DBT Build and that builds all the model".
IT	
architecture	"We write back everything to the map. Bronze, silver or gold map".
IT/ Data	
tooling	"Out of Power BI, we make an connection with data bricks, to load in the data".
IT/ Data	
tooling	"And beyond that we also use Power Automate, but that's to automate that, from A to Z".
IT	
architecture	"We want a platform that is scalable".
IT	
architecture	"We don't want to be dependable on one product, but more products".
IT	"It could be that Azure Data Factory, 2,3 years ago was the tool, but nowadays it is a different
architecture	one"
Structure	"We're doing it with two, he is something more in the backend, I'm on the frontend".
Data	
quality	"We're trying to push it away from our team, to the source".
Data	
quality	"To the application manager, this is your concern or business".
Data	
quality	"You don't always get away from that, we've a few steps in our process, that ensure the quality".
Data	
quality	"We've written a few tests, in DBT, for example for a left join".
Data	"If you have a from and a left join, that the left join doesn't ensure an explosion of the data,
quality	because of the match, the data can explode".

Data	
quality	"Also in the sense of garbage in is garbage out".
	"It starts with the management, they said, we see future in this. We need to efficiently use our
Strategy,	data. That was the first step. Afterwards, this project is turned up on this whole street to make,
culture	the whole process".
	"And that's mostly. On this moment it is primarily the operational employees, those are asking
Strategy,	and the leaders, not as much. They already have reports, they're looking at certain things from
culture	helicopter view".
Strategy,	"It are mainly the operating employees who are in the business, for example sales employees.
culture	They wanted to see different things, so there are we busy with".
Strategy,	"No that is not that yout a data starte an as"
culture	"No, that is not that part a data strategy or so".
Skills of	
employees	"You don't need to have specifically pre-knowledge or so, I've done HR management".
Skills of	
employees	"YouTube is your biggest friend".
Skills of	"What do I need generally? For us SQL, you need to now that. That is important. Python because
employees	more important, I would say in a year it is mandatory for us".
Skills of	"And for the rest, purely the tooling itself. Yes, that's something, you need to deep dive into the
employees	documentation".
Skills of	
employees	"You need to know how the tooling worked, but for the rest, not that, that skills".
Skills of	
employees	"And, in principal Dax, if you can count that with it".
Descriptive	"We genuinely make use of descriptive analysis, that's the main part. And then, we're mainly
analysis	talking about sales and logistics".
	"Within these areas, we are doing a lot, literally historical data. If what's primarily important,
Descriptive	what's happened vesterday. What orders are open of vesterday and where can they do something
analysis	for".
Descriptive	"Yes primarily yes, there screaming the hardest or the most loud. But yes, the, in general have
analysis	the most demand on insights, ves".
	"Oh, yes we're doing it for every areas. Every areas does get reports, also all the areas want
Descriptive	reports, but it is primarily logistic and sales that demands a lot. They demanding a lot of
analysis	insights".
Diagnostic	"Yes, apparently the last you said. Indeed by the interpretation of the employees. But yes that
analysis	true, but we want more to do that we do that for them".
	"But yeah a nice example is, within our profile branches, our garages. We're doing tire changes.
Diagnostic	switches between winter tires and summer tires in the changeover period. That's a moment where
analysis	you can really see an enormous shift in turnover and volume".
Diagnostic	"It would be nice if we're going to link this to external data, so for example on weather, that
analysis	based on that you'll diagnose".
Predictive	"No. I'm thinking, we're working on it with a few. For example with a student that's busy to
analysis	make a predictive analysis for the stock. A predictive model for the sales and purchase".
	"Yes, for example we've budget for sales. Yes, but also purchasing needs to respond to data.
	anticipate what's need to be purchased, and process the actual stock of tires we've. Additionally.
Predictive	managing delivery times for different customers efficiently is important. The analysis go quite
analysis	far".
	"Yes, that's a thing in our industry. What's a little bit the direction, is that we gather source prices
Predictive	from different website, we're striping different websites. Based on that we could determine
analysis	what's the trend".
	"What we do want to know is what's the demand of the customer, on which moment. That we
Predictive	can predict that. Because that apparently, sales can do something with it logistic can you
analysis	conFigure based on that".

analysis web shop. But no, we can't predict that". GenAI as GenAI as GenAI as "Yes, ChatGPT, I don't do anything with Google. It's all ChatGPT, I've a premium license, such as a pro license, and I do everything with o3 and o3 mini". "Yes, we've a few licenses. We've premium for different areas, who can use them. If, for example when you've premium, than it's also better qua privacy etcetera." "We've used it for example determining the lead chances. As customer of us, you can register yourself on the web shop that you want to be customer. Someone of sales is extremely busy with this, because in general we get 20/30 different requests and he's going to screen potential customer, form, are you interesting for Heuver?" "Yes, it's primarily, I get a question, we want to have insights in for example, how many warehouses will be directly delivered, so not directly via our head office, but how often directly and everything. And then 1 don't know how to visualise it, so l'll ask, what should be a good formulator visualisation? And then healso comes sometimes with a picture ors." GenAI as "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenAI as "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge decestrater assistant GenAI as "Yes, for all the programming languages indeed yes". GenAI as "Yes, for all the programming languages indeed yes". GenAI as "Yes, that's what y	Descriptive	"Yes, currently only describing, that's what we see in Google Analysis. What are we see on our
GenAl as "Yes, ChatGPT, I don't do anything with Google. It's all ChatGPT, I've a premium license, such as a pro license, and I do everything with o3 and o3 mini". "Yes, we've a few licenses. We've premium for different areas, who can use them. If, for example when you've premium, than it's also better que privacy etcetra." "We've used it for example determining the lead chances. As customer of us, you can register yourself on the web shop that you want to be customer. Someone of sales is extremely busy with this, because in general we get 20/30 different requests and he's going to screen potential assistant customer, from, are you interesting for Heuver?" "Yes, it's primarily. J get a question, we want to have insights in for example, how often directly task and everything. And then I don't know how to visualise it, so I'll ask, what should be a good visualisation? And then I don't know how to visualise it, so I'll ask, what should be a good visualisation? And then I don't know how to visualise it. GenA1 as "Yesh, 11 think, diagnose what you said. I think if's very helpful for that". So why, why something happened, what's exactly happening, summarizing. That's also what's happening with Copilot and other Microsoft products". GenA1 as "That people, from vithin the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge deassistant centralised". GenA1 as "So he's making code than for me. That's what I'm doing. I describe what I want and what I want sasistant better for me". GenA1 as "Yes, for all the programming languages indeed yes". GenA1 as	analysis	web shop. But no, we can't predict that".
coding "Yes, ChatGPT, I don't do anything with Google. It's all ChatGPT, I've a premium license, such assistant "Yes, we've a few licenses. We've premium for different areas, who can use them. If, for example when you've premium, than it's also better qua privacy etcetera." "We've used if for example determining the lead chances. As customer of us, you can register yourself on the web shop that you want to be customer. Someone of sales is extremely busy with this, because in general we get 20/30 different requests and he's going to screen potential assistant customer, from, are you interesting for Heuver?" "Yes, it's primarily. J get a question, we want to have insights in for example, how many warchouses will be directly delivered, so not directly via our head office, but how often directly and everything. And then I don't know how to visualise it, so I'll ask, what should be a good formular visualisation? And then he also comes sometimes with a picture or so". GenAI as "Yes, it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenAI as "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge decoding assistant "Yes, for all the programming languages indeed yes". GenAI as "Yes, for all the programming languages indeed yes". GenAI as "Yes, and it's the future, in that's what I'm doing. I describe what I want and what I want assistant better for me". GenAI as GenAI as	GenAI as	
assistant as a pro license, and 1 do everything with 0.3 and 0.3 mini". "Yes, we've a few licenses. We've premium for different areas, who can use them. If, for example when you've premium, than it's also better qua privacy etcetera." "We've used it for example determining the lead chances. As customer of us, you can register jourself on the web shop that you want to be customer. Someone of sales is extremely busy with this, because in general we get 20/30 different requests and he's going to screen potential assistant extender, from, are you interesting for Heuver?" "Yes, it's primarily. J get a question, we want to have insights in for example, how many GenA1 as and everything. And then I don't know how to visualise it, so I'll ask, what should be a good visualisation? And then he also comes sometimes with a picture or so". GenA1 as "Yeah, 1 think, diagnose what you said. 1 think it's very helpful for that". So why, why something haspenid, what's exactly happening, summarizing. That's also what's happening with Copilot and other Microsoft products". GenA1 as (Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenA1 as (Coding assistant exactly happening used for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenA1 as coding assistant assist the or a mini, 1 find it fantastic. I feel me really well and I know I almost don't need to assistant that what you experience. That's very important, because its more that you need assistant too't we, the o-3 mini, 1 find it fantastic. I feel me really well and I know I almost don't need to assistant too't know. Poyton that well, that's what I also can't that much. I've I time had a lesson	coding	"Yes, ChatGPT, I don't do anything with Google. It's all ChatGPT, I've a premium license, such
"Yes, we've a few licenses. We've premium for different areas, who can use them. If, for "We've used it for example determining the lead chances. As customer of us, you can register "We've used it for example determining the lead chances. As customer of us, you can register yourself on the web shop that you want to be customer. Someone of sales is extremely busy with data this, because in general we get 20/30 different requests and he's going to screen potential assistant customer, from, are you interesting for Heuver?" "Yes, it's primarily, 1 get a question, we want to have insights in for example, how many warehouses will be directly delivered, so not directly via our head office, but how often directly and everything. And then I don't know how to visualise it, so I'll ask, what should be a good formulator "Yes, it's primarily. I get a question, we want to have insights and other Microsoft products". GenA1 as GenA1 as "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenA1 as "That people, from within the busines, who're using the tools, the knowledge and skills have to coding assistant better for me". GenA1 as centralised". GenA1 as centralised". GenA1 as for he's making code than for me. That's what I'm do	assistant	as a pro license, and I do everything with o3 and o3 mini".
example when you've premium, than it's also better qua privacy etecter." "We've used it for example determining the lead chances. As customer of us, you can register yourself on the web shop that you want to be customer. Someone of sales is extremely busy with data this, because in general we get 20/30 different requests and he's going to screen potential assistant customer, from, are you interesting for Heuver?" "Yes, it's primarily, I get a question, we want to have insights in for example, how many GenA1 as and everything. And then I don't know how to visualise it, so I'll ask, what should be a good visualisation? And then he also comes sometimes with a picture or so". GenA1 as male verything. And then he also comes sometimes with a picture or so". GenA1 as do ther Microsoft products". GenA1 as and other Microsoft products". GenA1 as coding assistant "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenA1 as coding assistant "Yes, for all the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge de- centralised". GenA1 as coding assistant "Yes, for all the programming languages indeed yes". GenA1 as coding assistant "Yes, for all the programming languages indeed yes". GenA1 as coding assistant "I know, the o-3 mini, 1 find it fantastie. I feel me really well and I know I almost don't need to assistant the tore for me". GenA1 as coding "'		"Yes, we've a few licenses. We've premium for different areas, who can use them. If, for
"We've used it for example determining the lead chances. As customer of us, you can register yourself on the web shop that you want to be customer. Someone of sales is extremely busy with this, because in general we get 20/30 different requests and he's going to screen potential customer, from, are you interesting for Heuver?" "Yes, it's primarily, I get a question, we want to have insights in for example, how many warehouses will be directly delivered, so not directly via our head office, but how often directly task GenA1 as "Yesh, I think, diagnose what you said. I think it's very helpful for that". So why, why something happened, what's exactly happening, summarizing. That's also what's happening with Copilot assistant and other Microsoft products". "GenA1 as coding "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge de- centralised". GenA1 as "So he's making code than for me. That's what I'm doing. I describe what I want and what I want better for me". GenA1 as "Yes, for all the programming languages indeed yes". GenA1 as "Yes, for all the programming languages indeed yes". GenA1 as "Yes, for all the programming languages indeed yes". GenA1 as "Yes, for all the programming languages indeed yes". GenA1 as "Yes, for surt, that's		example when you've premium, than it's also better qua privacy etcetera."
GenAI as yourself on the web shop that you want to be customer. Someone of sales is extremely busy with this, because in general we get 20/30 different requests and he's going to screen potential assistant wresh "Yes, it's primarily. I get a question, we want to have insights in for example, how many warehouses will be directly delivered, so not directly via our head office, but how often directly and everything. And then I don't know how to visualise it, so I'll ask, what should be a good formulator isasistant "Yeah, I think, diagnose what you said. I think it's very helpful for that". So why, why something happened, what's exactly happening, summarizing. That's also what's happening with Copilot assistant GenAI as "Yes, and it's the future, in the sense, I expect that you'll get a lot more eitizen developers". "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge de-assistant coding "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenAI as coding "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to acoustic." GenAI as "Yes, that's what you experience. That's very important, because its more that you need knowledge of that you want". GenAI as "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to acoing wres, that's something for		"We've used it for example determining the lead chances. As customer of us, you can register
data this, because in general we get 20/30 different requests and he's going to screen potential assistant customer, from, are you interesting for Heuver?" "Yes, it's primarily, I get a question, we want to have insights in for example, how many warehouses will be directly delivered, so not directly via our head office, but how often directly and everything. And then I don't know how to visualise it, so I'll ask, what should be a good formulator "Yeah, I think, diagnose what you said. I think it's very helpful for that". So why, why something happened, what's exactly happening, summarizing. That's also what's happening with Copilot and sasistant and other Microsoft products". GenAI as "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenAI as "That people, from within the business, who're using the tools, the knowledge and skills have to coding use and get what they want. So you're not dependent on an ICT Team. So knowledge de-centralised". GenAI as "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenAI as "Yes, for all the programming languages indeed yes". GenAI as "Coding coding "Yes, that's what you experience. That's very important, because its more that you need assistant control it". GenAI as "I don't know Python that well, that's what I also can't that much. I've I time had a lesson, but I assistant don't k	GenAI as	yourself on the web shop that you want to be customer. Someone of sales is extremely busy with
assistant customer, from, are you interesting for Heuver?" "Yes, it's primarily, I get a question, we want to have insights in for example, how many warehouses will be directly delivered, so not directly via our head office, but how often directly task and everything. And then I don't know how to visualise it, so I'll ask, what should be a good formulator visualisation? And then he also comes sometimes with a picture or so". GenAI as "Yeah, I hink, diagnose what you sail. I think it's very helpful for that". So why, why something happened, what's exactly happening, summarizing. That's also what's happening with Copilot assistant GenAI as "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenAI as "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge decentralised". GenAI as "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenAI as "Yes, for all the programming languages indeed yes". GenAI as "Yes, for all the programming languages indeed yes". GenAI as "Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want". GenAI as "Yes, for all the programming languages indeed yes". GenAI as "I how't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant	data	this, because in general we get 20/30 different requests and he's going to screen potential
"Yes, it's primarily, I get a question, we want to have insights in for example, how many GenAI as warehouses will be directly delivered, so not directly via our head office, but how often directly and everything. And then he also comes sometimes with a picture or so". GenAI as "Yeah, I think, diagnose what you said. I think it's very helpful for that". So why, why something happened, what's exactly happening, summarizing. That's also what's happening with Copilot assistant and other Microsoft products". GenAI as (oding assistant "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenAI as coding use and get what they want. So you're not dependent on an ICT Team. So knowledge de- centralised". GenAI as coding assistant "Yes, for all the programming languages indeed yes". GenAI as coding assistant "Yes, for all the programming languages indeed yes". GenAI as coding "Yes, that's what you experience. That's very important, because its more that you need assistant "Yes, for all the programming for the futu	assistant	customer, from, are you interesting for Heuver?"
GenAI as warehouses will be directly delivered, so not directly via our head office, but how often directly and everything. And then I don't know how to visualise it, so I'll ask, what should be a good visualisation? And then he also comes sometimes with a picture or so". GenAI as "Yeah, I think, diagnose what you said. I think it's very helpful for that". So why, why something happened, what's exactly happening, summarizing. That's also what's happening with Copilot assistant and other Microsoft products". GenAI as "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". "GenAI as "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge deassistant coding "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenAI as coding "Yes, for all the programming languages indeed yes". GenAI as "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to cassistant coding "So, that's what you experience. That's very important, because its more that you need knowledge of what you want". GenAI as " coding "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to cassistant coding "Yes, for all the programming for the future. I'm, there is some		"Yes, it's primarily, I get a question, we want to have insights in for example, how many
task and everything. And then I don't know how to visualise it, so I'll ask, what should be a good formulator visualisation? And then he also comes sometimes with a picture or so". GenAI as "Yeah, I think, diagnose what you said. I think it's very helpful for that". So why, why something happened, what's exactly happening, summarizing. That's also what's happening with Copilot assistant assistant "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenAI as "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge decentralised". GenAI as "So he's making code than for me. That's what I'm doing. I describe what I want and what I want better for me". GenAI as "Yes, for all the programming languages indeed yes". GenAI as "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant control it". GenAI as "I don't know Soy un experience. That's very important, because its more that you need assistant knowledge of what you want". GenAI as "I don't know Soy un eed knowledge of it. To write a good prompt". GenAI as "I don't know Soy un eed knowledge of it. To write a good prompt". GenAI as "I don't know Soy un eed knowledge of it. To write a good prompt". GenAI "I don't know Soy uneed kno	GenAI as	warehouses will be directly delivered, so not directly via our head office, but how often directly
formulator visualisation? And then he also comes sometimes with a picture or so". • GenA1 as "Yeah, I think, diagnose what you said. I think it's very helpful for that". So why, why something happened, what's exactly happening, summarizing. That's also what's happening with Copilot assistant and other Microsoft products". GenA1 as "GenA1 as coding "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge decentalised". GenA1 as "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge decentalised". GenA1 as "So he's making code than for me. That's what I'm doing. I describe what I want and what I want besistant better for me". GenA1 as "Yes, for all the programming languages indeed yes". GenA1 as "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant control it". GenA1 as "Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want". GenA1 as "Yes for sure, that's something for the future. I'n, there is something within our company, who's integrated based or what you want". GenA1 as "GenA1 as coding "Yes, that's what you experience. That's very important, because its more that yo	task	and everything. And then I don't know how to visualise it, so I'll ask, what should be a good
GenAI as "Yeah, I think, diagnose what you said. I think it's very helpful for that". So why, why something happened, what's exactly happening, summarizing. That's also what's happening with Copilot assistant and other Microsoft products". GenAI as "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenAI as "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge de-centralised". GenAI as "So he's making code than for me. That's what I'm doing. I describe what I want and what I want better for me". GenAI as "Yes, for all the programming languages indeed yes". GenAI as "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant control it". GenAI as "Yes, that's what you experience. That's very important, because its more that you need kassistant knowledge of what you want". GenAI as "I don't know. So you need knowledge of it. To write a good prompt". GenAI as "I don't know. So you need knowledge of it. To write a good prompt". GenAI as "Yes, als for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see". GenAI "Yes, als for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see". GenAI as "Yes,	formulator	visualisation? And then he also comes sometimes with a picture or so".
data happened, what's exactly happening, summarizing. That's also what's happening with Copilot assistant and other Microsoft products". GenA1 as coding assistant "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenA1 as "That people, from within the business, who're using the tools, the knowledge and skills have to coding use and get what they want. So you're not dependent on an ICT Team. So knowledge de-assistant cofing "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenA1 as "Yes, for all the programming languages indeed yes". GenA1 as "Yes, for all the programming languages indeed yes". GenA1 as "Yes, that's what you experience. That's very important, because its more that you need assistant GenA1 as "Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want". GenA1 as "I don't know Python that well, that's what I also can't that much. I've I time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt". GenA1 as "Yes for sure, that's something for the future. I'm, there is something within our company, who's busy to search out with license of Copilot for Power BI". GenA1 as "Yes, also for us, we've made reports. For our uses and based on that they have Copilot, therefore	GenAI as	"Yeah, I think, diagnose what you said. I think it's very helpful for that". So why, why something
assistant and other Microsoft products". GenAI as coding GenAI as issistant "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenAI as "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge de- assistant centralised". GenAI as coding "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant bether for me". GenAI as coding "Yes, for all the programming languages indeed yes". GenAI as GenAI as coding "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant coding "Yes, that's what you experience. That's very important, because its more that you need assistant coding "Yes, that's what you experience. That's very important, because its more that you need assistant coding "Yes, for sure, that's something for the future. I'm, there is something within our company, who's integrated coding "Yes for sure, that's something for the future. I'm, there is something within our company, who's integrated don't know. So you need knowledge of it. To write a good prompt". GenAI "Yes also for us, we've made repor	data	happened, what's exactly happening, summarizing. That's also what's happening with Copilot
GenAI as "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenAI as "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge decassistant GenAI as "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenAI as coding "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenAI as coding "I know, the o-3 mini, 1 find it fantastic. I feel me really well and I know I almost don't need to control it". GenAI as "Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want". GenAI as "I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt". GenAI as GenAI as "Yes for sure, that's something for the future. I'm, there is something within our company, who's bit integrated wisy to search out with license of Copilot for Power BI". "Yes, for out we're made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see". GenAI as "Yes, also for us, we've made reports. For our uses and based of 1	assistant	and other Microsoft products".
coding assistant "Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers". GenA1 as coding assistant "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge de- assistant GenA1 as coding assistant "So he's making code than for me. That's what I'm doing. I describe what I want and what I want better for me". GenA1 as coding assistant "Yes, for all the programming languages indeed yes". GenA1 as coding assistant "Yes, for all the programming languages indeed yes". GenA1 as coding assistant "Yes, for all the programming languages indeed yes". GenA1 as coding assistant "Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want". GenA1 as coding assistant "Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want". GenA1 as coding assistant "Yes for sure, that's what I also can't that much. I've 1 time had a lesson, but I don't know. So you need knowledge of it. To write a good prompt". GenA1 as coding assistant "Yes for sure, that's something for the future. I'm, there is something within our company, who's busy to search out with license of Copilot for Power BI". GenA1 as coding assistant "Yes, also for us, we've made reports. For our uses and based on that they have Copilot, integrated <td< td=""><td>GenAI as</td><td></td></td<>	GenAI as	
assistant"Yes, and it's the future, in the sense, I expect that you'll get a lot more citizen developers".GenAI as coding"That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge de- centralised".GenAI as coding"So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me".GenAI as coding"So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me".GenAI as coding assistant"Yes, for all the programming languages indeed yes".GenAI as coding assistant"Yes, for all the programming languages indeed yes".GenAI as coding assistant"Yes, that's what you experience. That's very important, because its more that you need kassistant knowledge of what you want".GenAI as coding assistant"Yes, that's what you experience. That's very important, because its more that you need kassistant don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt".GenAI assistant"Yes for sure, that's something for the future. I'm, there is something within our company, who's integrated therefore we can ask questions of what we see".GenAI as coding assistant"Yes hor sure, that's something for the future. I'm, there is a do no that they have Copilot, integratedGenAI as coding assistant"Yes for sure, that's something for the future. I'm, there is a do no that they have Copilot, integrated <td>coding</td> <td></td>	coding	
GenAI as "That people, from within the business, who're using the tools, the knowledge and skills have to use and get what they want. So you're not dependent on an ICT Team. So knowledge decassistant GenAI as coding "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant GenAI as coding "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant GenAI as coding "So he's naking code than for me. That's what I'm doing. I describe what I want and what I want assistant GenAI as coding "Yes, for all the programming languages indeed yes". GenAI as control it". GenAI as coding "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant coding "Yes, that's what you experience. That's very important, because its more that you need assistant coding "Yes, that's what you want". GenAI as "I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt". GenAI GenAI "Yes, for sure, that's something for the future. I'm, there is something within our company, who's integrated busy to search out with license of Copilot for Power BI'. GenAI as codin	assistant	"Yes, and it's the future, in the sense. I expect that you'll get a lot more citizen developers".
coding assistant use and get what they want. So you're not dependent on an ICT Team. So knowledge de- centralised". GenAI as coding "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenAI as coding GenAI as coding "Yes, for all the programming languages indeed yes". GenAI as coding "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant coding "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to costistant GenAI as coding "Yes, that's what you experience. That's very important, because its more that you need assistant knowledge of what you want". GenAI as coding "I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt". GenAI GenAI "Yes for sure, that's something for the future. I'm, there is something within our company, who's integrated busy to search out with license of Copilot for Power BI". GenAI as GenAI as "Yes, also for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see". GenAI as "No, I think you'll always need them, but it disappears, instead of 10 programmers, you need there 5 or 2".	GenAI as	"That people, from within the business, who're using the tools, the knowledge and skills have to
assistant centralised". GenAI as "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenAI as GenAI as "Yes, for all the programming languages indeed yes". GenAI as "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant coding "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant coding "Yes, that's what you experience. That's very important, because its more that you need assistant coding "I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt". GenAI GenAI "Yes for sure, that's something for the future. I'm, there is something within our company, who's integrated busy to search out with license of Copilot for Power BI". GenAI GenAI as "Yes, also for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see". GenAI as "No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistant there 5 or 2". GenAI as coding "No, I think for example Copilot for Power BI, that you can get very fast insights in what	coding	use and get what they want. So you're not dependent on an ICT Team. So knowledge de-
GenAI as coding assistant "So he's making code than for me. That's what I'm doing. I describe what I want and what I want assistant better for me". GenAI as coding assistant "Yes, for all the programming languages indeed yes". GenAI as coding assistant "Yes, for all the programming languages indeed yes". GenAI as coding assistant "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to control it". GenAI as coding assistant "Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want". GenAI as coding "I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I don't know. So you need knowledge of it. To write a good prompt". GenAI "Yes for sure, that's something for the future. I'm, there is something within our company, who's busy to search out with license of Copilot for Power BI". GenAI "Yes, also for us, we've made reports. For our uses and based on that they have Copilot, integrated therefore we can ask questions of what we see". GenAI as coding coding "No, I think you'll always need them, but it disappears, instead of 10 programmers, you need there 5 or 2". GenAI "Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you want". GenAI as coding "No, I think verything will be more efficient . I think like all the things around it will be <td>assistant</td> <td>centralised".</td>	assistant	centralised".
coding assistant"So he's making code than for me. That's what I'm doing. I describe what I want and what I want better for me".GenAI as coding assistant"Yes, for all the programming languages indeed yes".GenAI as coding"I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to control it".GenAI as coding"Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want".GenAI as coding"Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want".GenAI as coding"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt".GenAI assistant"Yes for sure, that's something for the future. I'm, there is something within our company, who's integrated busy to search out with license of Copilot for Power BI".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need there 5 or 2".GenAI as coding coding"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integrated want".GenAI as coding"Yeah, I think everything will be more efficient. I think like all the things around it will be	GenAI as	
assistant better for me". GenAI as coding assistant "Yes, for all the programming languages indeed yes". GenAI as coding "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant coding "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant coding "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant GenAI as coding coding "Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want". GenAI as coding coding "I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt". GenAI "Yes for sure, that's something for the future. I'm, there is something within our company, who's integrated busy to search out with license of Copilot for Power BI". GenAI "Yes, also for us, we've made reports. For our uses and based on that they have Copilot, integrated coding "No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistant coding "No, I think for example Copilot for Power	coding	"So he's making code than for me. That's what I'm doing. I describe what I want and what I want
GenAI as integrated GenAI as integrated GenAI as integrated integrated interfore we can ask questions of what we see". GenAI "Yes, iso for us, we've made reports. For our uses and based on that they have Copilot, integrated integrated interfore we can ask questions of what we see". GenAI "See in 2.". integrated	assistant	better for me".
coding assistant"Yes, for all the programming languages indeed yes".GenAI as coding"I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistantGenAI as coding"Yes, that's what you experience. That's very important, because its more that you need assistantknowledge of what you want".GenAI as coding"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistantdon't know. So you need knowledge of it. To write a good prompt".GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's integratedbusy to search out with license of Copilot for Power BI".GenAI as codingcoding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need there 5 or 2".GenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedwant".GenAI as coding"So, I think everything will be more efficient. I think like all the things around it will be	GenAI as	
assistant"Yes, for all the programming languages indeed yes".GenAI as coding"I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistantGenAI as coding"Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want".GenAI as coding"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistantdon't know. So you need knowledge of it. To write a good prompt".GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's integratedbusy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, integratedtherefore we can ask questions of what we see".GenAI"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistant there 5 or 2".GenAI as coding"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedmitegrated"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedwant".GenAI as codingGenAI as coding"So, I think everything will be more efficient . I think like all the things around it will be	coding	
GenAI as "I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistant control it". GenAI as "Yes, that's what you experience. That's very important, because its more that you need assistant knowledge of what you want". GenAI as "I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt". GenAI "Yes for sure, that's something for the future. I'm, there is something within our company, who's integrated busy to search out with license of Copilot for Power BI". "Yes, also for us, we've made reports. For our uses and based on that they have Copilot, integrated GenAI "No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistant there 5 or 2". GenAI GenAI as "Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integrated want". GenAI as "Yeah, I think werything will be more efficient . I think like all the things around it will be	assistant	"Yes, for all the programming languages indeed yes".
coding"I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to assistantGenAI as coding"Yes, that's what you experience. That's very important, because its more that you need assistantknowledge of what you want".GenAI asGenAI as coding"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistantdon't know. So you need knowledge of it. To write a good prompt".GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's integratedbusy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistantdenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedGenAI as coding"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedGenAI as coding"So, I think everything will be more efficient . I think like all the things around it will be	GenAI as	
assistantcontrol it".GenAI as coding"Yes, that's what you experience. That's very important, because its more that you need assistantknowledge of what you want".GenAI as coding"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistantdon't know. So you need knowledge of it. To write a good prompt".GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's integratedbusy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, integratedtherefore we can ask questions of what we see".GenAI as codingcoding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistantdenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedwant".GenAI as coding"So, I think everything will be more efficient . I think like all the things around it will be	coding	"I know, the o-3 mini, I find it fantastic. I feel me really well and I know I almost don't need to
GenAI as coding"Yes, that's what you experience. That's very important, because its more that you need assistant knowledge of what you want".GenAI as coding"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt".GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's integrated busy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, integrated therefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need there 5 or 2".GenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integrated want".GenAI as coding"So, I think everything will be more efficient . I think like all the things around it will be	assistant	control it".
coding assistant"Yes, that's what you experience. That's very important, because its more that you need knowledge of what you want".GenAI as coding"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistant don't know. So you need knowledge of it. To write a good prompt".GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's busy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need there 5 or 2".GenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedGenAI as coding"Yeah, I think will be more efficient . I think like all the things around it will be	GenAI as	
assistantknowledge of what you want".GenAI as coding"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistantdon't know. So you need knowledge of it. To write a good prompt".GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's busy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistantthere 5 or 2".GenAIGenAI as coding"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you want".GenAI as coding"So, I think everything will be more efficient . I think like all the things around it will be	coding	"Yes, that's what you experience. That's very important, because its more that you need
GenAI as coding"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I assistantdon't know. So you need knowledge of it. To write a good prompt".GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's busy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistantthere 5 or 2".GenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedintegratedwant".GenAI as coding"So, I think everything will be more efficient. I think like all the things around it will be	assistant	knowledge of what you want".
coding assistant"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I don't know. So you need knowledge of it. To write a good prompt".GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's busy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistantGenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedGenAI as coding"So, I think everything will be more efficient. I think like all the things around it will be	GenAI as	
assistantdon't know. So you need knowledge of it. To write a good prompt".GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's busy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistantGenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedGenAI as coding"So, I think everything will be more efficient. I think like all the things around it will be	coding	"I don't know Python that well, that's what I also can't that much. I've 1 time had a lesson, but I
GenAI"Yes for sure, that's something for the future. I'm, there is something within our company, who's busy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, therefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistantGenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedGenAI as coding"So, I think everything will be more efficient. I think like all the things around it will be	assistant	don't know. So you need knowledge of it. To write a good prompt".
integratedbusy to search out with license of Copilot for Power BI".GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, integratedintegratedtherefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistantGenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedGenAI as coding"So, I think everything will be more efficient. I think like all the things around it will be	GenAI	"Yes for sure, that's something for the future. I'm, there is something within our company, who's
GenAI"Yes, also for us, we've made reports. For our uses and based on that they have Copilot, integratedintegratedtherefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistantdenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integratedwant".GenAI as codingGenAI as coding"So, I think everything will be more efficient. I think like all the things around it will be	integrated	busy to search out with license of Copilot for Power BI".
integratedtherefore we can ask questions of what we see".GenAI as coding"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistantdenAIthere 5 or 2".GenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you want".GenAI as coding"So, I think everything will be more efficient . I think like all the things around it will be	GenAI	"Yes, also for us, we've made reports. For our uses and based on that they have Copilot,
GenAI as coding "No, I think you'll always need them, but it disappears, instead of 10 programmers, you need assistant there 5 or 2". GenAI "Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you integrated want". GenAI as regrated "So, I think everything will be more efficient. I think like all the things around it will be	integrated	therefore we can ask questions of what we see".
coding assistant"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need there 5 or 2".GenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you want".GenAI as coding"So, I think everything will be more efficient. I think like all the things around it will be	GenAI as	
assistant there 5 or 2". GenAI "Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you want". GenAI as coding "So, I think everything will be more efficient. I think like all the things around it will be	coding	"No, I think you'll always need them, but it disappears, instead of 10 programmers, you need
GenAI"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what youintegratedwant".GenAI ascoding"So, I think everything will be more efficient. I think like all the things around it will be	assistant	there 5 or 2".
integrated want". GenAI as	GenAI	"Yeah, I think for example Copilot for Power BI, that you can get very fast insights in what you
GenAI as coding "So, I think everything will be more efficient. I think like all the things around it will be	integrated	want".
coding "So, I think everything will be more efficient. I think like all the things around it will be	GenAI as	
	coding	"So, I think everything will be more efficient, I think like all the things around it will be
assistant automated, everything goes faster".	assistant	automated, everything goes faster".

Labels	
	"We've a team, consisting of a data analyst, a data and analysis engineer and someone who's
	doing an internship, who's starting next Monday who's going to do a lot of things, in our company
Structure	with predictive modelling on our customer care area".
IT	"In a transition phase, we're currently on a monolite and changing to a multi architecture,
architecture	regardless microservices".
	"I usually compare it with a big shoebox where your can pick out a certain block and put in a
	block to try out certain functionalities. Whereby in the future everything is built via
IT	microservices, where as much as possible everything is saved in the local system, whereby all of
architecture	the systems are integrated, undoubtedly in the cloud".
	"Thereby we've a lot of other systems, like Google Analytics, Google Ads and also our CRM
Data	system, CDP, Customer Care system, thereby we've a lot of own built portals, tooling, data
sources	warehouses. Those are forming the peel around the process".
	"You talked about IT tooling, these are all data storages, yes, the development and management
	of those tools is within IT. Also our Saas- Applications are in general in management of IT, but as
	data area, we're not under II, two separate areas, choices are made well defined. We'll not go
Structure	with IT, but not to keep up, but driving growth".
IT	"Whereby we just said, the data is within the sources, but we're extracting the data from the
11	different places in general to our data platform. That's the core or essence of our data architecture,
architecture	our cloud platform".
IT/ Data	res, we re working within the cloud, with the philosophy that everything needs to be as mendiy
tooling	extraction Extraction ETL and data storage wise"
IT	"We also use matilion for our data integration from our data platform to our source systems back
architecture	and also feed our source systems with that kind of things"
IT/ Data	"Based upon that, we've our reporting peel, with our visualisation peel that's working on
tooling	Tableau".
IT/ Data	"Officially, we're a tableau house, also because the organizations which has helped us, with data-
tooling	driven working are a tableau club".
	"I always say it like this, the IT area cares for the data in the system, we're extracting it out of the
Structure	systems".
	"The responsibility could be never within our team, because I won't be on the seat of the business,
Data	so that means in the essence, that we've someone responsible within the source system. That kind
quality	of person is responsible for data, business rules within that system".
	"We've a vacature, not open, but provided for data steward role, whereby the data steward
	belongs to my business department, and is going to set up the business rules, which possible
Data	outliers are there on the business, that kind of stuff. Whereby, he is the controller of, the data
quality	steward of the source proprietor".
Data	
quality	"The owner of the data source is responsible, for the data quality in the source it selves".
Data	"Yes, but we're signalling a lot and in principal we signal everything, should influence the data
quality	steward, as well the data proprietor to make data rules better, sharper or adjust processes".
	"Of course, if we see that there are a lot of errors in the company names, if we see that addresses
Data	are not filled, we should see how to make that smarter, look how to compile processes smarter
quality	and to measure data clear".
Strategy	res, the data is by us on wir inveau, in general, it is part of the Wir. To let that have a such
sualegy,	significance. we also could let it be wrunn if or wrunn infance, interfuorial, purely because we see the growth motor in it."
culture	see the growth motor min.
Structure	that sounds pretty big, but in the fact it don't matters if you're within the customer service, we're
Suuciuie	i mai sounds preuy org, out in me fact it don't matters if you're within the customer service, we're

	you're creating data or within our case, in the marketing area and evaluating campaigns, how performing we campaigns, how we're performing in comparison with the rest, other campaigns".
Strategy, culture	"A sort of data ambassadors, we training them internally, we're develop them internally. That kind of things".
Structure	"That's what I see as data roles within the company, and everyone needs their own skills, their own capacities, and therefore we're looking, playing, every area has their own one responsible who can do serious analysis with data".
	"That's a part of security"
	"For example, are we going to give everyone access to our Toelevering Online ChatGPT environment, could be".
Skills of employees	"Of course, you need to be inquisitive, you need to like the puzzle. Figuratively speaking, every data question is a puzzle that we need to solve. Inquisitive, the drive and passion, the will to do it every time better".
Skills of employees	"No, is not. I like to have a good marketeer, that I can learn some things about data, than the other way around".
Skills of employees	"The in-depth knowledge is much more difficult to get, than data knowledge, especially with the tools which are currently available, that's children's game".
Descriptive analysis	"Yes, very much, literally, we don't do anything else".
Descriptive	
Descriptive	"That's also the power of our data platform, we could make every segment that we want".
analysis	in fact if you know how to fix it"
Descriptive	"If we combine that with sales data, we see that people with complaints for example, because
analysis	they've had contact, they come back"
Descriptive	"Customers who've had a complaint within the first order do probably more often a second third
analysis	or fourth order"
Descriptive	"That data slice ability of the mostly because we have or want to have all the data extremely
analysis	integrated we can make some good steps in that"
unurjois	"You can't help, you only can say, when 6 out of 10 time a customer has a complaint within the
Diagnostic analysis	first order and 8 times they doing a second order and without a complaint 6 times, we've diagnosed that".
Diagnostic	
analysis	"But that's purely, because we talk about 500/600 orders a week".
Diagnostic	
analysis	"Diagnostic also, that's also the case, our next step is within predictive, prescriptive".
	"We're already busy with that. To answer your question on certain areas, we're with the Erasmus
	University of Rotterdam, I was there last Friday, we're busy with what are factors that could
Predictive	contribute to whether or not an order is placed with us. What do we see happening in the process
analysis	leading up to the order?".
Diagnostic	
analysis	"Why are people placing an order or not?".
Predictive	"And, that's a step where we really busy with, but where I see we don't have the capacity and
analysis	time, that both sides of the medallion are to scarce".
D 11	"Yes, predictive technical wise, we're, and the stagiaire who's gonna start next week, that's
analysis	specifically on the customer service domain. There are we currently busy with setting the first steps".
Predictive	"There, are we currently busy with putting back the capabilities, there are we growing. Of course,
analysis	this will be more important".
Predictive	"I hear a X3G Booster model, extremely interesting, but I see that people finding it different to
analysis	make the good switch between theory and what's delivering it me".
Predictive	"Yes and no, apparently, people are understanding the business really well, but business wise
analysis	thinking, I think that's the biggest challenge currently".

	"Apparently, this is not a step to far, when we can state, this basket, is the chance x that it will
Prescriptive	finish. Then I will, based on that, how can we increase the chance, probably with different
analysis	elements".
Prescriptive	"Maybe, we need to setup an experiment to approach the customers proactively or for example
analysis	send a mail. What is needed to do therefore actually?"
Prescriptive	"But that's more prescriptive based on the business logics, then based on the data, he the data says
analysis	this, than I do that".
Prescriptive	"Already 100% prescriptive, I see, but that's more within the tools itself, as a CDB for example,
analysis	there is very much knowledge, logica, very much mathematical power in".
GenAI as	"Yes, for us, simply said, where is for us the most added value of GenAi in data area. Then, for
coding	us, this is mainly on formulas, error handling, that kind of things. That's what I see as most
assistant	important".
GenAI as	
coding	
assistant	"With a few presses on the button, the whole formulas is altered, to another language".
GenAI as	
coding	"The data and analysis engineer, for sure. The data analyst also sometimes, but Tableau is
assistant	therefore more easy, that this is not always necessary".
GenAI as	
task	"No, very simple. I see less added value of that, primarily because, you're working with a little bit
formulator	data literacy of the users".
GenAI as	
coding	"Also building nice, fancy visualizations, I've done that often enough, but if people can't
assistant	understand it, they can't understand it".
GenAI as	
coding	"So start with, what's the minimum people need, what can they understand, what also answers the
assistant	question, unless making it 10.000 steps complex and unnecessary".
GenAI as	
coding	"Yes, I think we've the capabilities for that, of course within a secure and a covered
assistant	environment".
	"Because that's is and stays unless my biggest fear".
	"What I see, is currently we're within Tableau Pulse, a new offering of Tableau. Your data model
GenAI	feeds, defining a metric and based on parameters Pulse gives suggestions, this is noticeable, this
integrated	is decreased, this has increased, this is different, this kind of things".
	"So literally I see this has happened, why is that? I expect that the average turnover the last few
GenAI	weeks was this, is stable increasing and that's because you're selling more in South-Holland for
integrated	example".
	"So are we using it right now. I know, also by myself, this kind of things are always around in my
	head, my thoughts are always different and will be different. I know that's happening, but this is
	how it is right now?".
	"Yes that's something I didn't told. That we're in our cloud tooling, in our could tool in general in
	that area, GenAI publicly can be setted in".
	"For example, to deploy large language models in our environment, that we're looking to that.
	That is, that is an essential point".
	"That's what I don't see as GenAI probably, I find, no large language models not GenAI. If we're
	using it for sentiment analysis, that's what we're looking to, what's the sentiment within a ticket,
	what do people think of that? ".

Labels	

	"Yes, we sell business telephony and that platform is of our own, so that's a source of data. We've
	for example marketing data for different channels or via tracking on our website. A tool as
Data	Piwick we use for that. For Sales we use a CRM package, Hubspot, Potential customers as well
sources	as current customers, also support is done in Hubspot, for example. There, we've tickets".
Data	
sources	"Therefore we've Mpeople for humans, so that's a source".
Data	
sources	"Then we've a few external sources, but we don't do much with that."
	"Yes, we gather everything in a data lake, we gathered data within different sources and then
	we've used the so-called star model. So we used a load schema there we load everything in into
IT	a datastore, historical save everything and afterwards we use, stage to combine/ merge
architecture	everything".
IT	"Then I want to transform and then Fact and Dimensions to gather the last layer. And then a data
architecture	visualization tool which queries into the fact and dimension tables"
	"Yeah we've a data team with data engineers a data engineer role that's a role by us a data
Structure	security role and data privacy role"
Data	"In the end, it goes by us about telephone data, calls with customer that can be tracked and traced
quality	hack to individuals and so that's very important"
Data	"Yes the data team annarently cleaning the data provide that when somethings is in the fact
quality	that's it is validated and that there is one single source of truth"
Data	"No manually input data isn't there. So yeah I don't know actually how relevant this question is
quality	We don't have data entry employees or so".
Data	
quality	"Sometimes a question comes from, what in other companies is the management board".
Strategy.	Some man a fuer de la companie de management companie de management com a l
culture	"Pfoe, not that concrete/clear that I can find a data strategy paper right now".
Strategy.	
culture	"Yeah, the choice is within the team, how the want to fill that in".
-	"For your understanding, we're working with circle leads who are responsible within the team for
Strategy,	strategy, priorities, and also the metrics. And because you're a circle lead, you work with data, as
culture	you are updating and maintaining the metrics".
	"And we want to present that in a central place. Than it is the question, oke how efficient is it to
IT	put that in a data warehouse. Then a data engineer came, one more, and after that, me as data
architecture	analyst, what's currently working with 4 people".
Strategy,	"That determines the strategy in that, so what choices are we making in which pipelines, how are
culture	we making documentation, how are we sure that the data is secured".
-	"I think in general three different things and you don't find that every time in the same persons,
Skills of	but one is technical, can code, constructs warehouse, be careful that data is automatically
employees	generated".
Skills of	"Then you've the analysis. Before the data, you need to know how the data is structured, how fast
employees	you can view that, slicing or filtering the data and understand that".
Skills of	"Then you've the translation point to the business". I haven't found anyone who is in every 3 parts
employees	good".
Descriptive	
analysis	"In general, this is used in every team".
Descriptive	"In the manner of a dashboard, the most important metrics that they've determine, that those are
analysis	insightful".
Descriptive	
analysis	"And then mainly descriptively, historical the last months".
	"Turnover, how many people we've reached with the story we told, how many new customers,
	how many customers are leaving, percentage of how many people are leaving. How many
Decomintizzo	
Descriptive	percentage of our hours is not attending because of what kind of way, that's how you describing
	"Look, ideally I would say every new investment that we do is totally based because we see this
--------------	---
Descriptive	in the data. That's not true. Would say that, but I think, partly that's true and within some teams
analysis	special things working, but what's not working within marketing".
Descriptive	"That's partly true, but mainly in some teams what works and what not, inside marketing, within
analysis	other teams is that more difficult".
	"We've a big team of developers. If there is developed a certain feature, then we measure that
	use. It's not if you look back in the time and say, I will do a certain A/B test between two
Descriptive	features. I'll look which one is used more and I'll develop that. You need to develop them both at
analysis	time".
Diagnostic	"Yes, the last one. This, diagnosis mainly on the people who presents the matrix or a report.
analysis	You're dependent on that and that's not what I see in every team".
Diagnostic	
analysis	"I've given a training this summer how you need to do that. With a colleague".
Diagnostic	"I mainly think that the time or the sense is not there. Or that there needs to be a skill, that isn't
analysis	there. So we need to develop that".
Diagnostic	
analysis	"It is possible, I've seen within my previous company, that it is possible".
	"Yes, in the time, we're doing a forecast on next year and the next three years. We'll lock them to
Predictive	look if we're following the current tendence, are we beating them or are we under it. Yes that
analysis	kind of indications".
Predictive	
analysis	"And, indeed we've churn prediction. So predicting who's going to leave next month".
Predictive	"Turnover predictions, we calculate that/them, cashflow predictions, is that present, that kind of
analysis	things".
Predictive	"For simple metrics of teams, lines will be drawn in Excel, so everything you are selecting and
analysis	extrapolate the trend or pattern".
Predictive	"We also use statistical models online to extrapolate the lines. And yes, churn prediction, that's
analysis	what I'm using. On this moment with a boost up 3 model".
	"Yes in target or purposes in the strategy for example. Are you using lines extrapolate or do you
Predictive	say, I've the insight that this will happen in the market, I'll high them with 10%. Yes this is a
analysis	combination of a linear model, maybe with some extra insights".
Predictive	"In principal, you firstly make conclusions, on which trend we're and extrapolate it. Will it be a
analysis	little bit too difficult and statistical, than the data team will make it".
Predictive	"Yeah, but in the end we're using a BI tooling that allows you to turn on forecasting and based on
analysis	that, that and that (Parameters) and how long you'll (11me)".
Predictive	"But's that normally a black box. I think you can find in the documentation which model is
analysis	
	Yes, I've in these, you can determine if it is in this category, but anomaly detection. So, at the
Ducastinting	moment there is less traine that I expect, we automatically get a warning that we ve less deals
Prescriptive	in an expected. Are we having less telephones on the platform than expected, than probably there is something where
Dragorintivo	
analysis	"Put there is not taken action (Automatically). It is more you get a notification one person"
Dresoriptive	"Ves, that is within the telephones, that's a statistical model. But for example number of
analysis	conversions, is something more than 20% over a week or so"
anarysis	"Ves everything expect descriptive. Ves that's were the uncoming time time and money is
	invested"
GenALas	"Ves Conjust is used a lot ChatGPT also. I think you wouldn't find a developer over here
coding	alongside myself that doesn't generate code. Or errors hugs put in input and look what's will
assistant	happen".
GenALas	"But also like explanation of data. I'll let automatically made reports for marketing. They said
data	this is happened, in relative sense, month over month or month to that in information so Think
assistant	about this or that".

GenAI as	
data	"Yes, I'll made that via Make.com, made a flow, load data into and ask multiple AI Bots, Chat
assistant	Bots to analyse your data and made a summarize of it. You can input every prompt you want".
GenAI as	
data	
assistant	"It is not an in depth analysis or so".
GenAI as	
data	"I've done it every time, then the first day it wasn't good, but the second or third day it was, the
assistant	prompt I've changed 20 times I think".
GenAI as	
data	
assistant	"Yes, it worked super good, this delivers me 1 hour a week"
GenALas	
coding	"Pfoe I don't know how everybody is using it, but I sometimes put code into it and ask if it could
assistant	more efficient or format it how I want to have it"
GenALas	"I'm not a star in formatting fortunately this doesn't need to so write documentation around it
task	check that documentation and then you'll have al the comments around it and ton, than I'll work
formulator	in general very secure"
GenALas	
coding	
assistant	"Ves not only for generating code"
GenALas	"No. Lonly can speak for myself. I've done some analysis with CSV unloading and asking
data	questions. The first time it works, sometimes less. But yes, I mostly use it. And if it is ridiculous
assistant	or nonsense I'll do it myself. If it isn't nonsense. I've gathered one hour"
assistant	"Ves we've given a training about that In the whole company in principal everything which is
	sensitive data that may not be in the Chathot"
	"Ves we've a company account so everybody can sees each other prompts in that Not that we
	are going to control ourself but that's an extra check because ves the least we wanna have is a
	data breach because we unloaded certain CSV to analyse data"
GenAL as	
task	
formulator	"In this time, I don't find generative AI good in creative things".
GenAI as	
coding	"I think data analysts and visualization people could work more effective, it costs much less time
assistant	to build a dashboard or to write a query".
	"We've done some tests that you're asking a question to the BI tooling and you'll get the answer.
	as well as visual, as well as answer, but that doesn't work that well. Because you need to label the
	data extremely well and every cell and column".
	"I'll think when that's finished, is that apparently what you see traditionally by a lot of companies.
GenAI	You'll send in a ticket or disruption by a data team, that you don't need that, but people can ask a
integrated	question in the input bar and they get an answer based on that".
GenALas	"Sometimes it works if you unload something in the Chatbot, a generative AI tool and you say I
data	want to know a percentage I want to select on this and this and I want that in a visual Which
assistant	visual vou'll present that works actually right now".
	"I've done lastly. I wanted to make an cohort analysis. So that means looking at when a customer
GenAI as	is there, in which period, and when you lose them, and then having a heat map of that. Well I
data	couldn't get it to work there, so I ended up building it myself again. So yeah. I'm not sure if that's
assistant	an issue with the prompt or something else".
GenALas	"I think that kind of tasks could very fast. I only ask if creative new ideas because in the end
task	GenAl is based on things that already are there, and if something isn't available. I don't
formulator	understand how something comes back by a certain model".

GenAI	
integrated	"That's apparently asking something and getting an answer".
GenAI	"Looker says having it. And that you've apparently whole presentation slides for management
integrated	presentations and so, including graphs and all".
GenAI	"I was there with a presentation, but I want to see it when you'll don't have the data labelled and
integrated	written that data not that nice, I think that's always something that is needed.
	"The knowledge and insights you needed, but in the end you have less output power necessary".
GenAI as	"I think, it's mainly an efficiency gain. Look, I think, if I generate a query, it helps that I know
coding	how I write queries, to know how to write that prompt or also to understand that the error or bug
assistant	in the group means something".
GenAI as	
coding	"Or because I can write Python, I can read what is there happening". That you know what's
assistant	happening".
	"Look, in essential you don't need to be an amazing coder, but you need to know what's
	happening there. By data analysis, you need to know how slicers and filters working and what's
	the difference between correlations and causation. Otherwise you're going to write not the right
	prompts to get right conclusions".
	"Or you don't need to write the prompts themselves, but then you're totally become unnecessary".

Interview 6

Labels	
IT	"Every e-commerce player, as merely of the e-commerce players are we on big query, or google
architecture	cloud. Has grown the last years under this group, merely because the switch of google".
	"Google analysis is last year decommissioned in GA4. GA4 is apparently very trouble, so
IT	everyone was compelled to switch into Google Cloud or big query. We were one of these
architecture	players. And we've build our whole infrastructure based on big query".
	"Then, you need to think about all the data regarding orders, website data, mainly think about
	customer journey, e-commerce clicks, click stream apparently. Then we've our logistic data.
Data	Than you need to think about how orders are processed, out of which warehouse they're coming.
sources	Then we've our finance data, I'm not that proficient in".
Data	"Then our customer service, that's all on Salesforce, also on Big Query, to train models based on
sources	that, predict things or describing".
	"Then we've our procurement branches. This gathers a lot of data out of China. Those have a
Data	different infrastructure, but comes in most of the times together in Google Cloud to produce
sources	weekly reporting, do predictive analysis or classify things".
	"There is one exemption, one of on the reason, we still use Click. That's more for the
IT/ Data	dashboarding, internal BI. The backend is on Google Cloud, but everything is visualised in Click
tooling	Sense".
IT/ Data	
tooling	"Then we've a part of the marketing team on Looker".
IT/ Data	"You don't hear that that often, it is a really new BI Tooling, the finest of it is that it is
tooling	integrating really well with Google Cloud, Big Query. It is of Google".
	"We've a BI team with a data engineer, a BI specialist and a team lead. Previous I also belong to
	that team, but because AI became so important for the organisation, this is separated from each
Structure	other".
	"Therefore I be directly under the jurisdiction of the director and am I working a lot with our
	sister organizations to conFigure an infrastructure out of the group, instead of getting a lot of
Structure	separate silo's, as BI now is".
Data	"This is really in the children shoes. We've a few processes that's checking, is this a logical
quality	value, is this a little bit inside the borders, not, then there goes an alarm off".

Dete	"But, this is really bad documented, what's the content of it. We've a few processes, we've
quality	knowledge".
GenAI as	"There have been a few signs to turn things up, however in most of the time you get lost in the
task	daily whim. And yes, documentation is not very sexy, often, people don't like these kind of
formulator	things. Therefore AI is a good solution".
Data	"Responsible is head of head BI, he is the one with the most knowledge of company processes.
quality	He can, by looking at the data, determine if it is a little bit logical or not".
Data	
quality	"This is not a good process, as I always say, but that's how it currently works".
Strategy, culture	"If you're growing as SME company, then you're facing a few things".
Strategy.	
culture	"There was demand to get more insights into the data".
	"The BI team has already good descriptive analysis, but they want to go more to predictive
Strategy,	analysis and causal relations, to describe why something has happened and can act based on
culture	that".
Strategy,	
culture	"That demand began to came, when the growth was starting to stagnate".
	"Out of the management, there was demand of someone who's more into the mathematics,
Strategy,	statistics, econometrics and who can give advice, which side we need to go, where do we need to
culture	pay attention to?".
Strategy,	
culture	"Strategical is a data-driven organisation".
Strategy,	
culture	"A lot of decisions are made based upon data. A good example is the website itself".
Descriptive	"It looks like Christmas, you've everywhere call to actions and so. And the problem is, all these
analysis	kind of things are really well tested. With A/B tests and relatively well statistical argumentative".
Strategy,	
culture,	"Not really a data strategy, we've a strategy, therefore we needed data, so let use data to satisfy
structure	within that strategy".
Strategy,	
culture,	
structure	"Data is not our end product, it is more as assistance".
Strategy,	
culture,	"You need one or two data engineers. A data analyst, a data scientist and a product owner, who
Structure	Oversees the overall process."
oulture	than it will be another structure, I know it as a Bol.com structure, that's when you're having a team of data scientists, who're fitting in into different parts/teams of the organization and where
structure	are periodically supporting and answering the questions within a project a specific team"
Structure	are periodicarly supporting and answering the questions within a project, a specific team.
sulture	"Veah we've a product owner, which is in this case the head of PL. Those is more busy with
structure	getting up requirements, but also can do hands on BL tasks
structure	"Than we've a data engineer, who's more in the backend. Than you need to think about DBT
Strategy	nython R flow The data analyst who translates requirements to data products a report that
culture	maybe will be used once, or a dashboard that has multiple function, or a predictive model with a
structure	advice report".
Descriptive	"This already setted up, within Click and Looker. There are always things that could be better
analysis	there are always new requirements reached. But in general, this is already there and in place"
	"We've a very big ticket box with request, how are you going to determine what has that for
Descriptive	effect on the infrastructure to make that, do we need to turn everything around to make that.
analysis	Than, there will be made an impact analysis".

	"In case of data descriptions, we're already an end. The only thing that's missing is metric trees,
Descriptive	that people understand, when you press on a, b will happen, but that's more knowledge and
analysis	maybe also some change management towards the organization".
	"The second, and then is it more, our turnover is decreased and than the request is within the data
Diagnostic	analyst or data scientists most of the time L because that role is not filled, and then is it using
analysis	econometrics lift experiments. Sometimes observing or testing incrementalities"
Diagnostic	"In lot of the time, we don't know the answer, because we didn't do an experiment based on
analysis	that" Drawing causal relationships is one of the most difficult things in general"
Diagnostia	"That kind of things. I try to put it away, have a look if it is really more had or coincidentally on
analysis	that day or in that country a national holiday, where nobody knows of"
Diagnostia	that day of in that country a national honday, where hobody knows of .
Diagnostic	"At the memory compating is a structural trand, then there will be a bigger response."
Dradiativa	At the moment something is a structural trend, than there will be a bigger research .
Predictive	we've different models in production, and then specific for forecasting, order forecasting,
analysis	because of configure the occupation in the warehouse or procurement".
Predictive	
analysis	"Therefore, we've custom models, which are on Arima, Action boost, it is which are you using".
Predictive	"We also have a procurement program, which is named Slim4. They're also having
analysis	autoregressive models, if I'm saying it well".
Predictive	"We also have return war predictions, so how big is the chance that something is called back. Do
analysis	we need specific actions to do?".
Predictive	"Then, we also have segmentation of customer, than you need to think of RFM, CLV, for
analysis	predicting the total customer value. Take marketing actions based on that".
Predictive	"Marketing mix modelling, attribution modelling, personalisation's, a Salesforce Engine is
analysis	behind that, all the models are behind that, I believe recommender systems".
Predictive	"Then we've vector stores who are searching for images and generating images back, to do
analysis	concurrent analyses".
Predictive	"Then we've a pricing engine, here are also enough econometric models behind it. Here you need
analysis	to think of exponential linear, apparently hierarchical smart".
Predictive	"We are looking if we can switch that into a machine learning model. Actually, we don't have
analysis	any budget to realize that".
	"Yes, that's on another granularity. For example the order forecasting is on country level. So you
Predictive	need to think of we're going to do next week this, we need to have more people for our
analysis	warehouse or customer service".
Predictive	"Purchase model is more on SKU Level. To host a model yourself, that's possible, but that
analysis	requires that someone's fulltime on that. That canacity don't we have at this time".
Predictive	
analysis	"Yes, but there are always new question's arriving"
Predictive	res, out there are arways new question's arriving .
analysis	"Ves that's Slim4 where that's in"
Dresorintive	
analysis	"We always have a human in the loop, we don't have models that makes decisions on its own"
Dragorintiyo	we always have a numan in the loop, we don't have models that makes decisions on its own.
riescriptive	"So yes we don't have an extension and of in meduation of Limowy"
anarysis	So yes, we don't have an autonomous model in production as I know.
р ·	Than we've them, RFM is one of them, as we see increase a segment that delivers not that much
Prescriptive	value, the marketing department does get a signal, here is something not well, here do you need
anaiysis	
Diagnostic	"I think the data maturity of the organization, needs to be recovered. Because people are
analysis	interpreting basic statistics wrong, which causes that people make choices wrong".
Diagnostic	"In the end, it goes about choices that be made well-founded or in the end the chance on making
analysis	a choice wrong minimalized."
Diagnostic	"Then, you can have the best data models in the world, but if the user is interpreting something
analysis	wrong, than the impact is not that much".
Diagnostic	
analysis	"It is mainly a cultural thing, that needs to be taken over and needs to be supported in".

	"So someone, with more a leader role in the organization, that coaches and trains the
Diagnostic	organization within this and how to interpret things. That would be more valuable than
analysis	implementing a new fancy model".
GenAI	"Yes, apparently a much. Apparently in relation traditional ML and GenAI I think 50/50 and we
integrated	see more in the direction of GenAI than language models".
GenAI	"We're building an infrastructure around a language model. In this case is that Gemini, because
integrated	we're partner from Google".
GenAI as	"In the end, we don't use the standard Gemini, we've an experimental version. There you've
data	some basic techniques like Rack, Finetuning, agentic systems, everything's is in that case on
assistant	Langchain, Langgraph".
GenAI	
integrated	"Do you know Deep research of ChatGPT, we're building something like that for procurement".
GenAI	"In short, what this model does it gathers data from our database based on a SOL has a look
integrated	what are trending product categories. Goes into the internet to confirm or debuke things"
GenALas	"In makes an analysis, this products are trending or more nonulair based on internet data, social
deta	In makes an analysis, this products are trending of more popular based on internet data, social model with sources, then the model are duese based on simple
uala	licession on dimension and that measure data and the model produces based on simple
assistant	annusion and images product recommendations".
C AI	"We've a report, that certain products will be more populair online or by certain competitors.
GenAl	Here you'll have a few examples of now a certain product could look like. Go purchase it, trying
integrated	to automatise a certain research part of the procurement department".
~	"Another model which is currently in production, is the marketing content engine, it simply
GenAl	looks to our current Google competitors content, looks what's trending, produces an article, he's
integrated	doing some adjustment and it's translated and send in 39 different languages".
GenAI as	
coding	
assistant	"Yes, for VS code we use GitHub Copilot, that's mainly for IT and data."
GenALas	
Gein II us	
coding	
coding assistant	"We've used Gemini, but that gave less good results".
coding assistant GenAI as	"We've used Gemini, but that gave less good results".
coding assistant GenAI as coding	"We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but
coding assistant GenAI as coding assistant	"We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not".
coding assistant GenAI as coding assistant GenAI as	"We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not".
coding assistant GenAI as coding assistant GenAI as coding	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is
coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have"
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works but it's not efficient that's the problem so your technical debt could increase a much.
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't nay, attention to it"
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it". "It mainly has to do with, a good model is based on domain knowledge and future engineering".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it". "It mainly has to do with, a good model is based on domain knowledge and future engineering".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it". "It mainly has to do with, a good model is based on domain knowledge and future engineering". "The making of a model is currently relatively so simple, so that's the part what you can automatize, so that you're making a pipeline and their is output on that, but what's your input
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it". "It mainly has to do with, a good model is based on domain knowledge and future engineering". "The making of a model is currently relatively so simple, so that's the part what you can automatize, so that you're making a pipeline and their is output on that, but what's your input depends on the fact that you're understanding the use case".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it". "It mainly has to do with, a good model is based on domain knowledge and future engineering". "The making of a model is currently relatively so simple, so that's the part what you can automatize, so that you're making a pipeline and their is output on that, but what's your input depends on the fact that you're understanding the use case". "At the moment, the language models or I think titans, we're currently is played with a lot, that
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it". "It mainly has to do with, a good model is based on domain knowledge and future engineering". "The making of a model is currently relatively so simple, so that's the part what you can automatize, so that you're making a pipeline and their is output on that, but what's your input depends on the fact that you're understanding the use case". "At the moment, the language models or I think titans, we're currently is played with a lot, that could be a breakthrough in the world of transformators".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it". "It mainly has to do with, a good model is based on domain knowledge and future engineering". "The making of a model is currently relatively so simple, so that's the part what you can automatize, so that you're making a pipeline and their is output on that, but what's your input depends on the fact that you're understanding the use case". "At the moment, the language models or I think titans, we're currently is played with a lot, that could be a breakthrough in the world of transformators".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it". "It mainly has to do with, a good model is based on domain knowledge and future engineering". "The making of a model is currently relatively so simple, so that's the part what you can automatize, so that you're making a pipeline and their is output on that, but what's your input depends on the fact that you're understanding the use case". "At the moment, the language models or I think titans, we're currently is played with a lot, that could be a breakthrough in the world of transformators". "The titans can understand context, can model the physical world, it wouldn't take long before the first features could be made and made a whole pipeline based on the use case".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it". "It mainly has to do with, a good model is based on domain knowledge and future engineering". "The making of a model is currently relatively so simple, so that's the part what you can automatize, so that you're making a pipeline and their is output on that, but what's your input depends on the fact that you're understanding the use case". "At the moment, the language models or I think titans, we're currently is played with a lot, that could be a breakthrough in the world of transformators". "The titans can understand context, can model the physical world, it wouldn't take long before the first features could be made and made a whole pipeline based on the use case".
coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant GenAI as coding assistant	 "We've used Gemini, but that gave less good results". "Yes, sure, how we currently using it, we don't like to make a loop, we know how it works, but we're describing it, let (the tool) generating it and look what's true, what not". "For seniors, or for people who're programming a lot, will it be more efficient. For juniors, it is more dangerous, because you see codes that are used, are not according to specific standards". "But, it looks like if it is really well, if you don't have a senior next to it, you'll get code in production that you do not want to have". "It works, but it's not efficient, that's the problem, so your technical debt could increase a much when you don't pay attention to it". "It mainly has to do with, a good model is based on domain knowledge and future engineering". "The making of a model is currently relatively so simple, so that's the part what you can automatize, so that you're making a pipeline and their is output on that, but what's your input depends on the fact that you're understanding the use case". "At the moment, the language models or I think titans, we're currently is played with a lot, that could be a breakthrough in the world of transformators". "I am wondering if we currently have reached a plateau, because the quickness is decreasing".

I	"Probably it will be in 5 or 10 years, when the next innovations will be there, than there will be a
	new bubble, because models are autoregressive. These models are lacking based on capacity,
	because they can't reason".

Interview 7

Labels	
IT	"We've Navision as ERP system, that's running onto the data of an SOL server, and that data
architecture	is the SQL server we use".
IT	"But that's pure production related, we also have R&D which have there own tool for drawing
architecture	which is integrated with the other system".
IT	
architecture	"But that's really basic".
Data	"We're now in the process of switching into a new ERP system, and with that new ERP
sources	system you'll also get WMS and things like that".
Data	"This system is out of 2010, so really an old system and qua database and things like that
sources	really restricted".
Data	"Yes, they're using their own system, I don't know exactly if they're really hard with each
sources	other integrated, but their are certain integrations".
Data	"We're working with 3 different ERP systems, and we're currently working to integrate that
sources	into one system that's internally or between locations goes more easy".
Data	"There, the implementation of the new system is ready, and within that Power BI is
sources	incorporated within that".
IT/ Data	"They've explained it to me, with all the data sources, because we're reporting nowadays
tooling	directly from the source, but that's not good for the performance of the system".
IT	
architecture	"They're doing it with datalinks etc".
IT/ Data	
tooling	"Yes, it is nowadays purely Excel".
	"Yes, we're now currently in the change, so if there's demand for a new dashboard, I'll do it in
11/Data	Excel, based on the source it doesn't matter, because it's on the same server and the code
tooling	behind it also, it's purely the visualization".
Descriptive	
analysis	"No, it are mainly KPIs that people wanting".
Descriptive	"Production related KPIs, Finance, Procurement, literally a lot of processes. where can be
Data	"Weah the method a little hit is that we're working with a yery old system and a let of nearly
Dala	Yean, the problem a fittle bit is, that we re working with a very old system and a lot of people have worked in it, but if you're going trough it you'll goe this descript look guite right"
Quality	"That's what we're trying to get as good as possible, because was reporting then also will be
Data	hat's what we're if ynig to get as good as possible, because yes reporting then also will be better"
Quality	"To let the system work, there are some strange transactions that will flow to the system to let
quality	it run smoothly"
Data	"I think it is mainly about the fact that people are working in the system and I'm the first one
quality	working on the SOL and then there is a lot more garbage"
Data	"Because on the frontend you'll see that everything is well aligned to each other, but in the
quality	backend is it different".
Data	
quality	"So ves, the more you'll see, the bigger the garbage".
Data	"Not directly for my feeling. But I agree the person who delivers the input is responsible for
quality	their own data".
Data	
quality	"Yeah, I mainly think because of the new system, is it more easy to do everything together".
Data	
quality	"So the vision is more on data focused".

Strategy,	
culture,	
structure	"LinkedIn technically I'm now 1.5 year purely focused on the data".
Strategy.	
culture.	
structure	"You truly realize, the more able to monitor the data, the more you can steer onto it"
Descriptive	"That you purely know that's what I need to do that's what I expect with data you've a lot
analysis	more insights into that"
Descriptive	"Because ves later it will be more extreme if you've visualized everything in Power BL you
analysis	may ask if that's good because it's a big shift"
Descriptive	"Because the danger is that nearly are only looking into dashboards instead doing the things
opolygig	they need to do"
Strategy	"So that's the question what may need to get and what not Earlier it was posice because we've
sualegy,	So that s the question, what may people see and what hot. Earlier it was easier, because we ve
culture,	a few KPIS, but now it's more, if it is your business area you can see it and only that, but you
Structure	don't need to see other things".
Strategy,	
culture,	
structure	"Because that's only leaving you're from your work".
Strategy,	
culture,	
structure	"Yeah, I think it is purely out of the management, I think really simple reports".
Strategy,	
culture,	
structure	"Purely which relations do we've. There are working operational employees also with".
Strategy,	
culture,	
structure	"That's not that it make sense, but it will be less comed up".
Strategy,	"Yes, that's a difficult question to answer. I think when you'll ask the Belgian colleagues,
culture,	they'll have another answer, they've a whole digital team, which ins continuely working with
structure	this".
Strategy,	
culture,	
structure	"Yes, I'll do everything on my own".
Skills of	
employees	"Yes, now the most important are to translate very big datasets into something useful".
Skills of	"If you'll go through an average SOL server, there is enormous information and you need to
employees	know what you'll exactly need and how to translate this".
Skills of	
employees	"Another thing is how do I translate the question's of somebody how do I visualise that"
Skills of	"I can ask you what you want to see, but if you'll come with 10 things how am I going to let
employees	that see in one visualization"
Skills of	
employees	"It is really about the performance of it"
Skills of	It is really about the performance of it.
omployees	"There becomes the part of coding also important"
ConALog	There, becomes the part of coding also important.
oclina	
aggistent	"And there ChetGDT is also suited for"
assistant	And, under Chalof I is also suffer 101.
SKIIIS OI	res, mainly about data is SQL very important. Thereby fill use python, because that's
employees	sometimes easier to code".
Skills of	
employees	"Yes, and then sometimes a little bit VBA of Excel".
Skills of	"Yes, we've an external party, who've conFigured the basis for the building year, they've also
employees	done the whole transition of ERP system".

Descriptive	
analysis	"They've standard dashboard formats, based on that, we can go further".
	"Yes, we are mainly working with KPIs. Production product, how many have you made of
Descriptive	this, drawbacks in minutes, how many orders finished and what's the efficiency. What've you
analysis	predicted and what do have finished".
Descriptive	"Yes, than we've purchasing, you look what are the relations, how many are delivering on
analysis	time, what quality and purely, what's the actual status of what needs to be delivered".
Descriptive	
analysis	"And, yes than you've sales, what's the lose purchases, how many parts are purchased".
Descriptive	"Than, you've sales, purchase and production, that are the main 3 parts where you can steer
analysis	and manage as organization on".
Descriptive	"I think that this is operational, these are the most important processes within the company.
analysis	HR also could, look what's the time, but it is less prioritized".
Diagnostic	"Yes, I think a little bit of both, you're restricted in your data. So if you can say it this is, than
analysis	it's oke. But in general it is the interpretation of the user".
	"If you'll look and for example the half of the organizations was sick, I had the half available,
Diagnostic	than you can determine it, but if I don't know how many FTE is available it is more the
analysis	interpretation of".
Diagnostic	
analysis	"It's also a little bit evaluating, on the basis of what's happened and did".
Diagnostic	
analysis	"That's also a process that will evolve continuously".
Predictive	
analysis	"Yes, that's by us not that exiting, the production is full, that's not easy to predict.
Predictive	
analysis	"It it more with Excel formulas, a little bit a rough estimate".
	"Yes, within our areas it is always a little bit difficult, within our areas it is always really
Predictive	logical. You'll sell a certain part of machines, for the rest it is more sure how to predict what's
analysis	going to happen".
-	"Yes, that's what you see within our business. You'll sell about 1000 machines per year and
Predictive	the planning is really full, so for the next half year, you'll exactly now what you are going to
analysis	produce".
Prescriptive	"Yes, you'll have it only within the front part. There you have lose sales, in the system is
analysis	something available, what I expect to do on sales that month".
Diagnostic	"Yes, I'll think mainly in the first two parts is where the demand will going to be. If there are
analysis	going to be certain exciting".
GenAI as	"Yes, I think mainly what you've mentioned earlier with coding. I've learned Python with
coding	stack overflow, but that was terrible to produce that fault or error and nowadays you'll have to
assistant	put it in ChatGPT and you'll have within a second an answer.
GenAI as	
coding	"Yes, that's were we are, not that far. I don't know how far are people within the organization
assistant	with it, but I can imagine when you'll need to translate at once, it is very valid".
GenAI as	"Yeah, I think within data analysis, it is mainly the coding part. It delivers me a lot of time,
coding	because I don't know to look at stack overflow, how do I need to do that little part, but I can
assistant	ask it".
GenAI as	
data	"Yeah, and I think the visualization part, that's not my strongest part, I want to a business
assistant	question to what people wanted to see".
GenAI as	
data	
assistant	"I'll use it to ask, what visualization do you want to see, what do you prefer, things like that".
GenAI as	
coding	"I'll think it is mainly SQL and Python and it is controlling, but also VBA, that's were I'm not
assistant	that good in, then it's also generating code".

GenAI as	
coding	
assistant	"Yeah, that's a little bit my handicap, and I'm compensating that, that's how I see it currently".
GenAI as	
coding	"Yeah, I think it is purely my advantage, that the last year of school, it was available, because
assistant	you now need to now how to work with and what kind of questions you need to ask".
GenAI as	"Yeah, we started a few weeks ago with Power BI, so that's purely that I ask them to make an
data	purchase dashboard, what kind of things you'll want to have in there. And you'll have a look,
assistant	what's my current system and you now what you can put in there".
GenAI as	
data	"But, we never take that so hard over, it is always the question of the of the management
assistant	itself".
GenAI as	
data	
assistant	"But it gives me the possibilities and an idea what's possible".
GenAI as	
data	"But on the other part, you see that people become lazy of that and don't now if that's the most
assistant	optimal".
GenAI as	
data	"I think if it will be at the expense of your function, you'll need to be notable in your
assistant	creativity".

Interview 8

Labels	
	"Generative AI, it is within the name, generates something, where machine learning is about
	analysing the data, product modelling, and analysing images".
	"It has emerged trough an innovation of Google in 2017, this is the transformer paper, the paper is called "Attention is all you need", there they've find out something, that called the
	Transformer Model and based on that, all the famous AI and AI applications are build on".
	"As, Cloude, Open AI, ChatGPT and Entropic, Amazon is all build on that".
	"It transforms input data into output data, the most famous is Large Language Model, so
	you've text in and text out."
GenAI as	
task	
formulator	"The most important use cases for companies are text to text, speech to text."
GenAI as	
task	"And yes, text to code is a little bit difficult, because on the one hand you say, it belongs to
formulator	text, text is within a model, and other people will have another opinion".
GenAI as	
coding	"So that is of code to text of a prompt and code will come out, examples are tools as Windsor
assistant	or Cursor, there you'll see a lot of that things".
	"Where I am a big supporter of is not use AI because of AI, but look what's the story behind
~	"My advise is not to directly look into the technical solution, but first look into the problem".
GenAl as	
coding	
assistant	"These have build a text to SQL pipeline".
GenAI as	
coding	"They are starting with a very relevant business problem and bottleneck that they've, namely
assistant	that is it takes freaking long to get up the SQL".

GenAI as	
coding	
assistant	"It is a combination of two frameworks, Langchain and Langgraph".
GenAI as	
coding	
assistant	"That are one of the biggest frameworks of Generative AI, Open Source".
GenAI as	
coding	"What they've build is not only what ChatGPT does, input in output out, but more an Agentic
assistant	System, whereby all different steps are carried out".
GenAI as	
coding	
assistant	"For example when you've a query as question, than you need to perform certain things".
GenAI as	
coding	"Namely, you first need to look what does she want, then you've text into another part of text,
assistant	then a sort of analysis or summary of what needs to happen with the query".
GenAI as	
coding	"Next step is to look, hey, do we've that data, there the whole thing of a knowledge
assistant	repository".
GenAI as	
coding	"This is a way to improve results, building an agentic system could be done on different
assistant	ways".
	"In this case, you've a few flaws of LLM, LLMS hallucinations, LLMS can't good reasoning
	and therefore you've different techniques to prevent this and there out you'll get a certain
	structure".
GenAI as	
coding	"For producing a query, so in this example, there stands write query, this is very solid, as it
assistant	goes on input data in and output data out, you can do whatever you want".
GenAI as	
coding	"Of course you can validate if some query is a good SQL, or of course is that a good use
assistant	case".
GenAI as	
coding	"I talked with a agency owner of a development agency, agency, what value do you've then,
assistant	therefore you needs to be more on consultancy tasks and thinking out certain things".
GenAI as	"Of course, in certain manners, writing code helps, ofcourse it helps if you're being software
coding	engineer, but as with no code tools, you nowadays have agentic features, that you can describe
assistant	what a tool needs to do and you get it".
GenAI as	
coding	"With no code there can broke minimum, as you'll have that with as you'll use cursor in your
assistant	id, therefore thins could be broken".
GenAI as	
data	"Also within business intelligence purposes, what could be relevant is analyse data. Just load
assistant	in a certain graph, screenshot and look what do you see".
	"A very famous example is CAD (Computer Automated Design)".
	"So, skills are changing, 100%, new skills are coming in, 100%".
	"100%, also companies will fall down or doing there best to stay, yes 100%, that was also
	with the internet bubble".
	"The winners of 1995 are not the of 2005, those of 2005 not of 2015".
	"Ofcourse is that very dynamical, but I think it is very valuable for every company to start, in
	essence with informing, what are the possibilities and risks analysing".
	"But if you're nowadays doing nothing with AI, than it will be tricky".
	"I think you can look into a few factors, you can't predict the future, but doing a try to".
	"If you look back to the factors what GenAI have bring so far, where it is now, are there 3"
	"First is the height or size of date appealty"
	This is the height, of size of data capacity.

"That is there, pillar 2 is adoption degree".
"And the third degree is that small teams can have a very big impact. If you look at Deepseek,
they claim they've with 100 man realised a opensource model, that is even as good, the best
model of OpenAI".