



INTERNSHIP REPORT

The road to financial insights and performance management



6 OKTOBER 2022

BRYN
Vught

Inhoud

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Preface

This document is a report that was written for my 5th semester internship project, which is the first internship I have ever done for the school of Fontys university of applied sciences. This project is called “The road to financial insights and performance management” and was given to me by a company called Bryn which is a subsidy of a company that is called De Jong. I got to know the company before I started my internship, through a common friend who introduced us. After Guido Raaijmakers (adviseur digitale transformative) and I had a meeting, I was recruited and I secured a part-time job and an internship project. Since September 2022 till January 2023, I have been researching, reporting and realizing the project.

Within the previous semesters, I noticed that I was lacking a bit in the documentation side of any project. Hence, I started being in my own comfort zone, since that we work most of the time in groups. Meaning, my group and I would split the work where I will always pick the coding work and skip the documentation to my group. Therefore, this internship got me to experience working individually in the real world, where nothing is theoretical/ hypothetical anymore. Stepping out the comfort zone made me learn how to work in a team within an organization, made me learn how to write reports and improved my coding skills.

However, during the internship, I have seen that my school mentor, Rob Verhoeven, and my boss/work mentor, Herman Wismans, were always there for me when I needed help. They were always there when I asked for feedback and guidance in writing the report. Most importantly, I cannot stress enough how patient they were with me, when I start to question every piece of information that I got. Nonetheless, they stuck with it, explained it and helped me learn more than what I could imagine.

Therefore, I would like to thank my mentors of the support and guidance during the project. Additionally I would like to also thank Guido Raaijmakers, for giving me the opportunity to work and realize this project at Bryn. Most importantly, I would like to give a special thanks to the CFO, Goldy van Loghem, for being patient with me during the project and for the financial lessons I got from her in the realization of the project.

May the force be with you all,

Ramy Alashabi

's-Hertogenbosch, 9th January 2023

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List of Terms & Abbreviations

Word & abbreviations	Meaning
Evolved	“to develop gradually, especially from a simple to a more complicated form; to develop something in this way” (Oxford, 2023)
opted	“to choose to take or not to take a particular course of action” (Oxford, 2023)
Derived	“to come or develop from something” (Oxford, 2023)
Commenced	“to begin to happen; to begin something” (Oxford, 2023)
Diminish	‘to become smaller, weaker, etc.; to make something become smaller, weaker, etc.’ (Oxford, 2023)
thus	“in this way; like this” (Oxford, 2023)
Valuability	“worth a lot in money or amount” (Oxford, 2023)
Hence	“for this reason (Oxford, 2023)”
Considerable	“great in amount, size, importance, etc.” (Oxford, 2023)
Specifically	“connected with or intended for one particular thing only” (Oxford, 2023)
vividly	“in a way that produces very clear pictures in your mind” (Oxford, 2023)
a.k.a.	“also known as” (Oxford, 2023)
i.e.,	“used to explain exactly what the previous thing that you have mentioned means (from Latin ‘id est’)” (Oxford, 2023)
erupts	“[intransitive, transitive] when a volcano erupts or burning rocks, smoke, etc. erupt or are erupted, the burning rocks, etc. are thrown out from the volcano” (Oxford, 2023)
MFA	“Multi-factor Authentication (MFA) is an authentication method that requires the user to provide two or more verification factors to gain access to a resource such as an application” (Onelogin by one identity, 2023)

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Management Summary

The name of this project is “The road to financial insights & performance management”, it was commenced on the 25th of August 2022 till the 10th of January 2023, for Bryn. Bryn is a business intelligence company that delivers insightful dashboards (Bryn, 2022), and is a subsidiary of a company called De Jong. The goal of the project is to deliver a dashboard that gives insights into the performance of the company and to solve the bottlenecks that the current reporting system is facing.

The project started with a main question “How can data from various sources within the company be processed in order to provide insights into financial and performance management ?.” Based on that 6 sub questions were evolved to help in answering the main questions, and they are as follow:

1. How to collect data from different sources?
2. What is the current reporting process?
3. What is the desired improved reporting process ?
4. Which is the most applicable Business intelligence tool to utilize ?
5. How can the financial and performance management be realized ?
6. How can the financial and performance management be Implemented within De Jong?

Through the first sub question, it was possible to identify the location of the data and to understand the type of data. The second sub question talks about the current reporting process within the organization, using lean six sigma wastes to identify the wastes within the process. While studying the current process, the following problems were noticed:

- The organization finds it hard to track the performance of the company and the employees.
- Report creation is done manually.
- Report creation is time and resources consuming.

Based on these wastes, the third sub question talks the improved process and how can the work be automated. These processes are visualized using a BPMN scheme. The fourth sub question talked about the best BI tool available and can be used within this project. Based on the choice of the BI tool, the fifth sub question researchers how the prototype is to be built. Finally based on the realization of the project, the sixth sub question is introduced with the implementation plan. Basically, it researches how can the product be implemented within the organization, including a discovery of “user based access” security measures. Where a user can have access to their information only based on their login details.

Based on the research that is done on the sub questions, the main question was answered. As De Jong can now track their performance and have detailed insights on their finances, through the dashboard/ the proof of concept that was made. As the dashboard does not only show information about the employee, but also the clients of the employee and the performance of both parties. Furthermore, the dashboard has eliminated the lean six sigma wastes that were in the current situation and automated the process.

In a summary, this document shows every step taken from the beginning of the project till the end, it represents the approach, what is expected of the approach and the results of the approach. Based on this document, this project can be recreated and can be improved on in the future.

1. Introduction

This document serves the purpose of explaining the “The road to financial insights and performance management” project for the Business Intelligence consultancy Bryn, which itself is a subsidiary of De Jong Accountants en Adviseurs. De Jong noticed that the performance within the company is leading to hours that are not billable and to get financial insights, it requires some manual work. Therefore, this project was made to gain a grip over the financial and performance aspects of the organization. Hence, the objective of this document is to report the problem, the research done to approach the problem and the implementation. All the research information below will be summarized to the most important points and for more details, the appendices will be attached and referenced.

1.1. Readers guide

This document contains 7 chapters as can be seen below:

1. The first chapter is an introduction about this document and the objective of the document.
2. The second chapter serves the purpose of introducing the current problem and the company.
3. The third chapter is the project statement chapter, where the goals, research questions and methods used.
4. The fourth chapter is the research chapter. Where the research, preliminary research and the implementation will be reported.
5. The fifth chapter will elaborate the recommendation and conclusion of the project.
6. The sixth chapter serves the purpose of an evaluation of the project
7. The seventh chapter serves the purpose of a personal reflection.

The rest are the sources and the appendices.

2. Context and background

2.1. About the client

Bryn is an IT Services and IT Consulting company that is result-based and customer oriented. Consequently, Bryn is a business intelligence consulting company, that delivers a “Due-diligence” research based advice and technical solutions to their clients. Additionally, Bryn focuses on the whole customer journey that they take with their clients, as they make sure that there is a professional taking the same steps with the client to ensure and maximize the success of the business of their clients (Bryn, 2022).

The clients that Bryn has, are coming from all sort of industries, from farmers to big corporations and usually, they are customers that would like their processes, book keeping or finances digitalized and automated. Especially that we live in a time, where technology means efficiency (III, 2015). Thus, Bryn ensure the continuous efficient growth within their clients business processes step-by-step, as they stay working with their clients till after the realization of the project, as to maintain the system deliver a continuous client support.

Moving on to the organization structure, as it can be seen in the figure below, Bryn is part of a overarching organization called De Jong accountants en adviseurs. However, there is no defined hierarchy within these subsidiaries, as they all work as one team and seek for the completion of one another (De Jong, 1985).



Figure 1 orginaization Chart

Furthermore, to ensure the efficiency and effectiveness of the clients business process and to get insights and possible opportunities for the business, Bryn uses business intelligence tools. These tools are used to visualize the client's data in real time, in the form of a PowerBI dashboard. It can be financial dashboards or sales dashboard, or management within the organization it-self. They do not just automate processes, but they also get more out of their clients company, regarding a smart and oriented entrepreneurship. That is not done by irrationally using trending applications , but by making verdicts based on an fundamental vision. Basically, they think along with the client on the automation of the process and the design of the product. As they also introduce further financial insights with the qualitative data, and help their clients company to reach the full potential by decoding where the opportunities are (Bryn, 2022). Hence, an increase in productivity due to an automation of a used to be a manual process and a good financial grip with critical insights of the company.

NOTE: Starting here the whole organization including the subsidiaries will be referred to as “De Jong”

2.2. Current situation

De Jong has their data on 3 different systems and these systems are:

- Qics, Is a cloud program that registers and invoices hours
- Auditcase, a database that store all information about the clients(i.e., name, company, phone, age, and etc..)
- Exact, is a financial program that deals with invoices and bank statements details.

These systems are used daily by the organization to keep track of their data and clients (V.Loghem, 2022). Therefore, whenever the organization wants to see their finances or the performance of their employee's within the company, the data is collected from audicase and Qics, an excel report is made by the CFO to visualize the data and then compared with the data in Exact. Furthermore, what has already been done to start this project, is that the client's missing data were collected by contacting the clients and the data were collected into a Auditcase and Qics.

2.3. Problem analysis

The main problems that the organization is facing is that account managers are not able to tell whether the increase/decrease in the “afboeking, bijboeking and revenue ” is due to the employee's exceeding the budget or an overall internal organizational performance. In addition to that, the employee currently has by no tool to check his own performance within the organization. Furthermore, it was noted that, within the organization, the CFO has to do all the calculations manually (V.Loghem, 2022)on an excel sheet to show the financial situation to the account managers. Therefore the main problems are :

- Reporting is done manually
- Reporting requires manual inputs
- Reporting is not available to everyone within the company
- Reporting is missing the mandatory KPI's
- Reporting is time and resources consuming
- Reporting can be more efficient

Within the company, whenever there is a meeting between the “account managers” to discuss the performance of the company/employee, the CFO has to go through multiples manual processes that are also collected and compared from and with different applications, and then a report is created using excel. Therefore, to steer clear of “motion” and “waiting time” wastes (Lean six sigma Experts, 2021) ,the focus of this project is to introduce an improved reporting process with more focus on the KPI's. As De Jong wants to have an automated end product(i.e., a dashboard), that could be accessed by every employee within the company. For more information please check the appendices Appendix L: problem analysis

3. Project statement

3.1. Project goal

The goal of this project is to have an end product that give insights into the performance of the company, to solve the bottlenecks that the current reporting system is facing.

3.2. Solution requirements

De Jong has stated some main business requirements Appendix B: Interview 1 Goldy. These requirements are summarized as follow:

- BR01 Performance management must be introduced in the end product
- BR02 Automation of the CFO's manual reporting process
- BR03 The report process must be clear of errors.

3.3. Research approach

In this section, the problems are going to be analyzed using various methods. These methods will help in answering the research questions or guide us in to the right direction.

These Methods are used to comprehend the problems at a business- level and pinpoint what the possible solutions approaches are, before nose-diving into ICT solutions and processes.

3.4. Research questions

These are the research questions that this project will address:

Main question

How can data from various sources within the company be processed in order to provide insights into financial and performance management ?

Sub-questions

- a. How to collect data from different sources?
- b. what is the current reporting process?
- c. What is the desired improved reporting process ?
- d. Which is the most applicable Business intelligence tool to utilize ?
- e. How can the financial and performance management be realized ?

Due to the confusion of the semantics of realization and implementation, It was decided to add an extra sub question that tackles the business implementation of the project as it can be seen below.

- f. How can the financial and performance management be Implemented within De Jong?

3.5. Research methods used

Research methods are activities, tactics and procedures used in the compendium of data or proof for analysis with the purpose of revealing additional information or establish a vivid understanding of the topic. There are plenty different types of research methods and for this project we are using the methods provided by Fontys (Fontys Hogeschool ICT, 2020) and they can be found in the Appendix A: Project plan

4. Research

In this chapter, a description of the research sub question will be explained, including a step-by-step explanation of the research methods used to do the research with some elaboration on the results.

4.1. Sub question 1

How to collect data from different sources?

The purpose of this question is to help in data collection and to know where the data is stored. As by the end of this question, data storage should be identified, data type should also be identified and the options for the data connection should be identified.

To answer this question, the following methods will be used.



Figure 2 Sub question 1 Research methods

- Literature study will be used to research previous work, for the reason that someone might have done the research.
- Interview will be used to research the best possible way in collecting the data and identify the sources of the data.
- Peer review will be used to have the collection of the data validated.

4.1.1. Results

Literature study

As it was already mentioned in chapter 2.2, there are 3 data sources. In order to understand how the data can be collected from these sources, a literature study is done, to understand the linkage between these sources and a BI tool. According to Qics website, this problem of data collection from different sources has been approached previously as Auditcase and Qics has “opted for a link between their two software” with each other (Qics Bv., 2022). In addition to that, to gain access to the data or collect the data from the storage, you will have to contact Qics (Qics Bv., 2022). That is because the data is stored in an SQL Server, which makes the connection between the storage and a business intelligence tool possible and accessible.

The End result of this method, is that we got to know that we can connect the Database to the dashboard. That is done based on the server ID, Database ID, User name and password as

it can be seen in figure 3 and can be seen below



Figure 3 SQL server database connection

Interview

After conducting the literature study an interview about the data collection was done. To acquire about the data an interview with the CFO and the data analyst about the types of applications and if there is a way to collect them. The CFO is Goldy van Loghem and she is the financial officer of the company, where her input has a huge impact on the project due to the project being about automating her work. The data analyst is Herman Wismans, and he is the expert in the technical department. The interview type was an unstructured interview, where the interviewer prepared 3 questions and the rest of the questions evolved from the answers of the interviewee and this can be found in Appendix D: interview 3 Herman

The interview can be summarized into the following:

- In order to get access to Qics, a communication link needs to be commenced to enquire about the database login details and that was automatically done as it can be seen below.

Sander de Regt (QICS)
14 sep. 2022 15:24 CEST

Beste Ramy,

Excus, laat ik ten eerste melden dat de toegang tot de database wel goed bij ons was ingevoerd en het IP op de juiste database ge-whitelisted. Ik heb alleen per ongeluk het verkeerde databasenummer en daarbij behorende username in de reactie naar jullie gezet.

Bij deze de juiste gegevens:
Server:
Database:
Gebruikersnaam:
Wachtwoord: [3y](#)

Wachtwoord OnetimeSecret:
Let op! Deze link is maar 1 keer te openen, sla het wachtwoord veilig op.

Laat even weten of je zou bij jullie data kan.

Met vriendelijke groet,
Sander de Regt

Figure 4 Contacting Qics

- The Auditcase Data is an excel sheet, that is stored in a cloud file as it can be seen below.

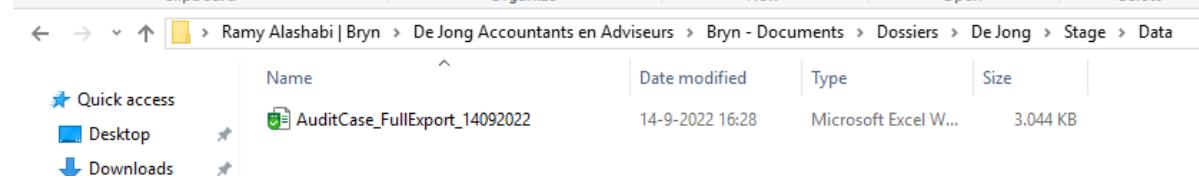


Figure 5 Auditcase Data Location

- It was suggested that the data from exact will not be used, due to the information within exact already exists in Qics. Sadly, it cannot be checked whether the data that is on Exact actually exists in Qics and that is due to not having access to the program nor the data. However, according to the data analyst Appendix D: interview 3 Herman, the data on Exact contains only the debited amounts in Euros and the column of the debited amounts can also be seen in Qics. Due to NDA reasons some information will be blurred as it can be seen below.

Debiteurcode	Debiteurnaam	Debiteur	Default aantal	Default artikel	Default bedrag	
101780			1	Voorschot	99,51	
167			1	Voorschot	44,41	
99956			1	Voorschot	1825,27	
103430			1	Voorschot	360	
9634962			1	Voorschot	187,5	
99657			1	Voorschot	40,7	
75			1	Voorschot	523,75	
104870			1	Voorschot	114,36	
101100)	1	Voorschot	725,13	
99953			1	Voorschot	40,66	
99955			1	Voorschot	40,66	
103990			1	Voorschot	261,88	
99902			1	Voorschot	331,71	
99707			1	Voorschot	785,63	
105730		55	05730)	1	Voorschot	5036,05
99692				1	Voorschot	312,03
104800				1	Voorschot	392,81
99889				1	Voorschot	113,08
55176		diseurs	55176)	1	Voorschot	500
99943				1	Voorschot	95,79
99944				1	Voorschot	117,15
103230				1	Voorschot	3169,25
107800				1	Voorschot	35,35

Figure 6 Data types

- As it can be seen in the figure above, this data is a quantitative data type. The main reason why it is said to be quantitative is because the dataset be containing discreet and continuous information. According to (Great Learning Team, 2022), discreet data contains information about the company(i.e., Number of employees or clients), and continuous is the data that can be measured by the form of decimals (i.e., revenue.)

Peer review

After the interview was done, a peer review with the data analyst "Herman Wismans" was made, to validate the data collection method and help to improve the work done. The review was written by the data analysis and can be summarized into the following:

- The data from exact needs to be validated with the CFO and added to the recommendation chapter.
- The type of data was not specified nor mention within the research.

As a result of the review, a new point was made under the interview method and right above the peer review method, describing the data types.

4.1.2. Conclusion

In summary, the project started with 3 data sources and that dropped into 2, due to the data already existing in Qics, according to the data analyst. However, it was learned about where the data is stored and how to connect the data from the database after contacting Qics to the BI tool. Additionally it was learned that there is a collaboration between Qics and Auditcase, which makes the work easier. In conclusion, it can be proved that the goal of this question is reached. In the following chapters, the processes that need to be automated and how it can be automated based on the data collected, will be researched.

4.2. Sub question 2

what is the current reporting process?

The purpose of this question is to highlight the wastes and add more information to the preliminary research that was done in the project plan of the current reporting process. Where by the end of this question, the wastes are identified and the current process is visualized, as this would help ahead in finding the desired process based on the highlighted wastes.

To answer this question the following methods will be used:

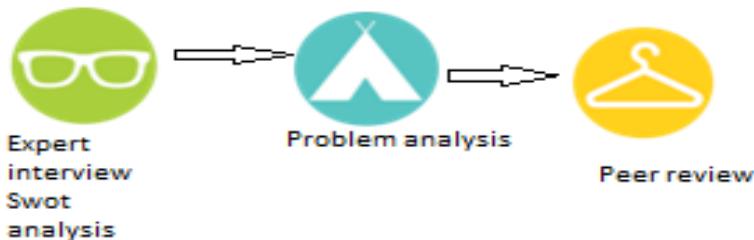


Figure 7 Sub question 2 Research methods

- An interview will be used, with an expert on the current reporting system.
- Within the project plan, it was mentioned that the usage of the field method (problem analysis) would be made, but that method is replaced by a literature study. The reason was that, the previous method did not add much value to the research question, therefore, the literature study method will be used instead.
- Swot analysis will be used to analyze the strengths and weaknesses of the company and recognize the opportunities and risks. The table was created by the intern based on the interview that was done.
- A peer review method will be used to validate the current reporting process and the highlighted wastes

4.2.1. Results

Literature study

To understand the current process better and the wastes around it, we first need to understand what lean six sigma is and how it can help. Lean six sigma is a methodology of work, that ensures the delivery of a sustainable process. It was founded by Toyota and what makes this methodology so successful, is that it uses the existing knowledge and talent internally before searching for the talent externally, hence the focus on internal Performance. Lean six sigma has 7 wastes (Kettering University, 2016) which can be seen in the figure below.



Figure 8 Lean six sigma wastes

Using this figure above, we can now identify the wastes of the current process within De Jong. Within the BPMN scheme, the wastes will be highlighted in a red box and it can be found below.

Expert Interview

After conducting the literature study, an interview was organized with the CFO. The CFO is Goldy van Loghem and she is the financial officer of the company and the one whose work is automated by this project. The interview can be found in Appendix B: Interview 1 Goldy, where the interviewer asked the CFO during the interview some questions about the current reporting process and these questions can be found in the transcription of the interview. However the interview can be summarized into the following:

- It was understood about how most of the CFO's work is done manually and during the Interview the CFO showed her calculation how it is done.
- It was talked about how much time consuming it is and how much of a struggle it is to find all the data necessary.
- A BPMN was created to elaborate more on how the CFO does her current work . This BPMN diagram was the product main of this interview. Business process model and notation is a graphical showcase for describing a business process. In this case, the BPMN model will show the whole work process that the CFO has to go through. The BPMN can be found in **Appendix G: Current BPMN**.
- This is the current process that the CFO has to go through and this diagram was included in the project plan, in the first week. The reason why this is included in here again, is because this BPMN diagram and the " current reporting process" research was not supposed to made, commenced, or shown before this report document was made. It was made earlier due to the enthusiasm and passion of the intern by translating the interview that was made with the CFO to a BPMN diagram. This diagram has a crucial part in the research part and the understanding of the project. Therefore, it is included here and below is the same BPMN diagram, but with the bottlenecks highlighted and the whole diagram can be found in Appendix H: Current BPMN highlighted.

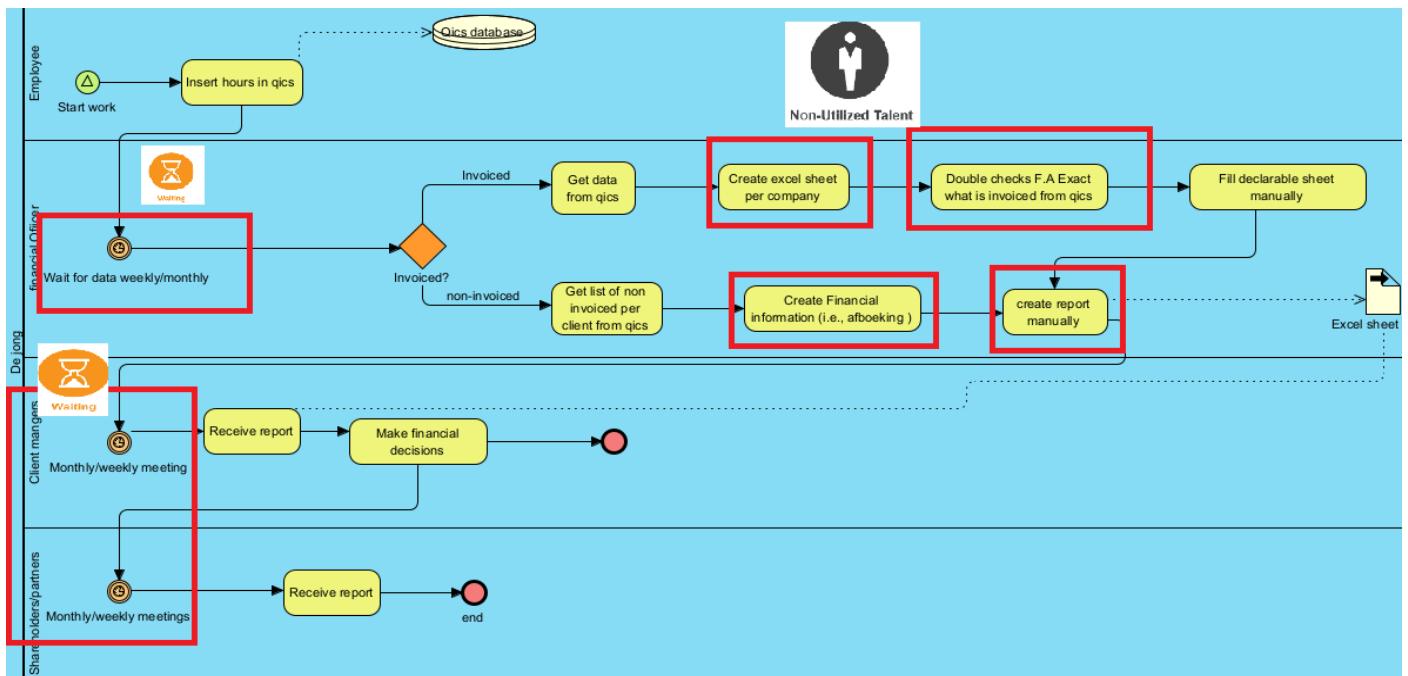


Figure 9 BPMN scheme with lean six sigma wastes highlighted

It can be observed in the scheme of the BPMN , that the process starts with an employee adding their hours worked and information into Qics. After that, within the CFO lane of the BPMN it can be observed that the CFO has to weekly or monthly wait for data to be filled, then checks if the data is invoiced or not. If the data is invoiced then the CFO creates a report, double checks the report data and then send to the relatie beheersers. If the data is not invoiced, the CFO goes through the same process, but this time with different information (i.e., Afboeking and client information). As it can be seen in the scheme, the red boxes are the wastes of lean six sigma. The creation of the reports can be seen as a non-utilized talent waste and the waiting for the reporting time or for data to be filled is also a time waste.

Swot analysis

SWOT analysis is a management technique that is used to help the organization to identify the weaknesses, strengths, opportunities and threats within the business (Kenton, 2022). The reason why SWOT is being used in here, to address what the organization lacks and diminish any possible risks.

The Diagram can be found in Appendix M: SWOT analysis and it can be summarized into the following:

- the strength of the company by having this project is that it keeps the company always in check, performance management wise, and that the data is shared to everyone which improves the trust between the employees.
- The weaknesses are based on that the CFO talents is being non utilized by report creatin and that the company had no means of tool to check performance.
- The opportunities that are created with this project which involves the usage of artificial intelligence in the prediction of revenue and that more performance management KPi's could be added later easily.
- The threats, where clients could be not satisfied due to employees not knowing how they are performing.

This information does not help in finding a solution to the problem, but it does give information about this project and information about the weaknesses within the company.

Peer review

After the interview and the Swot analysis were done, a peer review was made with the CFO “goldy van Loghem”, to validate and improve on the current reporting process (a.k.a. BPMN process) and the interview transcription. During the peer review, this document was sent to the CFO to read chapter 4.2 and to give her review here, and the review is :

“Het klopt dat op dit moment alle managementinformatie handmatig wordt gegenereerd. We komen als organisatie wel van een punt waarin we nauwelijks stuurinformatie hadden. We hebben het afgelopen jaar veel tijd geïnvesteerd in het bouwen van de huidige managementrapportages. Ondanks dat ze nog handmatig gegenereerd moeten worden (en daarmee tijdrovend zijn), verschaffen ze al wel veel inzicht in de financiële ontwikkeling van de organisatie. Een voordeel van het (handmatig) bouwen van de rapportages is dat we op dit moment precies inzichtelijk hebben welke informatie we uiteindelijk willen hebben, waarna we de rapportages kunnen gaan automatiseren. “

As a result of this review, it got to be known that the translation of the interview to a BPMN was a success, and that the results of this research sub question were also validated.

4.2.2. Conclusion

It can be concluded that the work of the CFO is done manually and contains many wastes following the lean six sigma wastes, as it can be seen in the interview. In addition to that, the strengths and weaknesses of the company got to be known and the results were validated by the CFO. Therefore, it can be proven that the purpose of this sub question was finally complete, as we understand the current process fully and based on this current process a new improved process will be made and researched in the next sub questions and this will be used as a concrete base for the next sub question.

4.3. Sub question 3

What is the desired improved reporting process ?

The purpose of this questions is to improve on the previous reporting process, understand the gap between current and the desired process and to understand what will be automated.

To answer the third question 3 methods will be used:



Figure 10 sub question 3 research methods

- An Expert interview will be used where an interview will take place with the CFO to understand the desired process and what needs to be automated.
- GAP analysis will be used to understand the current situation and the desired situation, and the gap between them.
- Peer review will be used to validate the desired process.

In figure 10 it can be observed that there was a 4th method in use, which is called “root cause analysis”. This method was diminished from this sub question, as it does not show the way forward to the solution, but it showed the root cause of the current situation that is already mentioned in chapter 2.

4.3.1. Results

Expert interview

An unstructured interview was done with the CFO, where she explained what the desired reporting process is and this interview can be found in Appendix B: Interview 1 Goldy. Based on this interview, 2 BPMN process were created. The first BPMN can be found in chapter 4.2.2 and that is the current reporting process. The second BPMN which is the newly improved BPMN can be found in Appendix I: New BPMN. The interview can be summarized into the following:

- The CFO wants the “data collection ” process to create a report, diminished.
- The CFO wants her time and skills spent somewhere else other than creating a report when needed.
- The CFO wants to always validate the calculations before any meeting
- BPMN Diagram was made based on the wastes made and can be found in Appendix I: New BPMN
- Within the new BPMN scheme, analysis department is introduced with the function of ensuring that the program is running, tackle any errors and further develop the program in the future.
- CFO work is automated by a BI tool that will collect data, refresh visuals and calculations, to the most recent date.

- Time waste is diminished, as any account manager could look at the dashboard without asking the CFO to create a report manually.

Gap analysis

After conducting the interview, a GAP analysis research method is used to basically measure the gap between the current situation and the desired situation, with remedies on how to fill the gap in (Hanna, 2021). The purpose of this diagram below is to elaborate more on the newly designed BPMN

	Current State (FROM)	Desired Future State (TO)	GAPS	Remedies
Item 1	Reporting is done manually in excel-time consuming	Automated process to save time and eliminate the non-utilized talent waste.	Not everyone has access to the report as it is done manually and takes time of the CFO	Create an automated end product that does the calculations automatically
Item 2	CFO has to collect and recreate the KPI's everytime	Automated data collection and representation of mandatory KPI's	CFO collects data manually and represents KPI's everytime manually	Make the data collection automated or on schedule
Item 3	employees have no clue on how their performances are within the company	Employees can check their performance and improve based on it	Employees has no tools to check their performance.	create an end product that displays the performance of the employee.

Figure 11 Gap analysis

Now that it is known what the gap is and what the remedies are, the next step is to look into the best BI tool that will include the remedies which can be summarized into the following:

- BI tool that is available to everyone simultaneously to display performance.
- BI tool that has a known coding experience within the organization.
- BI tool that can collect the data automatically and on schedule.
- BI tool with a considerable subscription fee.

Peer review

After the interview and gap analysis were done, a peer review was made with the CFO Goldy van Loghem, to validate and improve on the desired reporting process (a.k.a. new BPMN process) and the interview transcription. During the peer review, this document was sent to the CFO to read chapter 4.3 and to give her review here, and the review is :

“De BI tool geeft heel veel inzicht en is altijd up to date. De handmatige managementrapportages kunnen nu op elk gewenst moment uit het dashboard gehaald worden. Daarnaast kunnen we middels inlogrechten collega’s toegang geven tot de informatie die hij of zij nodig heeft. Uiteraard zit hier ook een beschermende factor in, niet alle collega’s mogen over alle informatie beschikken. Het moet mij enorm veel tijdswinst opleveren als ik de informatie voortaan rechtstreeks uit de BI tool kan halen. Wat wel het allerbelangrijkste is, is dat de informatie die de BI tool weergeeft ook juist en volledig is.”

As a result of the review:

- The new BPMN scheme is validated
- The requirements made from the gap analysis were also validated
- New access and information security requirement was gained, which will be mentioned in the recommendation.

4.3.2. Conclusion

It can be concluded that the new BPMN process includes a new department which is the data analysis department, which leaves the CFO with less manual work. Furthermore, Gap analysis is done and based on the gap analysis, a couple of requirements were made that would help in the next sub question. These requirements and the scheme were reviewed and validated through the CFO. In conclusion, it is proved that the purpose of this sub question is achieved, with the results shown above. Based on this result Performance management will be research in depth and requirements collection will take place.

4.4. Sub question 4

Which is the most applicable Business intelligence tool to utilize ?

The purpose of this question is to find the most applicable Bi tool to use in the automation and the creation of the final product based on the gap analysis done in the previous sub question.

To answer this question 5 methods will be used:

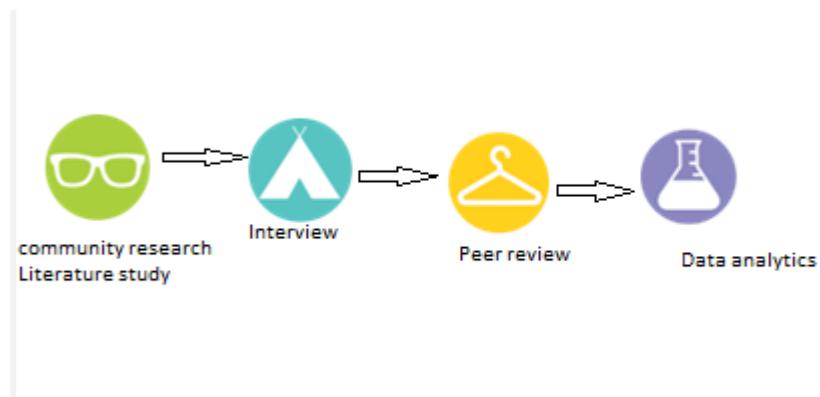


Figure 12 Sub question 4 Research methods

- Community research will be used, where it will be searched for a specific problem on any communal page(i.e., stackoverflow).
- Literature study will be used to research on the business intelligence tools available.
- Interview will be used with purpose of system requirements collection about the dashboard GUI and to enquire further on what is the preferred BI tool within the organization after the community and literature studies.
- data analytics will be used to decided which tables and columns to remove. The purpose of this is to clean the data and to keep history of the available columns and tables.
- A peer review will be used to validate the choice of the best BI tool.

4.4.1. Results

Literature study

A research was done on what is the best BI tool to use based on previously research articles or websites There are plenty of business intelligence tools available and based on this article (Haije, 2022), the top 5 tools are chosen and they can be found in **Appendix E: Dashboard tool research**. Within that document, 5 requirements were made based on the interview with the data analyst Appendix D: interview 3 Herman and the Gap analysis in Chapter 4.3. Below is an example of the research done on Powerbi tool with the requirements being vividly visible:

Power bi

The first tool that we will be talking about is power BI. Power bi is a set of software services and apps that works simultaneously to turn the data into coherent and interactive visually feasible data (Microsoft, 2022). This tool will be researched below based on the requirements it need to fulfill.

1. Does power Bi has the ability to add data from different sources ?

According to Microsoft (Microsoft , 2022), Power Bi has the ability to import data from more than 100+ sources that can be checked in the website including SQL, python and excel.

2. Does power BI has the ability to keep the data secured ?

According to Microsoft (Microsoft , 2022), all data within power BI are encrypted automatically using Microsoft-managed keys. These keys ensures the security of the data incase of a server error. In addition to that, when data is collected or imported to power Bi credentials are always required with a secure password. In addition to that, Powerbi does not have a public workspace, where anyone around the world can access it. It is more privet and can be published to a specific workspace which is then shared with a password and username (Power BI, 2020).

3. Does Power BI has the ability to allow access to all employees?

According to Microsoft (Microsoft, 2022) Power BI can be shared with everyone inside and outside of the company via a link. This link will always only give access to specific overview. However, when a link is shared the shared link can not make any changes or edits on the original file. In case of this project and improved BPMN process where we have made an analysis department to control the dashboard, this tool makes the work of the department S.M.A.R.T.

4. Has Power BI been used before within the organization and the intern ?

Power BI has been used before by the organization on a daily basis, as discussed in the organization structure chapter. Additionally Power BI has also been already used by the intern in the last 2 years, and it can be seen on canvas in the previous semesters course. Where for last semester, the intern has created a Power BI application that predicts House prices. In addition to that, power bi requires DAX as a formula language, which is very similar to excel (Microsoft, 2022).

5. What are the prices of power BI's subscriptions?

According to Microsoft, there are 3 types of power Bi with different prices which will be elaborated below.

Figure 13 Power bi requirments researched

These requirements are elaborated in details in the document and as a result of that document, a table was made that shows the tool's choice with the requirements summarized to 1 word below.

BI tool	data source	security	accessibility	experience	subscription
Power BI	YES	YES	YES	YES	YES
Tableau	YES	YES	YES	NO	NO
Qlik Sense	Maybe	YES	YES	NO	NO
SAP analytical cloud	YES	YES	YES	NO	NO
SAS business intelligence	Maybe	YES	YES	NO	NO

Figure 14 Table of tools

In the research it was concluded that it is advised to use the powerbi tool in the development and realization of the product. That conclusion is based on the requirements that each tool was check for as they were literature studied, community studied and referenced from various articles.

Community research

The community research method was used in combination with literature study in the Appendix E: Dashboard tool research . specifically in the 4th requirement of the tools within the document, which can be seen in figure 14 as experience requirement(a.k.a. coding experience). The whole document is a literature study document, but the 4th requirement could not be researched via literature but via community study, due to the requirement being very specific to coding experience. Below is an example of Qlik's bi tool 4th requirement:

4. Has Qlik been used before within the organization and the intern ?

Qlik have never been used within the organization nor the intern. Therefore, Using this application will cost not only time but also resources. In addition to that, when searched for the question of will the user need to learn additional coding language, the answer was yes. According to the community of Qlik, a basic understanding of SQL is mandatory or any coding language to use the application (Qlik community, 2017).

Figure 15 Example of the 4th requirement and community research done

However, it can be summarized that all tools require some knowledge of additional coding language, but since power BI and Dax is already an asset to all parties, powerbi was advised. In addition to that, it is mandatory to know through the community if there is a link between qics and powerbi, as if someone has developed a direct link between the two. According to Qics website (QicsMilestone, 2017), it seems like this problem was solved, as qics is introducing powerbi dashboard to their clients since 2017. However, according to this blog made by qics (Qics BV, 2022), qics offers prebuilt powerbi dashboard, that is easily connected to Qics API. This also means that clients of qics can also create their own dashboards and their own insights.

Interview

An interview with the data analyst Herman Wisman was done and can be found in **Appendix D: interview 3 Herman**. The Purpose of the interview was to verify the 2 research methodologies, their products that were done previous to this interview, to collect requirements on the template built and to get more creative ideas. Additionally, the interview started with 3 open questions and based on these questions more evolved as a continuation. The interview can be found in Appendix D: interview 3 Herman and the questions can be found below.

Those 3 questions were:
How long have you been working in IT?
nowadays what do you work on like what BI tool ?
what happened to the data source of EXACT?

Figure 16 Main questions asked during the interview

The reasons behind asking these specific questions are:

1. The verification of the 2 research methods used previous to this method .
2. The Verification that the Power BI tool is indeed the best option and the most used currently.
3. To enquire about the Exact data set and why is it not included anymore.

Based on these questions and answers more questions evolved it can be found in the appendixes.

These starting questions might not suit the case of the research, however they were used to initiate the nonstructured interview, which lead to more questions that suits the case better.

Furthermore, before the interview was made, a template was also made on a power Bi application. This template can be seen in the figure below.

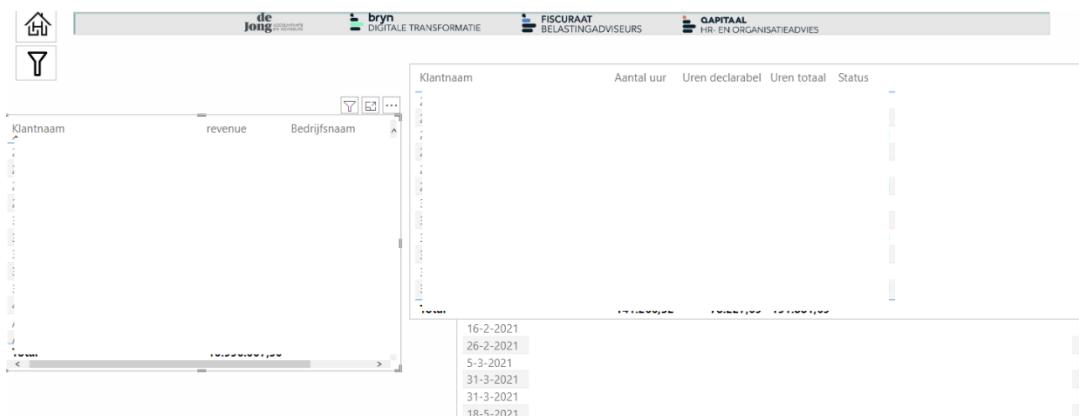


Figure 17 Dashboard template

The figure above shows the first template made with design and the feedback from the interview can be summarized in the following :

- The colors should have De Jong colors, which are yellow and light greyish.
- Instead of having 1 tab for every subsidy, it is advised to have 1 general tab for everyone and the other tabs are per KPI's per subsidy .However, this will be done in the 5th research question under the prototype methodology.

Peer review

After the interview and literature study were done, a peer review was made with the data analyst Herman Wismans, to validate the advice on the BI tool, improve on the research methods and the interview transcription. During the peer review, this document was sent to the data analyst to read chapter 4.4 and to give his review here, and the review is :

"Did the fact that Qics has built an data model in Power BI had any impact on your conclusion?. And why did Qics choose to build a data model on Power BI and not on other BI tools? Probably the same reason why we choose for Power BI. Mentioned the reason why Qics choose for Power BI might substantiate further our choice for Power BI. I don't see this in your conclusion."

Based on this review the following was done:

- Qics were emailed to enquire about their choice of power bi and the reply was that they build their solution based on Microsoft technology as it can be seen below.

[QICS] Re: [QM] De Jong Accountants en Adviseurs| Qics data model

 AD Alex den Haan (Qics BI/Analytics support) <bj@qics.nl>
To Ramy Alashabi | Bryn

[\(i\) Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.](#)

Qics Customer Service

 **Alex den Haan (QICS)**
19 dec. 2022 15:50 CET

Hi Ramy,

We build our solutions based on Microsoft technology, so therefore Power BI.

Met vriendelijke groet,

Alex den Haan

 **Ramy**
19 dec. 2022 12:18 CET

Hi Alex,

This is a random question but very useful for my project... I was wondering why did Qics choose Powerbi to build the data model in and not in any other BI tool ?

Kind regards,

Ramy Alashabi | Bryn

Figure 18 Qics choice of BI tool

Data analytics

When the data was imported to Powerbi and looked at, it was noticed that there are a lot of empty tables, empty rows, and some columns are filled with 0 and 1 which makes no sense. Therefore, an excel sheet was created that shows all the tables with their columns, what do the table contain and if it should be deleted. This excel sheet can be found in [**Appendix K: Excel sheet.**](#)

4.4.2. Summarized conclusion

It can be summarized that Powerbi is the best tool to be utilized within this project. This is due to Microsoft being a big organization that is integrating with every other software, which make it easier to use and to utilize. Furthermore, based on the peer review and the reply from Qics on their reasoning for the choice of a BI tool, it is clearly vivid that Microsoft is the best choice. Additionally, during the interview with the data analyst, it was learned that powerbi is the most BI tool used within De Jong and favored. Therefore, it can be concluded that the purpose of this sub question is achieved and can be proven with the document and results above.

4.5. Sub question 5

How can the financial and performance management be realized ?

The purpose of this question is to collect all the requirements that will have an effect on the performance management, research performance management and how it can be realized within the organization and create a prototype of the final product with all the information needed to force the valubility of the product (Realization).

To answer the fifth question 5 methods will be used:

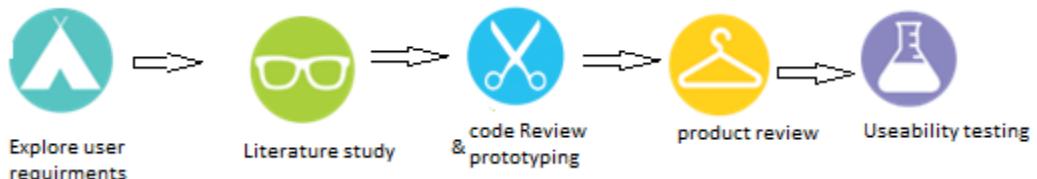


Figure 19 Sub question 5 Research methods

- system user requirements will first be explored.
- Literature study will be used to study the visuals that will be used in prototyping
- Prototyping will be used to create a Power bi application
- Code review will be used to check the prototype and the outcome of the code.
- After the creation of the prototype, usability testing will be used to test that the program is usable.

4.5.1. Results

Explore user requirements

For the explore user requirement method, a requirement analysis document was made and can be found in Appendix F: Requirements engineering. This document was made based on all the interviews done with all stakeholders, as in the requirements was not done based on 1 interview. An example of this is, during an interview when an interviewee says that he has a trouble with something while explaining the process, the interviewer turns that into a requirement, even though it was not mentioned as a requirement. Sadly, some of the requirements cannot be met due to insufficient data (i.e., Sick hours percentage) as the system does not save the previous contract hours per employee, but updates it and deletes the old. Below, will include the top 3 requirements of each table as the whole table can be found in the appendix.

6.1. MoSCoW User Requirements

Table 1 MoSCoW User requirements

User requirements	Explanation	Must-Should-Could-Won't
1. User wants to see the declarable and non-declarable hours spent on clients.	The user would like to see how many hours were spent on a task/client and if that amount is declarable or not declarable	Must
2. User wants to see active and non-active clients.	User would like to see who are the active and non-active clients	Must
3. User wants the ability to see the history of last time work was done for clients.	The user would like to see when the last work was done for a client and if that client is active or not.	Should

Figure 20 Top 3 user requirements

The figure above show the top 3 requirements of the User requirement with an explanation, that talks about what the user expects the system to do.

6.2. MoSCoW Functional requirements

Table 2 Functional requirements

Functional requirements	Explanation	Must-Should-Could-Won't
1. System must be able to automatically present updated data.	System must does a scheduled refresh to automatically present the recent data of today.	Must
2. system must be able to automatically transform new data from database into dashboard.	System must transfer the data that is registered in Qics automatically to the BI tool .without manual interaction	Must
3. system must allow the user to filter data using slicers.	System must allow the user to use the slicers to filter the data.	Must

Figure 21 Top 3 functional requirements

The figure above show the top 3 functional requirements which talks more about what the system should do.

6.3. MoSCoW non-functional requirements

Table 3 Non- Functional Requirements

Non-functional requirements	Explanation	Must-Should-Could-Won't
1. System must have an intuitive, S.M.A.R.T GUI	System must be easy to understand and to follow, maybe user guide document should be made	Should
2. System must be open for further development.	System must not be closed, as in case further development was needed, it should allow that.	Must
3. System should be maintainable	System should be easy to maintain incase of errors.	Should

Figure 22 Top 3 non-functional requirements

The figure above shows the top 3 non-functional requirements which is a constraint of how the system should display the functional requirements. In conclusion the whole

tables including the requirements that cannot be met can be found in Appendix F: Requirements engineering

Literature study

A research was done to understand what are the best way to represent data in visuals. For this purpose a literature study was made and can be found in Visual selection chapter of the proof of concept document. This study helped in the building of the prototype and the representation of the data as it can be seen below.

Visual selection

In the prototype and the figures above, it can be seen that there are variety of data visualizations are being used, these visuals were researched, to ensure that the data is represented correctly.

- The first visual that can be seen is the line clustered bar visuals. According to (Mike Yi, 2019) this visual is used for the purpose of the comparison and in the case of this project it is between the bijboeking and afboeking per month.
- The second visual that can be seen is the pie chart. According to (Velarde, 2021) this visual is used for the purpose of representing parts of a whole pie and in the case of the project it represents the revenue in total between all the subsidies which are 4.
- The third visual that can be seen is the doughnut chart. According to (Velarde, 2021) this visual shares the same purpose as the pie but can be more readable incase there are more than 6 subsidies and in the case of the project it represents the total hours based on the facturatie vorm(i.e., Voorschotten, termijnbedragen and onkosten.)
- The fourth visual that can be seen is the Bar chart. According to (Velarde, 2021) this visual is used for the purpose of data comparison on 2 axis. One axis can be categorical and the other is numerical and in the case of the project it shows the revenue per client.
- The fifth visual that can be seen is the line graph. According to (Mike Yi, 2019) this visual is used for the purpose of representing change over time and in the case of the project it shows the revenue over the months.

Based on this, the visuals were made to fit the business reporting perfectly.

Figure 23 Study done on visual selection

Prototyping

For the prototyping method, a Power bi dashboard was made to visualize the requirements, KPI's and it is the end product that will be delivered to the client. There was a document created and can be found here Appendix N: Proof of concept/ prototype showing the following:

- how the data model was built and validated as can be seen in the figure below.

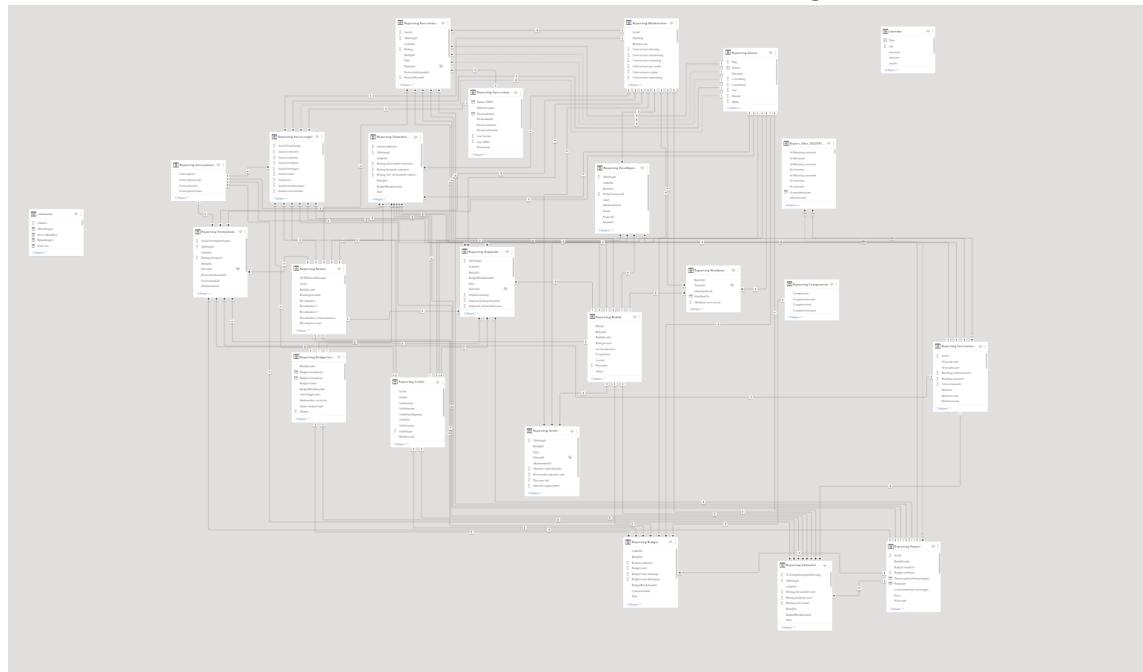


Figure 24 Data model on Power Bi

- The document also shows what the first template was and how it became after the feedback session with the data analyst as was mentioned in “chapter 4.4.1 Results”.

- The document also contains a table of the top 10 most important measures (a.k.a. codes) created as can be seen below

Name of measure	Formula of measure
Afboekingen =	<code>CALCULATE(SUM('Reporting Facturatievoortgang'[Bedrag]),FILTER('Reporting Facturatievoortgang','Reporting Facturatievoortgang'[subtype]="Deducted"))</code>
Bijboekingen =	<code>CALCULATE(SUM('Reporting Facturatievoortgang'[Bedrag]),FILTER('Reporting Facturatievoortgang','Reporting Facturatievoortgang'[subtype]="Added"))</code>
bij en afboeking =	<code>SUM('Reporting Factuurregel'[Bedrag bijboekingen])-SUM('Reporting Factuurregel'[Bedrag afboekingen])</code>
bruto rev =	<code>var val= SUM('Reporting Factuurregel'[Bedrag totaal])- SUM('Reporting Factuurregel'[Bedrag bijboekingen]) var val2 = val+SUM('Reporting Factuurregel'[Bedrag afboekingen]) return val2</code>
cumulative revenue =	<code>var todaydate = TODAY() var todaymonth = MONTH(todaydate) var todayday= DAY(todaydate) var yearfilter= GENERATE(VALUES('Reporting Datum'[Jaar]),var todayincurrentyear= DATE('Reporting Datum'[Jaar],todaymonth,todayday) return CALCULATETABLE(DATESYTD('Reporting Datum'[Datum]),TREATAS({todayincurrentyear},'Reporting Datum'[Datum])) return CALCULATE(TOTALYTD([Revenue 2],'Reporting Datum'[Datum]), KEEPFILTERS(yearfilter))</code>
YTD =	<code>CALCULATE(TOTALYTD([Revenue 2],'Reporting Datum'[Datum]),SAMEPERIODLASTYEAR('Reporting Datum'[Datum]))</code>
hours last week =	<code>CALCULATE(SUMX('Reporting Geboekte uren','Reporting Geboekte uren'[Uren totaal]),FILTER(ALL('Reporting Datum'[Datum]),WEEKNUM('Reporting Datum'[Datum])=WEEKNUM(TODAY())-1),FILTER('Reporting Geboekte uren','Reporting Geboekte uren'[Uren totaal]<> BLANK()),FILTER(ALL('Reporting Datum'[Datum]),YEAR('Reporting Datum'[Datum])=YEAR(TODAY())))</code>
hours current week =	<code>CALCULATE(SUMX('Reporting Geboekte uren','Reporting Geboekte uren'[Uren totaal]),FILTER(ALL('Reporting Datum'[Datum]),WEEKNUM('Reporting Datum'[Datum])=WEEKNUM(TODAY())),FILTER('Reporting Geboekte uren','Reporting Geboekte uren'[Uren totaal]<> BLANK()),FILTER(ALL('Reporting Datum'[Datum]),YEAR('Reporting Datum'[Datum])=YEAR(TODAY())))</code>
Revenue 2 =	<code>CALCULATE(SUM('Reporting Facturatievoortgang'[Bedrag]), FILTER('Reporting Facturatievoortgang','Reporting Facturatievoortgang'[subtype]="Billable"),FILTER('Reporting Datum','Reporting Datum'[Datum]<=TODAY()))-[corrections]</code>
title hours worked =	<code>"Medewerker: " & CALCULATE(SELECTEDVALUE('Reporting Medewerker'[Medewerkernaam])) &" Hours/week: "& CALCULATE(SELECTEDVALUE('Reporting Medewerker'[contracturen per week]))</code>

Figure 25 Top 10 Measures with their DAX Code

- These measures will be reviewed in the next research method by the CFO and the Dashboard will also be reviewed by any of the account managers and finally a user manual will be made that explains how to use the dashboard.

Code Review

During the building phase of the measures in the dashboard as it can be seen in figure 25, the CFO Goldy van Loghem, worked very closely with the intern on the calculations of the measures, to ensure the accuracy of the information that will be displayed. The challenging part of working with the CFO was translating financial calculations to a DAX code calculation as it can be seen below.

```
bruto_rev = var val= SUM('Reporting Factuurregel'[Bedrag totaal])- SUM('Reporting Factuurregel'[Bedrag bijboekingen])
var val2 = val+SUM('Reporting Factuurregel'[Bedrag afboekingen])
return
val2
```

Figure 26 Dax code translation

However, a final meeting was scheduled to validate the results as it was not possible for the intern to validate it himself , due to not having access to that specific data.

Nonetheless, as it can be seen below the results are the same.

bruto rev	saldo rev	Bedrag totaal
1.848,75	-11,76 %	1.631,25
204,00	0,00 %	204,00
262,50	0,00 %	262,50
205,00	0,00 %	205,00
125,00	0,00 %	125,00
67,50	0,00 %	67,50
52,50	0,00 %	52,50
525,00	0,00 %	525,00
80,00	0,00 %	80,00
368.023,46	-10,29 %	330.167,32

1 2

Figure 27 Information displayed on dashabord

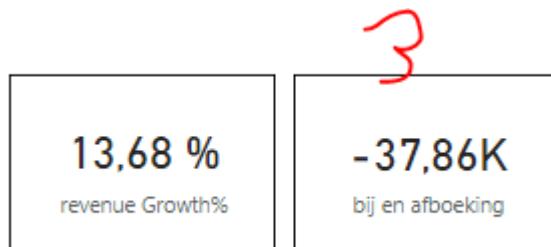


Figure 28 bij en afboeking information on dashabord

The figures above shows the saldo revenue in percentage and the bedrag total and the bij en afboekings, that one of the employees made in the period between 1-1-2022/30-10-2022. This can be compared with the excel sheet that the CFO has to make her self every reporting period, as it can be seen below

Figure 29 Excel sheet used for comparison

The comparison is numbered inside the figures above. Sadly most of the information within the excel sheet which can be seen in figure 29 , is blurred due to NDA reasons and the sensitivity of this information.

Product review

During a weekly meeting within Bryn, the dashboard was demonstrated to everyone in the meeting to review the product before release and to collect feedback. The feedback that was collected can be summarized as follow:

- Headers and columns names are not clear enough and need to be in Dutch.
 - The format of the values needs to be finalized (i.e., a percentage value needs to have a % sign behind the value.)
 - Some of the lines are duplicated and needs to be fixed (i.e., Klant naam is duplicated due to a klant naam company and a klant naam person.)

After the feedback was collected, the dashboard has been worked on and the errors were fixed as it can be seen below.

Medewerker uren	Declarabele onkosten	Niet-declarabele onkosten	Declarable Uren %	Productief Uren %	vakantie Uren	Ziek Uren %	Uren tijd voor tijdt	Bedrag declarabele uren
Medewerker								
Ramy Alashabi (303) IT specialist			28,11 %	71,89 %				14.249,30
Total			28,11 %	71,89 %				14.249,30

Figure 30 product review fix

Usability testing

During the testing of the dashboard for errors, a user manual guide was made to guide the user to the desired visual and can be found in the Appendix O: User manual. In addition to that, based on the product review and the feedback that was collected there, more errors were fixed, as the system was put to a user test during that demonstration.

4.5.2. Conclusion

This sub question was one of the heaviest questions as it used a lot of research methods. Within this question, the system requirements were collected, a literature study was made on the visuals selection, a prototype was realized, reviewed and tested. Therefore, it can be concluded that the purpose of this sub question is achieved and can be proven with the document and results above.

4.6. Sub question 6

How can the financial and performance management be Implemented within De Jong?

The purpose of this question is to study how can the realized product be implemented within the organization, how security to data can be enforced, and how can the system be maintained.

To answer the fifth question 3 methods will be used:



Figure 31 Sub question 6 Research methods

- Literature study will be used to enquire about implementations.
- Prototype will be used to build more on the system.
- The final product will be peer reviewed for validation.

4.6.1. Result

Literature Study

According to Microsoft (Roche, 2022), a power BI implementation has plenty of subject areas, as it can be seen below.

- BI strategy
- User needs and opportunities
- Authoring tools and user machines
- Tenant setup
- Subscriptions, licenses, and trials
- Roles and responsibilities
- Power BI service oversight
- Workspaces
- Data management
- Content distribution and sharing
- Change management and deployment
- Security
- Information protection and data loss prevention
- Power BI Premium
- Gateways
- Integration with other services
- Auditing and monitoring
- Adoption tracking
- Scaling and growing

Figure 32 Implementation subjects

Not all of these topics are relevant, therefore based on the peer review in question 3 some of these topics will be picked up as it can be see below:

1. User needs and opportunities, as a part of the implementation a user guide Appendix O: User manual was made to show how to use the system based on the

requirements that were collected Appendix F: Requirements engineering to build the system.

2. Roles and responsibilities, at the current status of the project, the intern is taking a role of the data analyst and is responsible for this project. However, after the deadline of this project, the responsibility of the admin will fall under the data analyst within the organization. As it can be observed in the new BPMN scheme Appendix I: New BPMN, the CFO (just like any other user within the organization) is a user of the system and when a problem erupts, the data analyst is contacted automatically.
3. Workspace, the main system file will not be shared to the users, as this will give the user access to all the data. Therefore according to Microsoft (Microsoft, 2022), there is a solution of publishing the desktop application of the system to the web application. This makes the sharing of the dashboard easier via a link and it limits the users access to the data.
4. Subscription, licenses and trials. A literature study was done over the subscriptions and license of the different BI tools and it can be found in Appendix E: Dashboard tool research. In the current situation, Bryn has 1 admin account with a pro licenses. This allows everyone who has access to it, to access it simultaneously, and gives various options in the prototyping of the dashboard. However, if this system is to be shared to the whole organization (50 employees), every employee will have to get a power bi account. A free subscription for the employees is the best advice as a pro account costs 8.40 euros per month x 50 employees, that would be 420 euros per month. Especially that the employees can not have access to the whole data and only the admin can edit and transform the data.
5. Content distribution and security. After the peer review on the 3rd question, it was realized that security and content distribution are important topics for the implementation of this project. Based on that, 50 different dashboard will have to be made specifically tailored per employee. However, since this is a specific topic about data distribution and security, a community research had to be made. Based on the power Bi community (Power Bi Community , 2020) and this article (Lasota, 2021), this problem was approached and solved, by using the row level security function in powerBI. This allows the admin to share the dashboard to a user with specific access to specific tabs, and this will be done in the prototyping method below.

Prototyping

Based on the literature study above, security improvements were made on the prototype and will be elaborated below:

- The Dashboard was published to the web app of the company as it can be seen below

	performance managment dashboard-stage	Report	De Jong Power BI	12/19/22, 3:42:05 PM	—	—	—	No
	performance managment dashboard-stage	Dataset	De Jong Power BI	12/19/22, 3:42:05 PM	N/A	—	—	

Figure 33 Published data and dashboard to webapp

- A new table was introduced to the dashboard with the email of the user and the access pages the user is allowed to access, as it can be seen below. For the addition of more users to the table, this has to be done manually.

Username	Page	Name	ID
ramy@bryn.digital	Medewerker info	Ramy Alashabi	13756
ramy@bryn.digital	Klant info	Ramy Alashabi	13756
ramy@bryn.digital	Finance breakdown	Ramy Alashabi	13756
ramy@bryn.digital	rand	Ramy Alashabi	

Figure 34 new security table

- Within the data model, the new table had to be linked with the medewerkers table, as it can be seen below

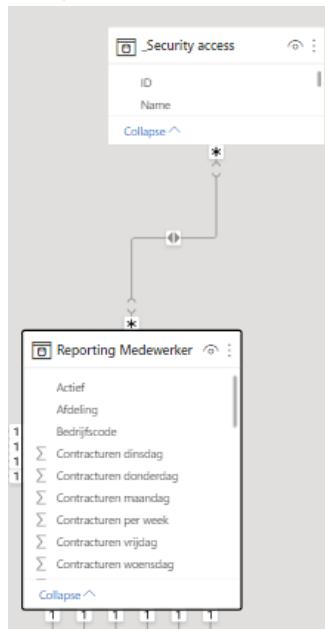


Figure 35 New table data model linkage

- After the linkage, 2 roles were made. The first role is an admin role and the second is one of the employees, as it can be seen below

The screenshot shows the 'Manage roles' page in Power BI. On the left, there's a 'Roles' section with 'Admin' and 'ramy' listed, and buttons for 'Create' and 'Delete'. In the center, there's a 'Tables' section showing a list of tables: '_applied filters', '_measures', 'Security access', 'calendar', 'Export_Aalles_20220914161524', 'Reporting Afdeling', 'Reporting Artikel', 'Reporting Bedrijf', 'Reporting Budget', 'Reporting Budget breakdown', 'Reporting Competentie', 'Reporting Datum', 'Reporting ExtraEigenschappen', 'Reporting Facturatieafspraak', 'Reporting Facturatievoortgang', 'Reporting Factuurkop', and 'Reportino Factuurreoel'. To the right, a 'Table filter DAX expression' box contains the following code:

```
[Username] = userprincipalname()
&& [name] = 'Ramy Alashabi' && [Username]
= 'Ramy@bryndigital.com'
```

Below the expression, a note says: 'Filter the data that this role can see by entering a DAX filter expression that returns a True/False value. For example: [Entity ID] = "Value"'.

Figure 36 Manage roles page

As it can be seen above, under the name of Ramy, the security access table is filtered to give access only to this email with this name.

- After the whole filter is set up, and the dashboard is published again to the web app, it will be needed to navigate to the database on the web app and click on security as it can be seen below.

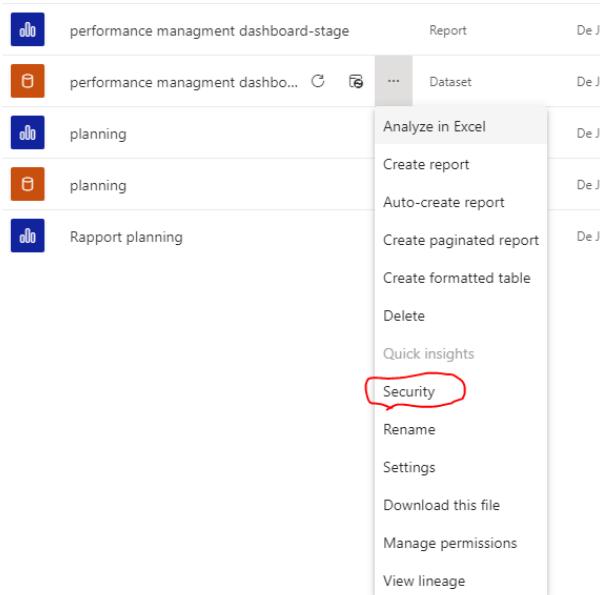


Figure 37 Navigation to security

- Inside the security tab, the only thing needed is to add the users email as it can be seen below

Row-Level Security

The screenshot shows a user interface for managing row-level security. On the left, there is a sidebar with a 'Members (1)' section containing a single entry: 'Ramy Alashabi | Bryn'. Below this is an 'Add' button and a close 'x' button. To the right of the sidebar is a main area with a heading 'Members (1)'. Underneath this heading is a sub-section titled 'People or groups who belong to this role'. A text input field labeled 'Enter email addresses' is present, and below it is another 'Add' button. At the bottom of the main area, there is a small note: 'Ramy Alashabi | Bryn' followed by a 'x' symbol.

Figure 38 Row level security email addition

- Now once the link of the dashboard is shared to the user, the user will have to sign in with the email on a free version and they will get to access the specific tabs as shown in figure 38 above.

Peer review

After the literature study and prototype were done, a peer review was made with the data analyst Herman Wismans, to validate the implementation plan from the literature study, validate the prototype and improve on it. During the peer review, this document was sent to the data analyst to read chapter 4.6 and to give his review here, and the review is :

“An easier and more integrated way for the security is to connect to the Azure Active Directory. This is a central location in the organization where the access of all users is managed. It should be possible to connect to the AD and use information about the users to determine which access they need.”

Based on the review the following was done:

- Azure AD was researched and according to (Microsoft, 2023) Azure AD is an identity service, as it provides MFA, Conditional access and it protects 99.9% of the time against cyber-attacks.
- The dashboard was released to the CFO and the data analyst for feedback collection and processing before the release to the whole organization. This will be mentioned in the recommendation as how to move forward, as user testing will take more time by the CFO.

4.6.2. Conclusion

This sub question tackles the implementation of the project within the organization. As a new security method was researched, prototyped, and reviewed. This was a big step for the project and the organization, as this was part of the previous peer review's and part of the implementation points that Microsoft provided. Therefore, it can be concluded that the purpose of this question is achieved.

5. Conclusion and Recommendations

In this chapter the conclusion and the recommendations of this project will be stated.

5.1. Conclusion

This project started with a couple of problem that can be found in Problem analysis chapter. From these problems a main question was made of “How can data from various sources within the company be processed in order to provide insights into financial and performance management ?”

Based on this main question 6 sub questions were made and researched to find an answer to the main question. The first sub question was about identifying the data types and the location of the data. The second sub question was about the current reporting process and the current wastes. The third sub questions was about the desired new process. The fourth question was about researching the best BI tool to use. The fifth question carried the realization part of the project, where a dashboard was made. The sixth question was about the implementation of the product into the organization. Based on the results of those sub questions, De Jong’s data is automatically processed within Power-BI and provides detailed insights into the financial and performance management of the organization and the employees, and it can be said and proven that the main research question was answered.

However, the report deviated a bit from the project plan. As the project plan promised 5 research sub questions and in the report the sixth was added. This is because of the confusion of the semantical words of “implementation and realization”. As to the intern both meant the same thing and that is due to having a software mindset, while on the hand within ICT and Business, Implementation had a different meaning.

Additionally, the sixth sub question helped in achieving the results. After that proof of concept was made, the security access was discovered as it was part of the implementation and part of the review that was given by the peers. Therefore, De Jong now has insights into their performance and financial data, the CFO work is automated and reports do not have to be made manually, and they can give specific access to specific users to specific information.

Furthermore, the project was completed within the time limit as it was mentioned in the project plan. However, the project is not 100% completed, based on the last peer review on the sixth sub question, which leaves the project at 95% completeness. Due to the time limit this cannot be researched and will be recommended.

5.2. Recommendations

When the project was done and the prototype was built, there were more features that could've been added. These features were unknown when the scope of the project was made, however after making the prototype more features were discovered and recommended. The first feature that was discovered was Azure AD, it is a service provided by Microsoft that provides security like MFA and single access login. This service was recommended by a peer within the organization, as it is more secure. This product will need to be researched beforehand. Based on the fact that the project is 95% complete, this point will compete the project to 100%.

The second feature that was discovered is the data state visualization, whether the data is live or a day old. This was out of scope when the project started, but when researched, this would be useful. As it was noticed when the prototype was made that there is a delay between data input on Qics and output on Powerbi. This does not have an effect at all on the project, but would've been nice to have.

The last feature that would be recommended to this project, which was also discovered power automate within power bi. Power automate has the same functions as azure devOps, as it allows you to send an email from power bi it self about some data, or it can also manipulate data on different environments from the dashboard itself. Power automate is a powerful tool that needs to be utilized and would've been great for this project.

Nonetheless, this project can develop further in showing detailed insights into budgeting, and more user testing. As this was just published as part of the implementation, however after some time of using the dashboard, feedback can be collected and processed by the roll of the data analyst.

Assignment evaluation

In this chapter the project will be evaluated by looking back at the problem and the goal of the project. Furthermore, the strategies, methods and guidance moments will also be elaborated below.

Problem and goal

The project started with the problem of that the employee's within De Jong were not able to know how they are performing, the CFO was creating the financial reports weekly/monthly, manually and the data was in different locations. These issues were approached with a goal of "Having an end product that give insights into the performance of the company and to solve the bottlenecks that the current reporting system is facing."

Therefore, to solve these issues, a proof of concept dashboard was made. This dashboard has the data collected from different sources, it creates the reports automatically so that the CFO does not have to do the reports manually and it gives the employees their own secure information based on login's credentials. The financial calculations were done by the intern with the help of the CFO and they are validated by the CFO. Based on this dashboard, De Jong now has a better grasp on their performance and can view their financial insights at any given moment.

Research strategies and methods

During the research part of the project, all of the ICT research methods were used (Fontys Hogeschool ICT, 2020), at least once per research question. Each research question had at least 3 different research strategies used. However, the most used strategies in this project were Library, field and showroom. Based on the mentioned strategies, various methods were used too. Community research, literature study, expert interview, Swot analysis, user requirements, usability testing, peer review, prototyping and many more methods were used to help in answering the questions. However, the intern had some trouble in finding the best/ suitable method to use in some of the research questions, especially in the beginning of the project. However, after some time of working on the report and some feedback were given, it was noticed that in one of the sub questions, the method used was not suitable. Therefore, it was changed and elaborated on the report on why it has changed.

Guidance moments

Nonetheless, during the whole internship time, no matter how good the intern was in the development of the prototype, some guidance was still needed. The first time a guidance was needed, was when the financial calculation were being developed, as the intern comes from an ICT and Business background and not a financial background as it was mentioned in the risks table. However, with the help of the CFO and the validation of the CFO, the prototype was completed. The second moment where guidance was needed, was the report writing, as the intern knows that his reporting skills are bad especially when it has to be summarized. Therefore, guidance was needed and was given by Rob Verhoeven (the first assessor at Fontys). Based on the feedback/ guidance of Rob, the report has became much shorter and more informative than what it was earlier, bloated with words and text. In addition to that, a sixth sub question was added to the research, that was due to the confusion of the semantical wording of the words “Implementation” and “Realization.” As at first, the intern thought that both words meant the same thing (i.e., software mindset), however in business, implementation meant implementing the realized product into the organization. On this crucial part, I had guidance from Rob Verhoeven (first assessor at Fontys), where it was advised to add a new research sub question. Furthermore, as a learning moment, I used to think that requirements are made only for the system and did not include it in any research methods before the 5th sub question. However, although they were made from the start of the internship based on the interviews and KPI’s it was not included, but I have learned that this was also important as part of the analysis and in the future reports I will make sure to include it.

Learning experience

During this project I have learned a lot and can be summarized into the following:

- I have learned to work independently
- I have learned some financial knowledge by working with the CFO
- I have learned how to write a report and stick to the point.
- I have learned how to pick the best strategy and methods for my research approach.
- I have learned how to implement the product within the organization.
- I have widened my knowledge about the different BI tools and their differences
- I have learned how to work within an organization, plan and manage my own work.
- I have learned how to make a BPMN Scheme based on requirement and problem analysis
- I have learned that requirements are not just system requirements and that they should have been included in the analysis part too.

Based on the points mentioned above and reflecting back to the start of the internship and now, I have shown my growth and implemented parts that made my assessors surprised. This shows that my enthusiasm and proactiveness in processing feedback, making sure that it is sticking with me for life.

Personal reflection

In this chapter I will be taking about my own evaluation based on the assessment form and a reflection on the overall performance during the whole internship period.

Reflection based on the assessment form

In the assessment form, there are 9 assessment dimensions that I will be assessed on and I will be using below to reflect on myself. The grading goes as follow:

- Unsatisfactory (U)
- Satisfactory (S)
- Good (G)
- Outstanding (O)

On each assessment dimension, I will elaborate what I have done, what went well and what could be done better with a grading that I will give myself.

Knowledge and insights

For knowledge and insight, I have carried all the knowledge I have from the previous semesters, especially the third semester. As the third semester taught me about the IT life cycle phases, which will be elaborated more on in the other assessment dimensions. However, the life cycle was carried and reflected on the research sub questions as each sub question completes the cycle. Furthermore, during the whole internship time, I worked independently, asked for help when necessary and learnt new financial terms and calculations. In general, the whole internship was a bit stressful. This was because I had to work individually; during the previous semesters, project work were in groups and based on that I usually took the hard coding part of the project with minimum reporting. This is due to me wanting to improve more on my coding skills “IT side” than the “business side”, as a data analyst. However, during this internship I also had to do the reporting, which pushed me out of my comfort zone; nonetheless, I have learnt how to write a report and it still needs more workshop. Based on this, I grade myself “sufficient”, this is because I am not satisfied with my reporting skills and it needs to be improved before the 8th semester. It is not that my reporting skills are that bad, it had structure and was informative; It was also used as an example of structure during the S&G sessions, but very bloated with texts, words and not straight to the point, and that needs improvement.

Analysis

Analysis is part of the IT life cycle and I would grade myself a “good” here. This is because, during the whole internship I analyze everything, I had a clear scope, problem and definition of the challenge written in the project plan and proposal. I had a strong, good problem analysis that was backed up by many stakeholders(i.e., CFO and data analyst) and was also visualized in a BPMN scheme. The analysis was in depth that the lean six sigma wastes were also used. Additionally, more analysis in depth was done on the solution (i.e., new reporting process BPMN scheme), BI tools, requirements, realization and the implementation of tool, all was backed up with research and documented. This can be seen on my 1st and 2nd research sub questions.

Advise

Advise is part of the IT life cycle and I would grade myself a “good” here. This is because, during the research part, I gave advice to the new reporting process, the BI tool, the implementation of the tool and gave many recommendations on how to move forward with the tool and what to use in the future. In addition to that, a whole BI tool document was created, which gave advise on the BI tool based on price, benefits and interests, in a clear structured way. This can be seen on the my 3rd and 4th research sub questions.

Design

Design is also part of the IT life cycle and I would grade myself a “good” here. This is because, before the realization started, a whole design of the new reporting process and the PoC were made. This can be seen in the 3rd and 4th research sub questions. After the best BI tool was chosen, a small design prototype was made and shown to the data analyst. Based on the data analyst’s feedback, the design of the dashboard was built. This was made based on the previous analysis and advice that were made during the research part of the internship.

Realization

Realization is also part of the IT life cycle and I would grade myself a “outstanding”. This is because, my realized product matches the design, it had a crucial part in answering the main question, it automated the work of the CFO in creating reports manually, and it is not just a prototype it is an actual 95% completed product. As this realized product is what hooked the client, as it is crucial to their work and the work of their employee’s . This was achievable based on the previous work and research. This can be seen in the realized product and in the 5th research sub question.

Manage & control (Implementation)

Implementation is the final part of the IT cycle and I grade myself a “good” here. This is because, previously I had the thought of realization and implementation were the same, but based on research and feedback, the 6th research sub question was formed and it tackled the implementation of the product within the organization. I would have graded myself a sufficient here because of the fact that the implementation could have been done better if there were more time as it was formed 5 weeks before the deadline. However, the fact that I did the implementation part within a week, not just describing the roles / responsibilities after I am done with my internship, but also publishing the dashboard to the users and implementing a security measure that is based on login credentials (information security). This shows my competence in researching effectively, independently and precisely. This was a huge surprise not just to the client but also to my assessors on the last S&G session, as this was, and I quote “not even done by 8th semester, graduation interns.”

Judgement

For judgment I would grade myself “good”. This is due to the fact that, my research questions were appropriate, collected from various problems, and are within the scope of the problem. I have applied various research strategies and methods in each question, and validated every single method and result by a peer review method, for the reliability of the result. My research questions were also within the IT life cycle as each question covers a part of that cycle. I showed competence, eagerness in learning, enthusiasm, and proactivity attitudes with an open mindset, during the internship. Showed that my research could be flexible and dynamic by adding a sixth question in the report which was not included in the project plan. I worked in structure, methodically and on finished on time as was planned in the project plan. However, transparency within the report was a bit of an issue, as it was a learning moment for me, it was improved significantly and inspired by my class mate’s report. As I have learnt that using bullet points, forces the writer to be straight to the point.

Communication

For communication I would grade myself “sufficient”. This is due to the fact that my report transparency was a bit bad at first and it was improving by time. As previously the idea or the information was in the report but bloated and needed a lot of energy to understand or get. By the end of the internship the report has changed drastically, as bullet points were introduced which helped the transparency in making the information “straight to the point.” Additionally, the report was well structured as it was used as a good example during the S&G session, However, what could improve my grade here is the fact that I collaborated nearly with everyone within the organization, especially the data analyst and the CFO. Our communication was clear, on point and did not cost much time. Nevertheless, this could still be improved after the 2 presentation I will deliver to school and the client.

Learning ability

For learning ability I would grade myself “good”. This is due to the fact that I have learned a lot during this semester. I have learned the following:

- How to write an academic research report, although still needs improvement.
- I have learned a lot about financial terms and calculations.
- I have learned about information security and applied it within this internship

Other than what I have learned, I also showed initiatives in asking questions, giving my own opinion and talking to almost every account manager within the organization. I had an independent position, as I am the manager of this project and asked for some guidance during the report writing and the forming of the financial formulas and calculations. However, all my results are reliable and validated on a professional level. Furthermore, what I need to improve so much on is feedback and taking feedback. My problem is that I try to analyze every single piece of information that I get, as I want the work that is based on the information that I got, to be reliable and validated. Thus, me analyzing feedback in a learning and defensive mindset. As before I apply any feedback, I want to understand why was mine wrong, is it academically/ research wrong or personal preference and structure wrong and etc..

Nonetheless, all the feedback from the first assessor and the stakeholder were processed and it really shows that it helped in improving the report and the dashboard. However, some of the feedback that I got might have been repeated (i.e., table of figures, figure names, spelling mistakes and etc.) and that is because it was not that I did not want to process these points, but I found them less mandatory than the main course. As these points would take an hour to 2 maximum to finish, but the main dish (research chapter) had a higher priority, thus the repetition of the feedback or seeing that not all the feedback is processed. The defensive mindset for learning purposes must be workshopped before the 8th semester.

Overall performance

In general, reflecting back on this internship period I have learned a lot by working in an organization. As I had opportunity to have the freedom to plan and execute this project, and to show management leadership in it. Most importantly, all stakeholders are happy with the working product that I have delivered.

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Appendix A: Project plan



PROJECT PLAN

The road to Financial insights & Performance management



Date completed: 04-10-2022

Author: Ramy alashabi

Version: 3

Status: Done **28 AUGUSTUS 2022**

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Document history

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0.1	Draft	29-08-2022	Create document
0.2	Draft	30-09-2022	Changed template and added extra chapters
0.3	Draft	5-09-2022	Adding extra chapters from Template
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0.5	Draft	07-09-2022	Processing feedback from Guido
0.6	draft	09-09-2022	Applied feedback from Herman made the goal more clear and wrote the management summary
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2.0	Done	23-09-2022	Final
2.1	Draft	29-09-2022	Draft after robs feedback on the 28 th of this month.
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List of Terms & Abbreviations

Word	Meaning

high fidelity prototype(hi-fi)	are highly functional and interactive prototypes. They are very close to the final product, with most of the necessary design assets and components developed and integrated. Hi-fi prototypes are often used in the later stages to test usability and identify issues in the workflow.
Digitalization:	is the process of changing something into digital. Even manual processes could be digitalized and done automatically.
Due-diligence	is the care that a reasonable person does something to avoid harm to other persons or their properties
Deciphering	Being able to understand, interpret and identify something

Management summary

The name of this project is "The road to Financial insights & Performance management", it was commenced to give detailed insights to the financial aspects of the organization and to track the performance of all the companies that are related to De Jong.

As De Jong is the main company with 4 other subsidiaries, they have a problem in tracking their performance within the inside of the company. Therefore, within this project the main objective and goal is to deliver a business intelligence tool that shows the employee's information with more insights on their work(i.e., time spent per client, income gained per client, last time worked for a client, and etc..)

As the desired result of the end product is an automated report creation, with insights to the critical KPI's. The methodology that will be taken within this project is the agile approach, as it will be noticed that there is a sprint deadline every 2 week in the planning phase chapter of this document.

In addition to that, the approach that will be taken in this project would be the ICT research methods approach. As it will be observed in the research chapter of this document that the research questions will be investigated in various logical methods. Hence, to get as much triangulation as possible, every question will have at least 2 methods used to study it.

Furthermore, the products of this project can be seen in the work breakdown structure in details but can be summarized into the following:

- Project plan
- Advice document
- Business intelligence prototype
- Internship report
- User guide

All of the products will be made and delivered within a limited time and that is discussed in details in the phase planning chapter of this document. However, the duration of this project should last for 18 weeks starting the 28th of august 2022 and should ends on the 10th of January 2023, by the submission of the internship report.

In Summary , this document will provide all the information needed to understand the organization, the project and the plan to achieve the end result. As this project will be built for the company and used by the company and its employee's to have a better grasp on their performance and financial reports.

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1. Introduction

This is a project plan document that will help guide a proposed project for the Business Intelligence consultancy Bryn, which itself is a subsidiary of De Jong Accountants en Adviseurs. De Jong noticed that the performance within the company is leading to hours that are not billable and to get financial insights, it requires some manual work. Therefore, this project was made to gain a grip over the performance and the financial aspects of the company.

Furthermore, this document serves educational purposes and is used as a concrete ground to continue working on the project in the future. The project is called “the road to Financial insights & Performance management”, this document functions as a backbone for the layout of the project. The approach, project management process and project objectives will be discussed among other relevant information in regards to formatting and structure.

1.1. Document objective

This project plan that is about the “Data health Management ” project will illustrate the following:

- objective of this project
- The structure in which the project will be built in.
- The schedule of the work phases and the deadlines
- The reason behind this project
- Resources that will be used
- The methodology of work

As this document will include only fundamental information and the qualifications of the project. In addition to that, it will be used to ensure a sound project base prior to engaging the client, and to observe the progress, consent to changes and the legitimacy of the project. As the purpose of this to the student is to be graded and be able to show the skills of managing a successful project independently. As for the company, a solid ground to work on this project furthermore in the future.

1.2. Reader's guide

Within this document, there are 6 chapters, where the context of the chapters will be described briefly below.

- The first chapter is this chapter and serves as an introduction to this document and its objectives.
- The second chapter is about the context and background. This chapter talks about the client and the organization, the project's current situation and describes the problems.
- The third chapter talks about the goals of the project, risks, WBS, risks and constraints.
- The fourth chapter talks about the research questions with the approach for every sub question using the ICT research methods.
- The fifth chapter talks about the planning and phases of the project.
- The sixth chapter has all the references listed.

2. Context & Background

2.1. About the client

Bryn is an IT Services and IT Consulting company that is result-based and customer oriented. Consequently, Bryn is a business intelligence consulting company, that delivers a “Due- diligence” research based advice and technical solutions to their clients.

Additionally, Bryn focuses on the whole customer journey that they take with their clients, as they make sure that there is a professional taking the same steps with the client to ensure and maximize the success of the business of their clients (Bryn, 2022).

The clients that Bryn has, are coming from all sort of industries, from farmers to big corporations and usually, they are customers that would like their processes, book keeping or finances digitalized and automated. Especially that we live in a time, where technology means efficiency (III, 2015). Thus, Bryn ensure the continuous efficient growth within their clients business processes step-by-step, as they stay working with their clients till after the realization of the project, as to maintain the system deliver a continuous client support.

Moving on to the organization structure, as it can be seen in the figure below, Bryn is part of a overarching organization called De Jong accountants en adviseurs. However, there is no defined hierarchy within these subsidiaries, as they all work as one team and seek for the completion of one another (De Jong, 1985).



Figure 1 orginaization Chart

Furthermore, to ensure the efficiency and effectiveness of the clients business process and to get insights and possible opportunities for the business, Bryn uses business intelligence tools. These tools are used to visualize the client's data in real time, in the form of a PowerBI dashboard. It can be financial dashboards or sales dashboard, or management within the organization it-self. They do not just automate processes, but they also get more out of their clients company, regarding a smart and oriented entrepreneurship. That is not done by irrationally using trending applications , but by making verdicts based on an fundamental vision. Basically, they think along with the client on the automation of the process and the design of the product. As they also introduce further financial insights with the qualitative data, and help their clients company to reach the full potential by decoding where the opportunities are (Bryn, 2022). Hence, an increase in productivity due to an automation of a used to be a manual process and a good financial grip with critical insights of the company.

NOTE: Starting here the whole organization including the subsidiaries will be referred to as "De Jong"

2.2. Project's current situation

In the current situation of the project, De Jong has their data on 3 different systems and these systems are:

- Qics, Is a cloud program that registers and invoices hours
- Auditcase, a database that store all information about the clients(i.e., name, company, phone, age, and etc..)
- Exact, is a financial program that deals with invoices and bank statements details.

These systems are used daily by the organization to keep track of their data and clients (V.Loghem, 2022). Therefore, whenever the organization wants to see their finances or the performance of their employee's within the company, an excel report is made by the CFO to visualize the data. Furthermore, what has already been done to start this project, is that the client's missing data were collected by contacting the clients and the data were collected into a Auditcase and Qics.

2.3. Problem description

Within the current situation there are 2 problems that can be noticed and will be described in details, below.

2.3.1. First problem

The first problem is that the data is contaminated by duplicates, null values, and typing mistakes (I.e., instead of writing "jaarrekening", it is written as" JRR"), which will be fixed using a business intelligence tool. In addition to that, some of their clients are set to be active, meanwhile there has not been any work done for this specific client for the past 2 years (V.Loghem, 2022). The main cause of this is because, employee's do not take the time to write the full word instead of abbreviations, additionally, the system is prone to duplicating values or having a value stored in a different table than where it is supposed to be(i.e., employee's cost per hour is in a different table than the "medewerkers informatie " table).

2.3.2. Second problem

The second problem that can be seen is that whenever a manager would like to track their employee's performance and how much time they spent on a certain task, most of the work to retrieve this data is manually done. As all the financial data is collected by the CFO physically, to create a report (i.e., Collecting data from qics and creating financial reports). This does not only cost time, but also effort, resources and degrades the efficiency.

Nevertheless, the main causes of that according to the financial officer (V.Loghem, 2022), is that the company does not have control yet over the budget as the data to make a critical decision is not available yet or too much work needs to be done, in order to create a visually feasible report. If an employee did his work and went over budget, these overtime hours will not be billed to the client and that forces De Jong to pay their employee from the internal money and that is not desired. As spending internal money could bring the company down or make it go bankrupt (V.Loghem, 2022).

If the BPMN (Lynch, 2022) process figure below is observed, it will be noticed that most of the work of the CFO is done manually, as this is a visualized figure of the current process which will be analyzed, bottle necks highlighted and improved.

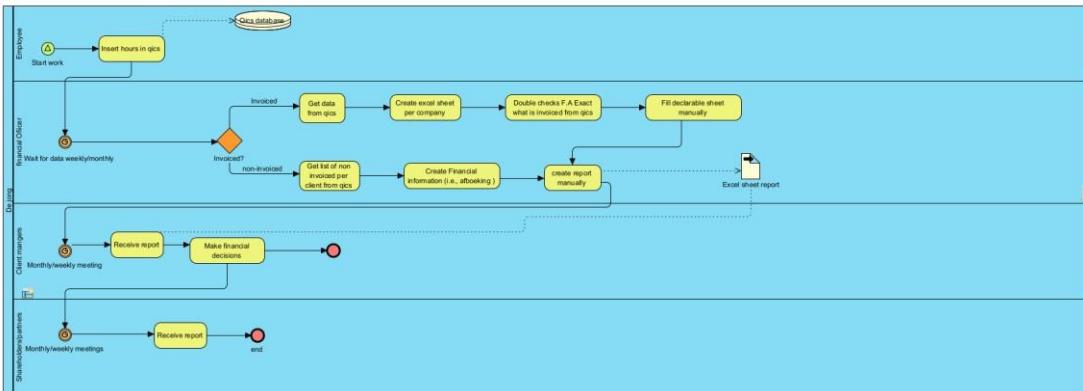


Figure 2 Current BPMN process

3. Project statement

3.1. Project goal

Therefore, the goal is to ensure that the data that goes through the dashboard is healthy by filling the missing data, develop a dashboard to gain insights over the employee's performance, gain more S.M.A.R.T insights about the mandatory KPI's, and automate the whole report design process depending on the data available.

3.2. Project scope

As a result of what is mentioned in chapter 2.3, the scope is limited to the acquisition of the data, the validation of the data's health and realizing a dashboard by automating the work flow of the CFO.

3.3. Deliverables & non-deliverables

In this chapter, what the project will and will not include will be shown in a table below.

Table 1 table of deliverables and non-deliverables

The project includes:	The project does not include:
1 Advice document	1 Using other coding language than python
2 Dashboard page prototype, that displays specific information based on the clients of the company.	2 Development of an automated system that sends/pushes specific information to clients (i.e., Birthdays wishes)

3 Dashboard page prototype about the company's financial KPI's	3 Contacting outside clients directly, to gain missing information.
4 Dashboard documentation, explaining the measures used and why.	4 Test plan
5 User guide	5
6 Internship report	6

3.4. Work breakdown structure

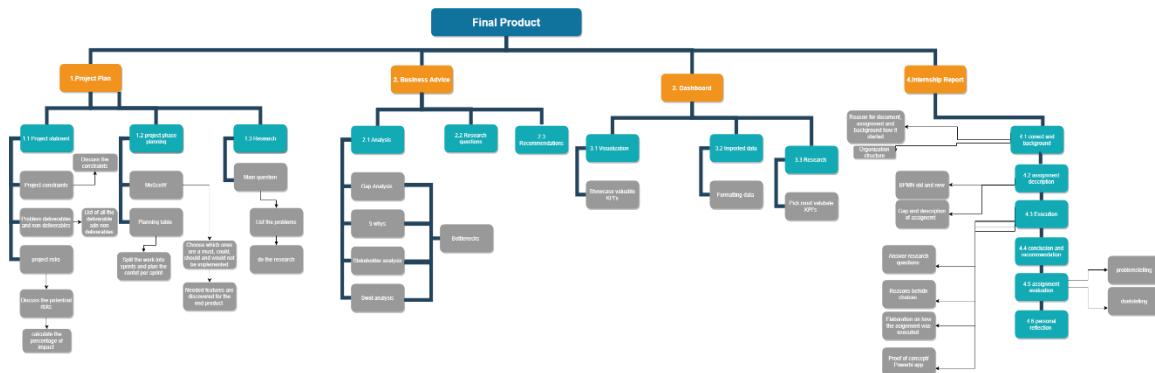


Figure 3 WBS chart

As it can be seen above, To achieve the final product, the work is split into 4 parts.

The first part is the project plan which is this document. The second part is an advice document, which will show the analysis done and give an advice on how to proceed, which applications to use and why. The third part is where the realization happens, where a dashboard will be built. Finally, the internship report, which will include some analysis from the advice document and will also overlap with the advice document. That is due to the report will be built based on the advice and more detailed. However, the report will include all the work that was done including retrospectives.

3.5. Project constraints

This project too might face some constraints as mentioned below:

- Time constraint, as only within 18 weeks does this project must be in the final working phase
 - Quality and time, as the student will be working on the project independently therefore time>quality .
 - As this project is for institutional training for the student money constraint is not much of a constraint to the project.

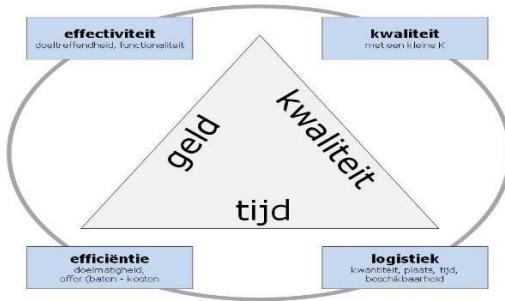


Figure 4 Constraints

3.6. Project risks

Table 2 Risk table

Risk	Probability	Impact	prevention
Sick leaves	50%	100%	-
Vacations	50%	50%	Make a good plan
Insufficient time	50%	50%	Make a realistic plan
Change of approach	50%	100%	Stick to the plan and if any changes make it small
Insufficient data	50%	40%	More research and data collection
Insufficient communications	50%	100%	1x per week meeting with couch at school and twice per week with tutor at work
End product does not meet expectations	50%	100%	Keep the client in the loop always with constant feedbacks
Difference between ICT and Accountant mindset	50%	100%	Keep a clear communication and run the numbers by them first

3.7. Methodology

The approach that will be used is agile (Agile alliance , 2022), and that is because agile is split into sprints or small steps of work. This causes the team that works with agile to manage uncertainty more, improves on transparency by keeping a back log and it also shortens the planning time. This methodology will be used as following:

1. Sprint meeting with the company tutor twice a week
2. Sprint meeting with the school tutor once a week

3. Backlogs tracking and roadmap
4. Clients satisfaction through continuous delivery
5. 2 weeks are given per sprint.
6. Demo will be shown every 2nd sprint or every sprint for constant feedback
7. Retrospective is to be set at the end of the 17 weeks

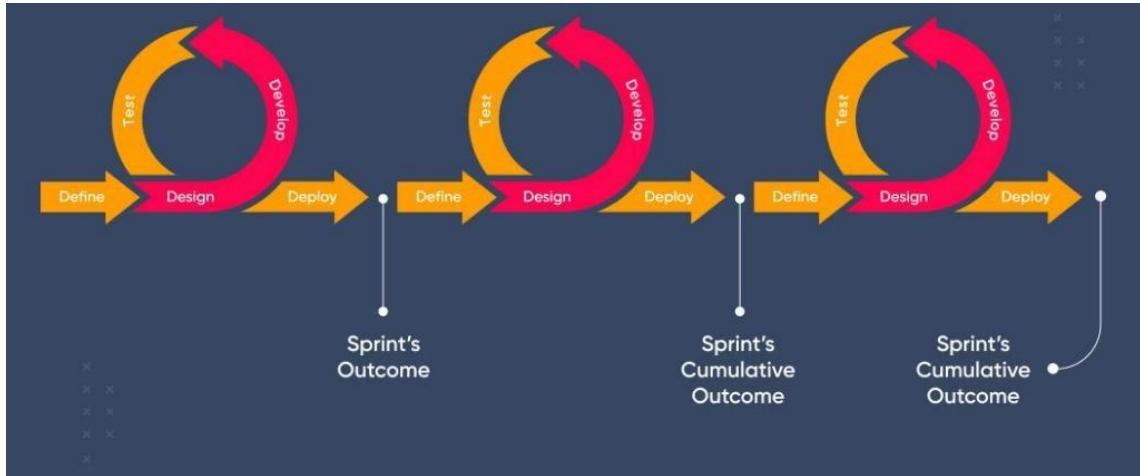


Figure 5 Agile methodology chart

3.8. Communication plan

All communications are done via teams, personally, asana or Emails.

1. Meeting the company tutor is done in the office twice per week
2. Meeting with the school tutor is done every other week online via teams
3. S&G sessions are done in school
4. Using emails to schedule a personal meeting with the other stakeholders when needed.

3.8.1. Stakeholders/ team members

Within the company of Bryn the team in total consist of 4 personnel. However since that Bryn is part of De Jong, the total number of the team is around 50. In this project the team's/stakeholders information can be seen in the table below:

Table 3 Stakeholders table

Name +e-mail	Abbr.	Role/tasks	Availability
Ramy Fuad Email:r.alashabi@student.fontys.nl	DA/Student	<i>Business and data analyst /Carries out the whole internship project</i>	<i>During the whole phases.</i>
Herman Wismans Email: herman@bryn.digital	DA	<i>Business and data analyst/ Tutor at the company and client</i>	<i>Twice every week in every phase</i>
Rob Verhoeven Email:r.verhoeven@fontys.nl	Docent/tutor	Guide and tutor throughout the internship	Once every week in every phase

Question	Method	How ?		
Guido Raaijmakers Email:guido@bryn.digital	DIGI. advisor	Digitala advisor/ Product owner/ tutor on processes	Once every 2 weeks(once on every phase)	
Goldy Loghem Email:Gvanloghem@dejongacc.nl	CFO	<i>Chief financial officer/ tutor with financial figures and conforming</i>	Once every 2 weeks (especially on dashboard phase)	
Lars Peeters Email: lars@bryn.digital	Data/AI specialist	<i>Initiated the project and collected the data</i>	Once every week or 2 weeks	
Marielle Wouthuis Email:mwouthuis@dejongacc.nl	MA	<i>Management assistant/ contacts clients incase sinfo went missing</i>	Once every 4 weeks	
Remi van Liempd Email:RvanLiempd@dejongacc.nl	RM	<i>Relationship management/ product owner</i>	Once every 6 weeks	

4. Research

4.1. Main research questions

In here the research questions will be listed below, to breakdown the main problems into 1 main questions that is followed by sub questions. These questions are the ultimate handbook in the research of the problem and ensures that the answers of the questions could be a potential solution to be implemented by De Jong.

How can data from various sources within the company be processed in order to provide insights into financial and performance management ?

- a. How to collect data from different sources?
- b. what is the current reporting process?
- c. What is the desired improved reporting process ?
- d. Which is the most applicable Business intelligence tool to utilize ?
- e. How can the financial and performance management be implemented ?

4.2. Research methods

Research methods are activities, tactics and procedures used in the compendium of data or proof for analysis with the purpose of revealing additional information or establish a vivid understanding of the topic. As it can be seen in the table below, there are plenty different types of research methods and for this project we are using the methods provided by Fontys “ICT research methods.”

How to collect data from different sources?		<p>Literature study: as a research on how to collect the data, where and why needs to be done. An end product of this should be an advice of which data collection method is the best and why?</p> <p>Interview: as the work could already be existing by de Jong using a specific method to collect data or if they have a preference.</p> <p>Peer review: where a stakeholder will have to review how the data is collected.</p>
what is the current reporting process?		<p>Expert interview: as an interview with the stakeholder would provide details about their work and the current situation. End product of this is a BPMN about the current process.</p> <p>Swot analysis: to analyse the strengths, weaknesses, risks and opportunities that the company has now. An end product of this is a Swot analysis table.</p> <p>Problem analysis: an analysis on the problem needs to be done in order to ensure the understanding of the problem and sticking to scope. As it is easy to get off scope with BPMN</p> <p>Peer review: The stakeholder will have to review the current BPMN and advice if it shows the understanding of the problem.</p>
What is the desired improved reporting process ?		<p>Gap analysis: as a gap between the current and the desired situation needs to be analysed. An end product of this should be a gap analysis scheme.</p> <p>Root cause analysis: 5 whys method will be used to get to the root of the problem. An end product of this is the root cause diagram.</p> <p>Expert interview: an interview with an expert will be done, to understand what needs to be automated and what doesn't. End product of this will be the improved BPMN</p> <p>Peer review: where a stakeholder will have to review the new BPMN and approve It.</p>
Which is the most applicable Business intelligence tool to utilize ?		<p>Data analytics: analysing the data of De Jong first could give insight and more understanding to the choice of the business tool.</p> <p>Community research: a research has to be done first on if this problem was already solved by someone else.</p> <p>Literature study: a research has to be done on why is this tool the best and if it is applicable in this project.</p> <p>interview: an interview needs to be done to see if the stakeholder in order to assess usability.</p> <p>Peer review: where a stakeholder will have to review the new BI tool.</p>
How can the financial and performance management be implemented ?		<p>Explore user requirements: To ensure the usage of the product in the future, user requirement and KPI's will be collected.</p> <p>Prototyping: a prototype based on the requirements will be built</p> <p>Code review: the prototype will be reviewed by peers.</p> <p>Usability testing: The usability of the product will also be tested to ensure the smoothens of the application.</p> <p>Product review: before the deadline of the project the product will be reviewed by peers and by mentors to ensure that the product is working perfectly before the delivery of the product.</p>

Table 4 Research methods used per question

5. Phase planning

5.1. Table of phases

Table 5 Table of Planning phases

Phase	Start/End Date	Deliverables
Research phase	29-08-2022/11-09-2022 (2 weeks)	Final version of project plan
Research phase	12-09-2022/26-09-2022 (2 weeks)	Advice document (draft 1.0) Data collection
1 st release phase	27-09-2022/11-10-2022 (2 weeks)	Dashboard (draft 1.0) Data tidying
2 nd release phase	12-10-2022/26-10-2022 (2 weeks)	Dashboard(draft 2.0) Dashboard documentation(draft 1.0)
3 rd release phase	27-10-2022/11-11-2022(2 weeks)	Dashboard draft (3.0) Advice document(final version) Dashboard documentation(draft 2.0) Internship report draft(1.0)
4 th release phase	12-11-2022/26-11-2022 (2 weeks)	Dashboard draft(4.0) Implementation plan (draft 4.0)
5 th release phase	27-11-2022/11-12-2022 (2 weeks)	Dashboard final version Dashboard documentation final version User guide (draft 1.0) Internship report draft(2.0)
6 th release phase	12-12-2022/19-12-2022(1 week)	Internship report (draft 3.0) User guide final version
7 th release phase	01-01-2023/07-01-2023(1 week)	Internship report (draft 4.0)
Final release phase	07-01-2023/10-01-2023(3 days)	Internship report final version

Each Phase will be working a new subtask following the Agile methodology, by separating the work into different deliverables and subtasks. The internship report will take a bit more iterations, as it is the most important document within this project for all stakeholders. Additionally, the student will try to finish the internship report before the vacations, to collect feedback.

5.2. Research phase

In the research phase, the focus will mainly be on the following:

- Familiarizing with the client and their needs
- Familiarizing with the business processes within the company
- Researching the problem and a solution for the problem
- Planning the work ahead of time

5.3. Moscow

Table 6 Generalized Moscow table

Features	Must	Should	Could	Won't
Automatic updates	X			
Different dashboards for strategic and tactical levels		X		
Interactive user interface		X		
Relevant KPI's in Advice document	X			
Relevant visual charts	X			
Supportive texts		X		

5.4. Required skills

In case the project goal wants to be met, There will be some soft and hard skills required as following:

1. Soft skills

- Critical thinking
- Problem solving skills
- Communication skills

2. Hard skills

- Knowledge of python for the analysis of the data
- Knowledge of Power bi for the dashboard
- Knowledge of business processes as BPMN and use cases

5.5. Project lead & Product owner

In the process of developing anything, every project goes through multiple milestones. These milestones are and will be evident with a meeting with the client and the school tutor, where the feedback will be gathered from all the stakeholders.

- The product owner or the client is Bryn, and the school tutor at Fontys. Jointly, they will assess the project and give feedback before the that the product is published live.
- The end user will be everyone involved in Bryn and De Jong, and their feedback will be gathered for future further improvements.
- The student who is working on this project will be the project lead.

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Appendix B: Interview 1 Goldy

Interview 9th September 2022

Introduction:

The interview was made on the 9th of September 2022 with Goldy van loghem. During the interview, the interviewer asked some questions about the KPI's of the project and what would they like to see in the dashboard, as a proof of concept. Additionally, what is the current and desired reporting process. This interview transcription will be using the summarized and edited version of an intelligent verbatim transcription. Before diving into the transcription of the interview, this interview was semi structured to open. As the intern had already prepared 3 important questions to ask the CFO, but based on these questions more questions evolve during the interview. Those 3 questions were:

1. What Kpi's would the CFO like to see ? and based on the answers more questions evolved.
2. What are the consequences of not starting this project at all or if this project didn't exist?
3. What risks can she see and how would they affect?

Transcription:

Student: Hey good morning, thank you for having me today

Goldy: anytime so what do you need?

Student: Hashanah, you're the CFO of the company right?

Goldy: yeah, that's a little too much call me the accountant of the company

Student: basically the same

Goldy: yeah the same but give it a name.

Student: so since that you're the CFO, you will be using the program a lot ?

Goldy: yes

Student: I have some questions, for example, what I have known from Lars, is that they want to see the amount of active and non active clients, as in if there weren't any work done for a client, for more than a year he's set to inactive, whom was working with what client, how many clients and etc.

I also had a meeting with Remy, and he had a KPI of wanting to see which client is profitable for us and who is not. So I was wondering if you have any KPI's that you would like to see in the project?

Goldy: yeah, ahm ik doe het gewoon in nederlands en roep maar als het niet volg is. De KPI's die ik doe is declaribitet in een percentage. Dat is een report die komt uit qics dat is een. Twee, op de basis van qics maak ik een excel sheet met de declarabel uren per week, het verloop ten opzichtig van de begroting dat is iets dat ik zit op excel te puzzelen.

Student: so it is more of a puzzle for you and soend a lot of time figuring it out and that's a problem its self it takes time

Goldy: yes it takes time ,dat is een

Student: nee that is twee

Goldy: klopt, dat doe ik elke week, darnaast elke maand maak ik een spreed sheet met omzet per maand. Dus als mijn colleagues zijn klaar met factureren, dan stel ik een overzicht van de omzet per maand, rpv de jong, fiscuraat, bryn plus consolidatie. Door consolidatie moet ik ook weten wat de company omzet is, into company omzet haal ik weer uit apart overzicht in qics.

Student: into company?

Goldy: ja, dus als Guido voor een klant voor de jong heeft gewerkt, schrijf hij uren op de client op de jong. En uit de rapportage op qics heb ik de inzicht in de uren en de kost met tarieven. En die worden geboekt in een financieel administratie.

Student: so basically een omzet per maand for bryn it self, fiscuraat en de jong in general 1 for everybody.

Goldy: yeah do you prefer I show it , so you can see ?

Student: Yeah if that is oke, I mean I will be working on it

Goldy: kijk, I do at first before I build this sheet, I have this sheet. I am an accountant, so what I would like to know en ik denk dat het echt geprogrammerd kan worden is wat is facturerred volgens qics en dan moet it terug zien in mijn financial administratie exact. Dus kijk ik zeg dit gefactureerd, dan ga ik naar exact , hier.

Student: you just compare

Goldy: ja en ik vergelijk hey ben ik iets vergeten ? dit is een factuur die elke maand. Vervolgen dit bedrag gaat naar deze sheet en daar doe ik de intocompany correcties op basis van ..let op .. dit haal ik uit qics per maand.dus dit is wat ik elke maand doe. Hoe gaaf zou het zijn als we deze sheet al zou kunnen automatiseren, dat ik die niet handmatig moet doen. Ik wil de zekerheid hebben we zijn natuurlijk vorig jaar pas begonnen met qics dus alles is new, dus mijn controle mechanisme is extra zwaar omdat ik de anderen niet vertrouw.

Student: ja

Goldy: dus dat doe ik

Student: so if I understood now correctly the whole process me as an employee now I register my hours on qics now these hours some of them are declarable and some are not. How do I know that on what basis ?

Goldy: if you work for the client it is declarable and if not its is not. Dit is de eerste KPI die ik noemde. Hier zie ik van elke medewerker, hier zie ik de uren schreven. Dus productieve uren zijn de uren die op een klant geschreven and non productieve zijn de uren die niet productieve zoals ziek of verloof of studie. En op basis daarvan moet dus de KPI declarbitiet berekenen en dit doe ik elke week.

Student:perfect, i see the process and I will make a BPMN process based on this

Goldy: dan im not done yet wat ik ook doe elke maand ik wil daar de KPI's delen met de relatie behreerers wat ik doe elke maand manually, per client manager heb ik een list die ik uit qics halen met alle uren die gemaakt zijn en niet gefactureerd zijn maar uren nog te factureren. Dus wat ik maak is de omzet per relatie en een heel belangrijk KPI , de bij en af boeking.

Student: bij en af boeking?

Goldy: het kan zijn dat ik met een klant 3000 euro hebben afgesproken en er staat 5000 euro open dus 2000 euro niet kan factureren dus afboeking

Student: ahh, so you remove it

Goldy: yes and that cost a lot of money

Student: where does it go then ? because it wont be declared to the client, so how do you pay the employee?

Goldy: wij zijn nu bezig dat wij de budget bewaking meer in de organisatie in de grip kan krijgen, want nu we zijn niet voldoende in control. As you can see we had a huge amount afgeboekt op de eerste half jaar, dus direct cash , daarom is het een heel belangrijk KPI.

Student: alright sound good, ooh yes a very important question, what is the cause of this problem that we are in now with the budget ?any main reasons ?

Goldy: ahm it's a mindset, bij alle collegas, want als je uren schrijven, hier de ballen zijn de budget. De rood ballen zegt dat je over de budget , de groen ballen betekent dat he meer ruimte in de budget heeft en wij hebben okk orange ballen en dit betekent dat je 80% van de budget heeft gesnoept.

Student: en de grijs ?

Goldy: grijs heeft geen budget maar mensen moeten aan de bell reken het is echt een mindset want budget is niet een strafmiddle maar een stuurmiddle het is 3 deleg ... 1 we werken efficiënt en de relatie beheersers moeten zorgen dat het efficiënt gaat worden. 2 de klant is gegroet of wat meer uren moeten factureren want we kunnen binnen de budget kunnen blijven. 3 de klant past niet meer met ons werk of zo.

Student: wat would the consequences in your opinion would be if this project didn't start or if I weren't here as an intern to help with this ?

Goldy: it would save my time and money and also the colleagues. Ook vallen wij om

Student: vallen wij om ?

Goldy: dan valt het bedrijf om weet je dan heb je geen stuuring geen control, we weet niet wat kopellen moet drieën i dont know any more if any revenue is coming or what so ever.

Student: alright it seems like I have collected everything, but I have an additional question..do you see any risks in this project?

Goldy: yes, the risk I see is the difference between ICt and accountancy.

Student: that is very true and I agree, I have some knowledge in finance but not as deep as an accountant

Goldy: the most important this for me is that it is correct, as I am a control freak and I would like to make sure everything is correct and that is why I was doing this manually. Now if this is going to me automated, I will need to make sure that the numbers are correct.

Student: I agree and that comes to the thing I was thinking when I started programing the financial part I will be having a meeting with you every week and control the progress.

Goldy: eens.

Student: alright I think I have got every thing that I need

Goldy: alright what now ?what is the next step?

Student: for now is finish the document create a bpmn of your process or work find the bottle necks
create a new process efficient one. I have a lot to do

Goldy: and when will you show me the progress

Student: you will fall in the later phases when I start the dashboard in week 12 probably.

Goldy:spounds good if you need something or aquestion just plan a meeting

Student: alright then super thank you again for your time

Appendix C: interview 2 Remi

Interview 5 September 2022

The interview was made on the 5th of September 2022 with Remi van liempd. During the interview, the interviewer asked some questions about the KPI's of the project and what would they like to see in the dashboard, as a proof of concept. This interview transcription will be using the summarized and edited version of an intelligent verbatim transcription.

Student: Hey Remi good morning

Remi: good morning

Student: as you know, this interview is about the data health management project within the company and as you know I will be the intern that will be working on the development of this project for us.

Remi: yes

Student: so, therefore I was wondering if I could get some information from you regarding the KPI's that you would like to see on the dashboard anything in particular?

Remi: Yes, I have some KPI's or information that I would like to see, as you can see here we have different financial information and insights. One of the goals I would like to see is to understand who is profitable and who is not, based on the revenue gained .

Student: yes, you mean per employee? As how much revenue the employee brought in?

Remi: that would be a plus, but I meant per client if they're profitable or not based on the hours spent, invoiced and debited hours to the client.

Student: okay this gives me an idea.

Remi: it would be nice if you found a margin between the worked performed by an employee and the billable payment, based on that you can decide which customer is profitable and which is not. Goldy is the CFO of the company,. It would be nice if you got a meeting with her after her vacation to get more insights, as this paper is usually made by her.

Student: alright, this sound about quite nice, I cant wait to get started on it. Thank you for youre time and insights.

Remi: Thank you again

Appendix D: interview 3 Herman

Interview Herman Wisman 26/10/2022

Introduction:

The interview was made on the 26th of October 2022 with Herman Wisman. During the interview, the interviewer asked some questions about the dashboard and the template made for the dashboard. With the purpose of collecting requirements of the dashboard's design and to ensure that the choice made in the dashboarding tools was the correct choice. This interview transcription will be using the summarized and edited version of an intelligent verbatim transcription. Before diving into the transcription of the interview, this interview was semi structured to open. As the intern had already prepared 3 important questions to ask the CFO, but based on these questions more questions evolve during the interview. Those 3 questions were:

How long have you been working in IT?

now adays what do you work on like what BI tool ?

what happened to the data source of EXACT?

Transcription:

Student: Hey Herman good morning

Herman: goede morgen

Student: I have a couple of questions especially about the business intelligence tool and yeah the purpose of this meeting is to just collect requirement and collect some feedback on the work done and I would like to start with for example asking you about how long have you been working in IT exactly or in the business it department exactly ?

Herman: ja precies wat is IT. Als we kijken naar de data science kant de data analysis kant, dan ben ik daar 7-8 year een beetje.

Student: ok and when you started, you started automatically with business intelligence tools or was there something else?

Herman: nee, het begon eigenlijk basis, op excel gewoon analysis, uitvoeren datum met een kaart samen voegen in excel en verschillende tabellen het was meer echt zoeken in de data dat was namelijk financial data. Vervolgens, Kwam een vraag bij partner bedrijf we willen een visuel maken bij een klant of een intern klant en zij werkt beste tijds met de BI tool target. Daar zij zorgde daar helemaal voor dat de data model daar op aangesloten op de data van de bedrijf aan gesloten werd en ik al bezig geweest met de dashbaord bouwen daar op.

Student: and when did you start working with Bi tools and dashboard exactly?

Herman: dit gedeelte wat ik net genoemd ?

Student: ja

Herman: volgens mij 2018

Student: so that's around 4 years ? I think

Herman: ja, het is lang geleden.

Student: time flies fast

Herman: ja ik zat te denken ja around 2017 daar ergens. Dat was mijn eerste ervaring met BI tool.

Student: what was your first BI tool you ever used ?

Herman: target.

Student: now adays what do you work on like what BI tool ?

Herman: sinds 2 jaar, nee sinds 5 jaar geleden zijn wij zelf opbouwen met powerbi binnen het bedrijf de reden dat we daarvoor gekozen, omdat het veel beter, toegankelijker.

Student: toegankelijker ?

Herman: ja makkelijker mee te beginnen of te opstart zeg maar. Dat een beetje en het is geïntegreerde met microsoft omgeven. Dus elke gebruiker zit op een tab, dit soort dingen die kant is meer integratie me microsoft zeg maar aan de andere kant, makkelijk te leren wat ik je net genoemde. En de manier waarop je jouw data model gaat opbouwen. Powerbi heeft heel veel standaard koppelingen ik spreek over 5 6 jaar geleden zatten daat gewoon standard koppelingen op van anderen applicatie. En dat was de reden om waarom wij met powerbi starten.

Student: ok and how did you guys come to this decision exactly ?

Herman: ik heb een paar applicatie door genoemen, dus target was een beetje bekent, powerbi even verder verdiept, tablue ook wordt onderzocht een qics, nee de laaste twee waren prijziger.

Student: it is a bit funny that you mention prices because I was also during my research of the dashboard, I came to the conclusion that powerbi is the best choice also price wise not just yeah.

Herman: als je de basis van powerbi gepaakt dan ben je vrij gekoppeld aan powerbi

Student: yeah, alright since its now advices and decided to use powerbi for this project, I have made a template by the way for the dashboard and I would like to have your own opinion about it, colors graphs, just name it . I have made this template based on brynn website colors but as you can see green and dark bluish. My idea was to have different pages for the companies, so 1 page per companies KPI. Any comments?

Herman: de type letters zijn de standard and niet pakken,,

Student: and the colors ?

Herman: in de home page is het slim om de kleuren van de jong te pakken met geel en combinatie met licht grijs bij vry en de rest, een beetje kijken naar hun kleuren en op dat basis maak the buttons.

Student: any thing else you would like to see ? I also had the idea to have a button here for the filters and stuff as you know

Herman: ja. En over de KPI en kijk welke visual per KPI zou het beste passen.

Student: that is true but what I mean is that I know the KPI within every other company within the organization is that I know their KPI's but for bryn there was only 1 which is to know which is active and non active client

Herman: dat was alles?

Student: ja dat was alles .

Herman: en de declaribitiet ?

Student: that was for goldy en stuff ?

Herman: no dat is ook voor bryn, dat willen wel van alle companies weten ... niet allen voor goldy.

Student: Ofcourse but its just i had an idea of what i can do is that .. some KPI's will overlap between the companies and then we can just filter it .

Herman: want je moet ook denken want ze willen ook wat je hebt nu is een pagina per company zegmaar ze willen ook bij voorbeeld de declarabrijet niet gewoon per company maar ook in totaal. Dus je moet terug vragen of het over per company or in totaal en the omzet van een klant willen ze weten per bedrijf of in totaal?

Student: i think it is per company, because when I had a meeting with goldy it was advised to start with fiscuraat as it is a small company.

Herman: en dan zie ik als je even kijkt hoe zou ik de pagina's in delen het is goed om een pagina te hebben waar bij het someert is bij de KPI's en darnaast de pagina per bedrijf ... met specifik KPI's.

Student: so we could have something like this general page for everyone and then specific pages per KPI's.

Herman: ja precises and de vraag is if per pagina moeten een anderen inrichting hebben ..want als het hetzelfde is ...dan is het niet nodig om 4 paginas te hebben.. zou ik zeggen maak vanuit een pagina met filters en van uit de home page 4 keer naar hetzelfde pagina gaat maar met anderen filters.

Student: ooh that is actually even smarter uses less resources.

Herman: minder werk hoef niet 4 keer hetzelfde pagina doen.

Student: that is true . then I will look more into it but I do believe that goldy is on vacation. And one last question about the data sources because I remember we started with 3 and now ended up with 2 but it was dropped exactly for what reason again ?

Herman: als wij naar de KPI's kijken die nu verstelt zijn dan hebben wij de data uit exact niet nodig want alles wat gevraagd wordt is ook in qics kan controleren. Want exact bevalt niet alle informatie om de KPI's te bouwen.

Student: a alright and if i remberer correcrly exact is only fort he belasting stuff .

Herman: ja en ook over factuurs betald dat zit ook in exact

Student: yeah ok

Herman: en alles dat gaat over declaribiteit, omzet dat zit alemaal in qics dus daarom zeggen wij voor nu exact is niet belangrijk.

Student: alright then, I mean it doesn't affect much of the data sourcing as qics has already plenty of data

Herman: precies.

Student: yeah then I guess I am done asking all the questions if you have any ?

Herman: heb je vanuit in het data model nu al je berekening kunnen opstellen die je nodig heb voor de KPI's ?

Student: yeah i looked into the data itself..i also created an excel sheet for the data and its history just documentation

Herman: goedzo

Student: other than that i did just in general let me show you. Basically I was looking at the connections and so far it seems like it is working and the next step I should do is the building of the measures for specific KPI's. the Specific KPI;s still haven't been done some are already done in here like the active and non active clients stuff like dat. Fixing the connection between the links and tables.. as you can see. As you can see all my information there the only problem I had there was the date table because for some reason it didn't want to work and display and then suddenly it worked .

Herman: vreemd

Student: this is what I have done so far... it just needs to make it look feasible and work on the KPI's.

Herman: zit er goed uit...een paar vragen die je moet de keyholders ook vragen... de datum bijvoorbeeld hoe willen ze dit zien ...de datum met dag en maand of gewoon jaar en etc. Student: alright i think i could ask remi or goldy maar ze zijn op vakantie nu.

Herman: ja is goed

Student: any more questions ?

Herman: nee

Student: alright well thank you again Herman.

Appendix E: Dashboard tool research



DASHBOARD TOOLS

The road to financial insight and performance management



19 OKTOBER 2022

BRYN

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Document goal

The goal of this research is to find a perfect match for a business intelligence tool with this project, where the proof on concept will be made on. There are plenty of business intelligence tools available and based on this article (Haije, 2022) that was published this month, we will pick 5 different tools. These tools will be compared and studied based on the requirements that will make the process faster. Furthermore, this document is used as a realized product of the 4th research sub question, where the “literature study” and “community research” methodologies will be used to develop this document. For further information about the research methodology please refer to chapter 4.2 of the internship report.

1. Requirements

To choose the perfect tool, there are requirements that needs to be fulfilled by the tool. These requirements are made based on the remedies of the GAP analysis research in chapter 4.3 of the report, based on the interviews done, time limit, and work pressure.

1. Dashboard must have multiple data sources accessibility

Since that we know that we only have one source of data (qics) and we know that it is in a SQL database, the BI tool must allow the connection between the SQL database and the BI tool. In addition to that, as it is important to have a concrete ground, it is important to find a tool that will allow the connection with different sources(i.e., Python, AI and dynamics 365) in case the client decided to expand the project in the future.

2. The data within the business intelligence tool must be secure and safe

It is mandatory to have the data secured, so that no data can be leaked outside the company.

3. The dashboard should be available for all management levels.

It is mandatory to have the dashboard available to all stakeholders/ employees. In such a case, that they can log in with their own credentials and everyone can have access.

4. Intern and employees are familiar with the usage of the tool and tool should not require knowledge on additional coding languages

It is time saving, resource saving and risk avoidance to use a tool that is already known to the intern and the employees of the company and tool can be used without knowledge of extra coding.

5. Dashboard subscription has to be affordable

It is also budget saving, if the tool offers good features with a relatively cheap price compared to the other tools.

2. Tools

In this chapter we will be discussing the tools and the research will be focused in depth based on the requirements in the previous chapter.

2.1. Power bi

The first tool that we will be talking about is power BI. Power bi is a set of software services and apps that works simultaneously to turn the data into coherent and interactive visually feasible data (Microsoft, 2022). This tool will be researched below based on the requirements it needs to fulfill.

1. Does power Bi has the ability to add data from different sources ?

According to Microsoft (Microsoft , 2022), Power Bi has the ability to import data from more than 100+ sources that can be checked in the website including SQL, python and excel.

2. Does power BI has the ability to keep the data secured ?

According to Microsoft (Microsoft , 2022), all data within power BI are encrypted automatically using Microsoft-managed keys. These keys ensure the security of the data in case of a server error. In addition to that, when data is collected or imported to power Bi credentials are always required with a secure password. In addition to that, Powerbi does not have a public workspace, where anyone around the world can access it. It is more private and can be published to a specific workspace which is then shared with a password and username (Power BI, 2020).

3. Does Power BI has the ability to allow access to all employees?

According to Microsoft (Microsoft, 2022) Power BI can be shared with everyone inside and outside of the company via a link. This link will always only give access to specific overview. However, when a link is shared the shared link can not make any changes or edits on the original file. In case of this project and improved BPMN process where we have made an analysis department to control the dashboard, this tool makes the work of the department S.M.A.R.T.

4. Has Power BI been used before within the organization and the intern ?

Power BI has been used before by the organization on a daily basis, as discussed in the organization structure chapter. Additionally Power BI has also been already used by the intern in the last 2 years, and it can be seen on canvas in the previous semesters course. Where for last semester, the intern has created a Power BI application that predicts House prices. In addition to that, power bi requires DAX as a formula language, which is very similar to excel (Microsoft, 2022).

5. What are the prices of power BI's subscriptions?

According to Microsoft, there are 3 types of power Bi with different prices which will be elaborated below.

Version	Function	Price
Power Bi free	This is the free version that is intended for anyone who would like to try the program or for small business owners or individuals, which gives you the basic features.	free
Power Bi Pro	Pro is the full version and the difference between the pro and the free is that with the pro you can share your data and reports with a huge number of users .however it has a limit of 10GB per user.	8.40 Euros/ month/ user
Power Bi premium	Premium has 2 types either in capacity or per user. The capacity user is basically a premium workspace that can be used to host a huge data set that can have a size of 50GB and more. And this can be shared within the organization unlike the per user, which will be limited to 1 user.	Per user 16.90 euros per month Per capacity per month 4,212.30 euros

For more information please check the website of Microsoft (Microsoft , 2022).

2.2. Tableau

The second tool that we will be talking about is tableau. Tableau is a business intelligence software that allows the user to analyze data, visualize it and make it comprehensible (Tableau, 2022). This tool will be researched below based on the requirements it need to fulfill.

1. Does tableau has the ability to add data from different sources ?

According to the website of tableau (Tableau, 2022), the tool can connect to different data sets and including excel, SQL and CSV.

2. Does tableau has the ability to keep the data secured ?

According to the website of tableau, the data is secured and a VPN is implemented. In addition to that, tableau offers a way to filter data access to specific personnel by something called “row-level data security.” However if the user decided to publish the dashboard, then it will be accessible to anyone in the whole world who has internet access (Tableau, 2022).

3. Does tableau has the ability to allow access to all employees?

According to Tableau (tableau, 2022), this tool has the ability to allow access to all employees, not just individually but also as groups. Which could be nice for information security in case that de Jong would like to give specific access to a specific subsidy of it .

4. Has tableau been used before within the organization and the intern ? Tableau

has never been used by the intern nor the employee's within the organization. This implies that if the intern decided to pick this tool, time will be wasted learning the tool and time will also be wasted in teaching the implementation of this tool with the guide. In addition to that, Tableau uses a similar formal to excel in its calculations (Tableau community, 2012).

5. What are the prices of tableau 's subscriptions?

According to tableau website there are 3 different versions of the tool which will be shown below.

Version	Function	Cost
Tableau Creator	This subscription is the full subscription where it allows you to connect, clean and prepare data. Create different visuals and more	70 euro per month
Tableau Explorer	This subscription is the same as the viewer with more rights like access to workbook and collaborative features	42 euros per month
Tableau Viewer	This subscription as the name suggests gives access to view public dashboards only to make informed decisions (pre-built dashboards)	15euros per month

For more information on this please check the website (Tableau, 2022).

2.3. Qlik sense

The third tool that we will be talking about is Qlik sense. It is a business intelligence tool that allows users to create charts and visuals that are interactive (Qlik, 2022). This tool will be researched below based on the requirements it need to fulfill.

1. Does Qlik has the ability to add data from different sources ?

Qlik allows data to be imported only from open database connection sources. These sources are limited to 16 of them and it includes SQL but excludes future implementations (i.e., Python and AI) (Qlik, 2022).

2. Does Qlik has the ability to keep the data secured ?

According to Qlik, they care about information security so much that it is by default, the system adds a security table when the data script is loaded, to limit or define who gets to see what (Qlik, 2022).

3. Does Qlik has the ability to allow access to all employees?

According to Qlik, this tool offers unlimited access to users using tokens. These tokens are credentials codes that are assigned to a person. If the token isn't used within 7 days, it resets and the person loses his access (Qlik, 2022). This makes Qlik more secure.

4. Has Qlik been used before within the organization and the intern ?

Qlik have never been used within the organization nor the intern. Therefore, Using this application will cost not only time but also resources. In addition to that, when searched for the question of will the user need to learn additional coding language, the answer was yes. According to the community of Qlik, a basic understanding of SQL is mandatory or any coding language to use the application (Qlik community, 2017).

5. What are the prices of Qlik 's subscriptions?

According to Qlik Website, there are 2types of subscriptions which will be shown below.

Version	Function	cost
Qlik sense Business	Allows access with user control for maximum of 5 personnel and has a standard space of 1.255GB	30 euros per month
Qlik Sense Enterprise SaaS	It is the same as the business but has unlimited amount of users and a huge increase in capacity.	Non-disclosed, contact sales

For more information please visit the website (Qlik, 2022).

2.4. Sap analytical cloud

The fourth tool that we will be talking about is Sap. Sap is a data analytical cloud company that developed this business intelligence tool that can visualize and report data in an agile methodological way. (SAP, 2022) This tool will be researched below based on the requirements it need to fulfill.

1. Does Sap has the ability to add data from different sources ?

According to the wiki of SAP (PIERRE, 2021) , the data can be added from various sources but it has some constraints and in the case of this project where we will be connecting a SQL database, it has a constraint of a 1000 column.

2. Does Sap has the ability to keep the data secured ?

According to the wiki of SAP (PIERRE, 2021), the data are fully encrypted and secure with an end to end SSO (single Sign-on).

3. Does Sap has the ability to allow access to all employees?

According to the help website of sap (SAP, 2022), the reports within the dashboard can be shared with other employees, including an access level. As in the permission given to the shared user can also be controlled.

4. Has Sap been used before within the organization and the intern ?

Sap has not been used previously by the company nor the intern. Therefore, using this tool would cause a lot of time and resources. Furthermore, according to the community of SAP, SAP does not require any additional coding as it is fully GUI supported (Nguyen, 2021).

5. What are the prices of Sap 's subscriptions?

Version	Function	Cost
Free	This is the free trial version for 90 days with limitations	free
Business	Here you have access to almost everything where you can create models share models and etc	30/user/month
planning	The difference between this version and the business version, is that the business version does not have "Enterprise planning function"	Price upon request

For more information please visit the website (SAP, 2022).

2.5. SAS business intelligence

The fifth tool that we will be talking about is SAS which is a short for statistical analysis system. SAS BI is a business intelligence tool that gives you the opportunity to display, prepare and predict data (SAS, 2022). This tool will be researched below based on the requirements it need to fulfill.

1. Does SAS has the ability to add data from different sources ?

According to the online book of SAS (SAS Institute Inc., 2006), this tool has the ability to connect to different data sources, external too, such as Oracle and SQL. However, when looked closely, python is not included in the list.

2. Does SAS has the ability to keep the data secured ?

According to the book, SAS takes security seriously as when the person signs in they authenticate that the person is saying who he is by checking the host's OS (SAS Institute Inc., 2006).

3. Does SAS has the ability to allow access to all employees?

Based on the book, you can give access to external users of SAS by something called “Meta data authorization” (SAS Institute Inc., 2006). Where the admin can give a specific user rights to specific users(i.e., User is allowed to read report only or edit.)

- Has SAS been used before within the organization and the intern ?

Sap has not been used previously by the company nor the intern. Therefore, using this tool would cause a lot of time and resources. In addition to that, it seems that SAS is a language by it self too, that you have to learn the basics of before using the application (padghan, 2019).

- What are the prices of SAS ‘s subscriptions?

There is no information about the subscriptions nor their prices on the website. However, on the website it is mentioned that , to get a subscription you will have to contact , as it can be seen below.

However, after digging a bit more into the pricing, some information was found on a comparison website or a review website that reviews the product (CompareCamp, 2019). According to the website, SAS has a free trial or a 9000\$/year/user subscription.

3. Conclusion

In conclusion, the requirements that were made were studied and researched. However these requirements can be summarized into key words that can be seen in the figure below.

BI tool	data source	security	accessibility	experience	subscription
Power BI	YES	YES	YES	YES	YES
Tableau	YES	YES	YES	NO	NO
Qlik Sense	Maybe	YES	YES	NO	NO
SAP analytical cloud	YES	YES	YES	NO	NO
SAS business intelligence	Maybe	YES	YES	NO	NO

As it can be seen in the figure above, Power BI was the only tool that passed all the requirements. The 2 tools that scored the lowest were Qlik and SAS and that is due to the fact that the data sources of these tools are limited. In case of future development within the organization and usage of machine learning or python was introduced, these 2 tools do not have the capabilities of supporting.

In addition to that for the comparison of maximum usage of tool and the price, power bi passes. That is due to the fact that power bi offers for a premium subscription per user per month 16.90 euros. That is 202 euros per year. Unlike the other tools which require a price of around 30 euros per month per user and that is around 360 euros per year. Furthermore, almost all of the tools require some basic understanding of coding, however powerbi Dax was taught to the intern in the first year of the study program. This makes the usage of Powerbi accessible. As a summary, as a proof of concept, it is advised that power bi will be used for the development of the dashboard and that is due to it passing all the requirements.

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REQUIREMENT ANALYSIS

The road to financial insights and performance
management



30 OKTOBER 2022

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1. What is Requirement analysis ?

Requirement analysis is a process where the collection of needs and expectation of a product is made. It is made based on an intensive communication between the stake holder and the software engineer/creator (Simplilearn, 2022). The purpose of requirement analysis is to accurately represent the stake holder's wishes, that can be translated into code and when made it meets the stakeholder's expectation. There are different types of requirements, however for this project we are analyzing the business requirements, user requirements, functional and nonfunctional requirements.

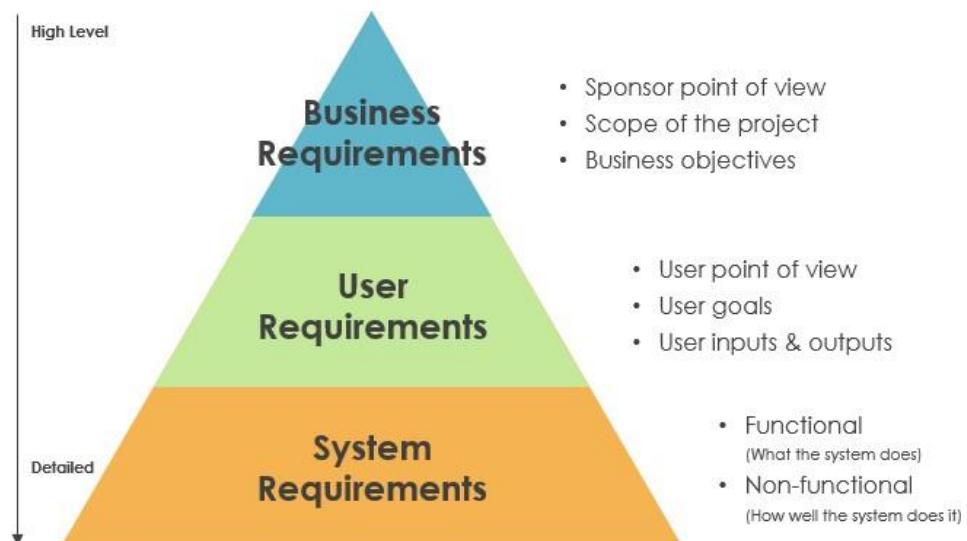


Figure 1 Requirement pyramid

These requirements mentioned above, does not have to have 1 source, as it can be collected from a direct requirements interview, or a case/ process of work which will need to be translated to requirement, or even from researching on the internet (Aziz, 2021). In this project, the requirements are collected from all conducted interviews and research done, as in there was no specific interview that was made only for requirements collections, but mostly translated from the work and process of work of the CFO into requirements and user requirements.

2. What is performance management and its relation to the requirements?

Before jumping into analysis of the problem, we first have to understand the business requirements and what is meant by performance management. Performance management is basically a continuous cycle of feedback and communication between the employee and their managers(i.e., who is doing what work, how long, how complex is the work, what can be improved and etc.. [Chassi, 2020]). These feedback and communication sessions are mandatory and do matter as they evaluate the current work process and might have an impact on any further future activities (Ruane, 2022). This continuous cycle is used to guarantee the accomplishment of the tactical goal within the organization (Lalwani, 2020).

These tactical goals has 3 types of performance management systems according to this article done by Ted Jackson (Jackson, 2021), and they are as follow:

- Management by objectives, and that is basically when an organization creates different objectives and then they shape their employees according to the objectives.
- Management by balance score card, and that is basically having objectives to accomplish, measuring this by using specific key performance indicators and taking initiatives. Based on a recent study done by ted Jackson, 88% of the companies are finding this approach to be the best (Jackson, 2021).
- Management by budget -driven business plans, and that is basically when the finance department of an organization has a budget and expects the other departments to develop a list of activities that they hope to get then within the coming year without raising the budget.

According to Herman, De Jong is an organization that would like to/ already have a management by balance score card, as they have their objectives, they have their projects, and now they want to measure their performance using the KPI's.

3. Business requirements

Business requirements is basically not what a system must do, but it is what a business must do (i.e., Complete a process), in order to stay relevant (Cox, 2017). The purpose of this, is to make the business more efficient by understanding what needs to be done, and that is done by aliening the goals and visions of the company and intensive communication.

Business requirements:

BR01 Performance management must be introduced in the end product, where every stakeholder is able to see their performance and the hours they made, but that is not possible as for now they don't have the tool for it.

BR02 Automation of the CFO's manual reporting process, where in case any stakeholder would like to see their performance or their employee's performance, the CFO does not need to create the whole report, as it is not automatically updated.

BR03 The report process must be clear of errors, where the report must be reviewed before publishing, as the information the report presents should not have errors where a wrong decision could arise based on the wrong information.

4. User requirements

User requirements are basically requirements set by the user. It is basically a set of requirements that tells how the user wants to react with the system and what do they expect the system to do (Doel, 2018). User requirements act as a concrete base for the system as they have to be unique, concise and simple, and based on 1 user requirement multiple functional or non-functional requirements could be made.

User requirements:

UR01: User wants to see the declarable and non-declarable hours spent on clients.

UR02: User wants to see active and non-active clients.

UR03: User wants the ability to see the history of last time work was done for clients.

UR04: User wants the ability to compare revenue between clients.

UR05: User wants the ability to see the declarable amount in percentage.

UR06: User wants the ability to see declarable amount per week.

UR07: User wants the ability to see the omzet per maand per company.

UR08: User wants the ability to see what is declarable and what is not per employee.

UR09: User wants the ability to see the afboeking amount compared to the declarable amount.

UR10: User wants the ability to see the top 10 customers.

UR11: User wants the ability to see the type of customers (i.e., real estate, services, etc..) **UR12:** User wants the ability to see the percentage of absenteeism due to illness.

UR13: User wants the ability to see the number of overtime hours and their purpose. **UR14:** User wants the ability to see new and departing customers with the reason.

5. System requirements

System requirements are basically a set of rules that the system must contain, in order for the system to run smoothly as requested. However, it describes the behavior of the system and its functions, which makes it easier for the data analyst to build and stakeholder to understand (Inflectra, 2022). There are 2 types of system requirements, Functional and non-functional requirements. The functional requirement is basically a description of what the system should do, its components or the behavior of the system. Mainly, what a system should show or display (Martin, 2022). The non-functional requirement is basically a constraint of how the system should display the functional requirements (i.e., speed of a graph to show , or speed of data load). It has mainly to do with the attributes of the functional requirements (Rome, 2020).

5.1. Functional requirements

SR01: System must be able to automatically present updated data.

SR02: system must be able to automatically transform new data from database into dashboard.

SR03: system must allow the user to filter data using slicers.

SR04: system must be able to compare declarable hours and non-declarable hours.

SR05: system must be able to display revenue monthly per company.

SR06: system must allow the user to compare revenue per clients.

SR07: system must allow the user to compare the afboeking amount and the declarable amount.

SR08: System must be able to show the active clients.

SR09: System must be able to show the non-active clients.

SR10: System must be able to show the revenue weekly per company.

SR11: System must be able to display the hours worked on clients per employee.

SR12: System must be able to compare between the actual declarable amount and registered amount in percentage

SR13: System must be able to show the top 10 customers based on revenue.

SR14: System must be able to show the type of customers (i.e., real estate, services, etc..) **SR15:** System must be able to display the sickness absenteeism in percentage.

SR16: System must allow the user to display new and departing customers with the reason. **SR17:** System must be able to display the amount of hours and overtime worked with a description.

SR18: System must have a separate tab of slicers in all pages.

5.2. Non-functional requirements

NFR01: System must have an intuitive, S.M.A.R.T GUI.

NFR02: System must be open for further development.

NFR03: System should be maintainable

NFR04: System must display visualizations within 15 seconds.

NFR05: System must be able to be used synchronously by all stakeholders.

6. MoSCoW requirements prioritization

MoSCoW is an acronym that represents “must have”, “could have”, “Should have” and “won’t have”. However, it is a method used in the prioritization and management of project requirements and gives clarity to the requirements. Additionally it helps in the understanding of the amount of resources or efforts that will be used in each requirement. To why the usage of MoSCoW is important in this project, is because MoSCoW gives a timeline that defines what needs to be completed first and gives a perfect representation for the expectations of the stakeholders.

6.1. MoSCoW User Requirements

Table 1 MoSCoW User requirements

User requirements	Explanation	Must Should Could Won’t
1. User wants to see the declarable and non-declarable hours spent on clients.	The user would like to see how many hours were spent on a task/client and if that amount is declarable or not declarable	Must
2. User wants to see active and non-active clients.	User would like to see who are the active and non-active clients	Must
3. User wants the ability to see the history of last time work was done for clients.	The user would like to see when the last work was done for a client and if that client is active or not.	Should
4. User wants the ability to compare revenue between clients.	The user would like to see how much revenue was coming in from different clients as who are the top 10 clients	Must
5. User wants the ability to see the declarable amount in percentage.	The user wants to the ability to see the declarable amount in percentage and compare with non declarable amount.	Could
6. User wants the ability to see declarable amount per week.	The user wants to see the declarable amount per week to compare the performance management with the week before	Must
7. User wants the ability to see the omzet per maand per company.	The user would like to see how much revenue did each subsidy made per month within De Jong	Must

8. User wants the ability to see what is declarable and what is not per employee.	User want to have the ability to see their own declarable and nondeclarable amount, to see where time was non productive.	Should
9. User wants the ability to see the afboeking amount compared to the declarable amount.	User would like to compare between the declarable amount and the Afboeking, to see how much of this revenue won't be billable.	Must
10. User wants the ability to see the top 10 customers.	The user would like to see who are the top best clients and the worst 10 clients as a comparison per year	Must
11. User wants the ability to see the type of customers (i.e., real estate, services, etc..)	The user would like to see the type of their clients, instead of googling everytime what the function of their clients is.	could
12. User wants the ability to see the percentage of absenteeism due to illness.	The user would like to see compared to the contract hours per week, the amount of absenteeism in percentage.	should
13. User wants the ability to see the number of overtime hours and their purpose.	The user would like to see the amount of overtime hours spent and on what.	Should
14. User wants the ability to see new and departing customers with the reason.	The user would like to see why did the client decide to leave the company or why did the new client join the company	Should

6.2. MoSCoW Functional requirements

Table 2 Functional requirements

Functional requirements	Explanation	Must Should Could Won't
1. System must be able to automatically present updated data.	System must does a scheduled refresh to automatically present the recent data of today.	Must
2. system must be able to automatically transform new data from database into dashboard.	System must transfer the data that is registered in Qics automatically to the BI tool .without manual interaction	Must
3. system must allow the user to filter data using slicers.	System must allow the user to use the slicers to filter the data.	Must
4. system must be able to compare declarable hours and non-declarable hours.	System must show the declarable amount and non-declarable amount next to each other in 1 page for comparison.	Must
5. system must be able to display revenue monthly per company.	System must be able to display the revenue gained monthly per company of De Jong.	Must

6. system must allow the user to compare revenue per clients.	System should allow user to pick 2 clients using the slicer for comparison of revenue.	Should
7. system must allow the user to compare the afboeking amount and the declarable amount.	System must show the afboeking and declarable amount per employee and client.	Must
8. System must be able to show the active clients.	System must show any client that worked with De jong this year as active and anything of last year is non-active.	Should
9. System must be able to show the non-active clients.	System must show the clients whom no work for was done for more than a year as in active.	Should
10. System must be able to show the revenue weekly per company.	System must be able to show the revenue per week per company of De Jong.	Must
11. System must be able to display the hours worked on clients per employee.	System must be able to show which client was worked on, how many hours were spent and by which employee.	Must
12. System must be able to compare between the actual declarable amount and registered amount in percentage	System must show the declarable amount hours and the registered amount un percentage.	Could
13. System must be able to show the top 10 customers based on revenue.	System must be able to show the top 10 clients of the company based on the revenue gained.	Must
14. System must be able to show the type of customers (i.e., real estate, services, etc..)	System could show the type of the selected customer(i.e., accountancy or real estate).	Could
15. System must be able to display the sickness absenteeism in percentage.	System must show the percdentage of abseteesim due to sickness compared to the Contract hours of the employee. Meaning if 40 hours per week, how many hours were the employee sick.	Must
16. System must allow the user to display new and departing customers with the reason.	System must show the new clients date of joining the reason behind it and departing clients date and the reason.	Should

17. System must be able to display the amount of hours and overtime worked with a description.	System must show the amount of over time hours worked per employee and why.	Must
18. System must have a separate hidden tab of slicers in all pages.	System could have a separate page for the filter slicers, so that the page does not look full and could represent better information than filling it up with slicers.	Could

6.3. MoSCoW non-functional requirements

Table 3 Non- Functional Requirements

Non-functional requirements	Explanation	MustShouldCould-Won't
1. System must have an intuitive, S.M.A.R.T GUI	System must be easy to understand and to follow, maybe user guide document should be made	Should
2. System must be open for further development.	System must not be closed, as in case further development was needed, it should allow that.	Must
3. System should be maintainable	System should be easy to maintain incase of errors.	Should
4. System must display visualizations within 15 seconds.	System must not take time to display a visual, as some visuals could take more than a minute.	Could
5. System must be able to be used synchronously by all stakeholders.	System should not be blocked from usage by employee's synchronously.	should

6.4. New Edits to the requirements

When the research method prototyping was commenced and the user requirement number 12 and system requirement number 15 were made, it was discovered that those requirement cannot be fulfilled. That is due to data missing. As the contract details per employee was missing.

 **Alex den Haan (QIcs)**
7 Nov 2022 14:28 CET

Just the current contract hours are registered in QicsMilestones. Therefore, it is not possible to report the contract hours historically.

Sincerely,

Alex den Haan
+31 71 750 54 74

Framework

7 Nov 2022 12:08 CET

This is a follow-up to your previous application with ticket number ~~123456~~ De Jong - Power BI for Qic... "

Hey Sander,

Sorry to bother, but I was looking at the data of the Medewerkers and I found the following :

Imagine the case of an employee who started on the 1st of may 2022 with a contract hours of 20/week and information is not traceable nor can be found in the database. I cant find what was the hours per employee advise and I be looking forward to your reply .

Thank you !

Kind regards,

Figure 2 Qics Email

When Qics was contacted to ask about if they hold or save the old contract hours per employee, their answer was no. Imagine an employee who started working last year December with a contract of 40 hours per week. Now a year later this employee has a contract of 20 hours per week. This data is automatically updated in Qics and the old data of 40 hours per week is deleted. Therefore, these 2 requirements cannot be fulfilled.

7. KPI's

KPI means key performance indicators, and they are important metrics to measure a business objective. As they help in the understanding of the business and the performance of the business, where critical decisions are made based on. KPI's has to be S.M.A.R.T, where they have to specific and to know what to measure, measurable and can be visualized, actionable where they can be influenced, realistic based on factual data, and within a time limit of weekly or monthly. These KPI's are collected from interviews done and community research (Wishart, 2022). Based on these KPI's below the Requirement analysis was made.

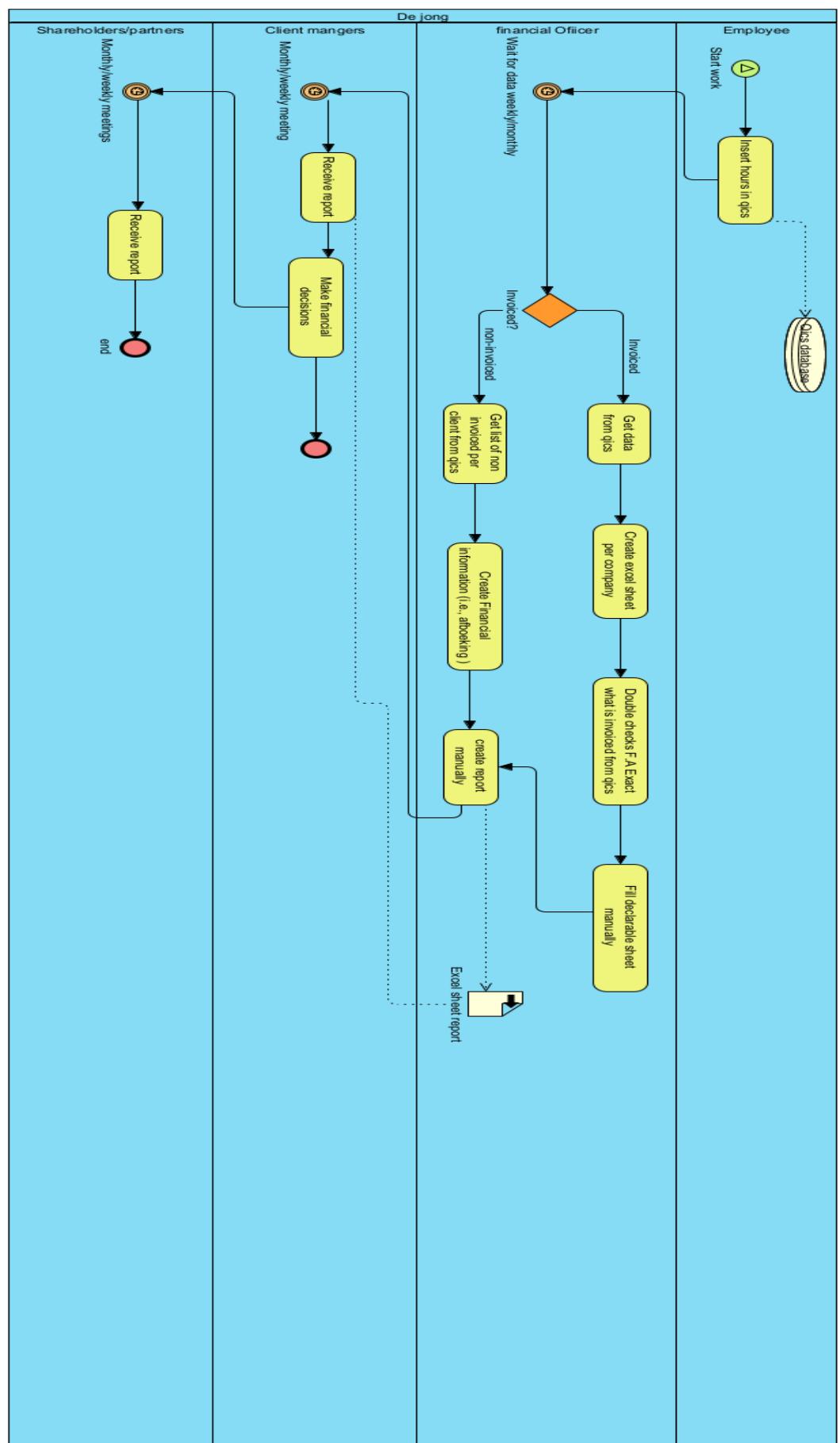
1. Active and non-active clients
2. Profitable and non-profitable clients
3. Declarable amounts and turnovers in percentage per employee
4. Declarable hours per week per client
5. Revenue and turnovers per month per company

6. Bibliografie

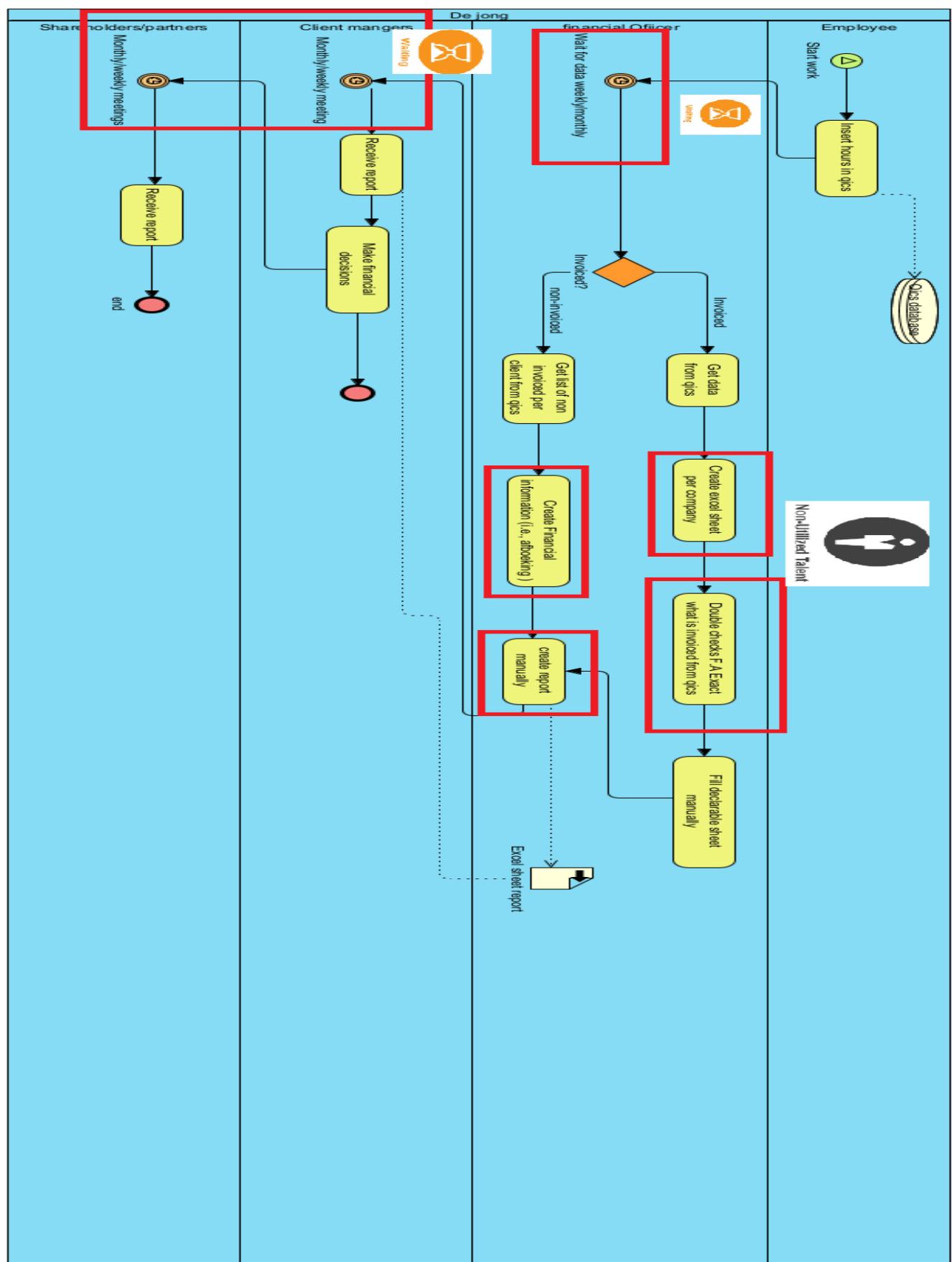
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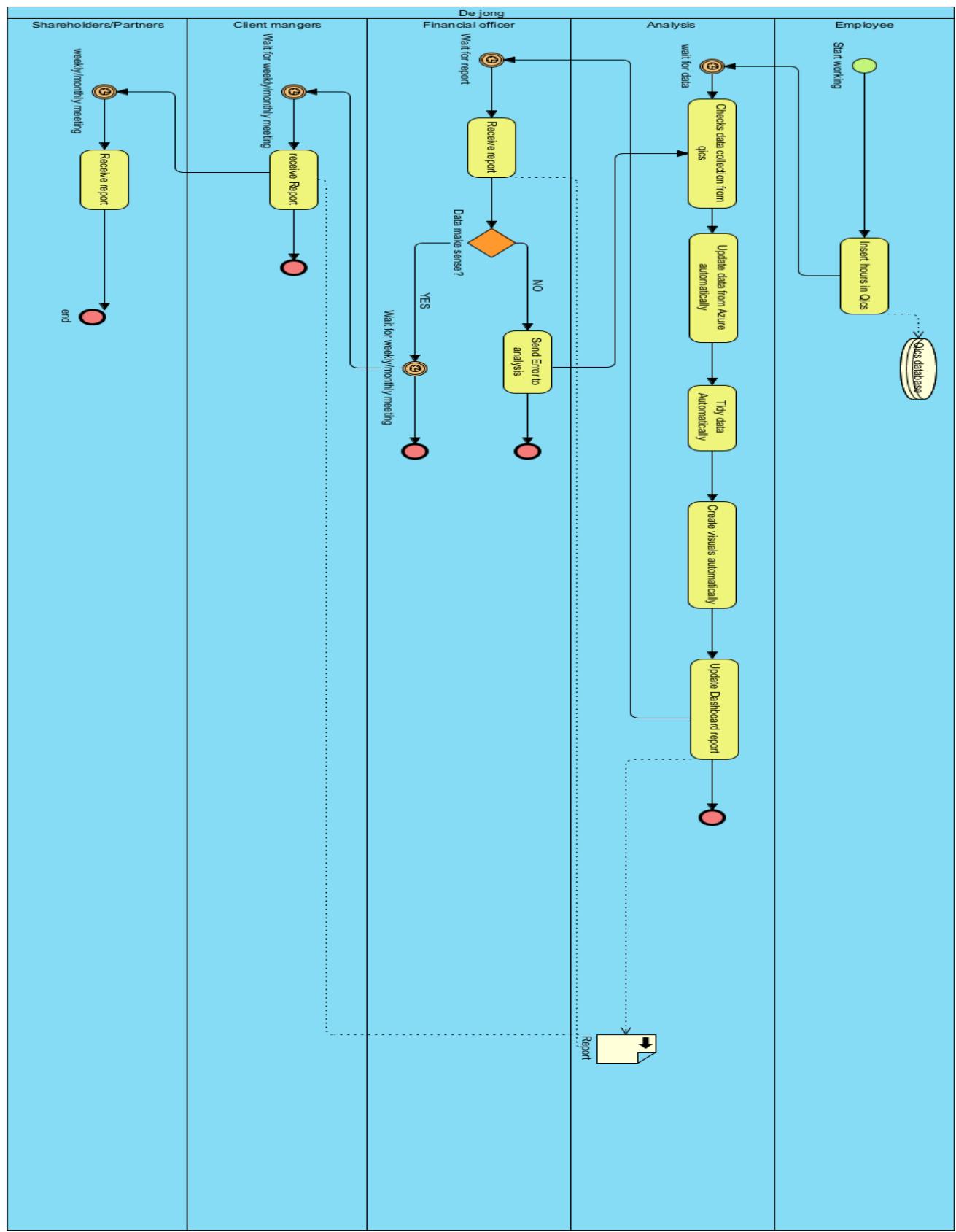
Appendix G: Current BPMN



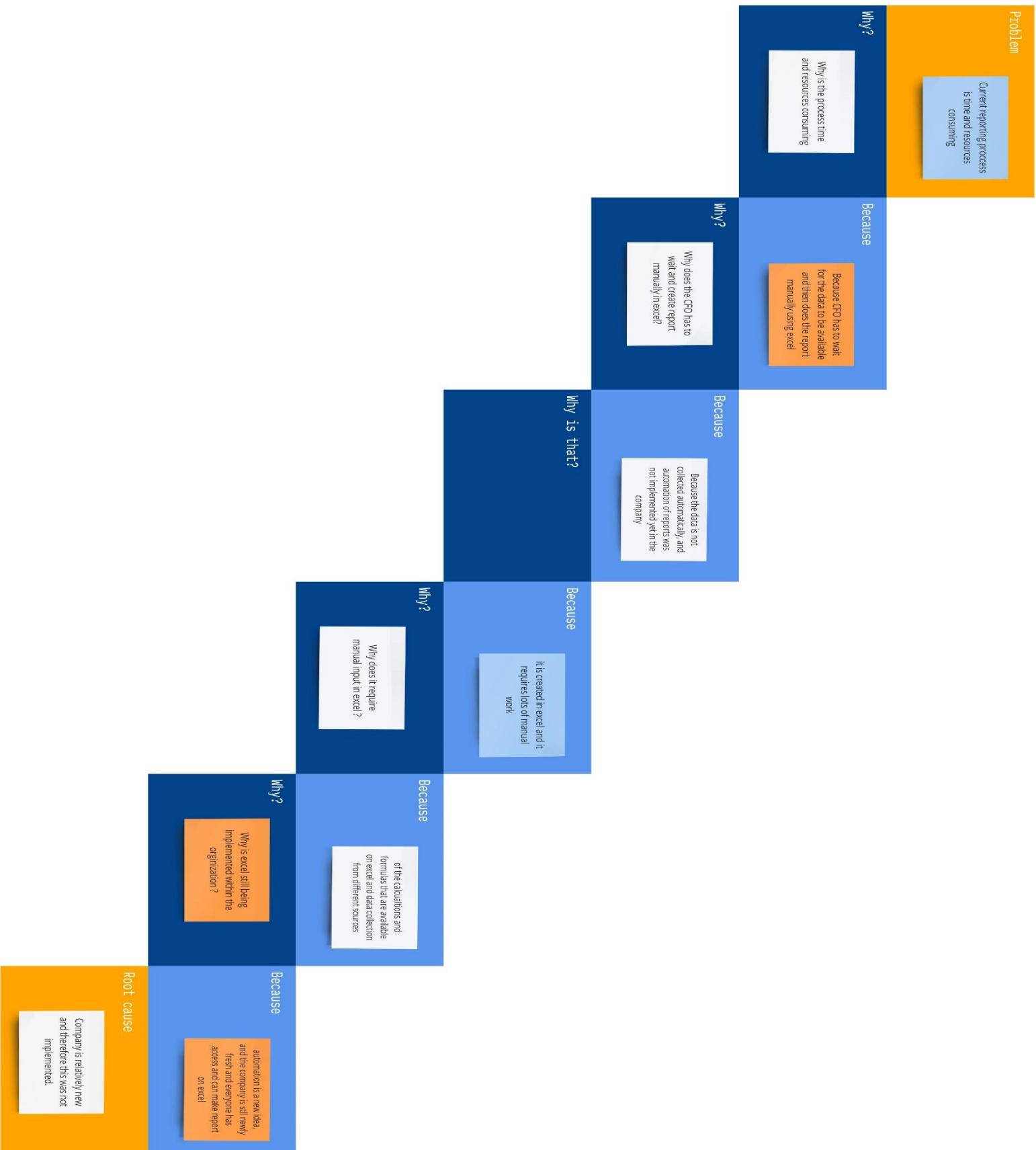
Appendix H: Current BPMN highlighted



Appendix I: New BPMN



Appendix J: Root cause analysis



Appendix K: Excel sheet



Data config.xlsx

Appendix L: problem analysis

Based on the interview that was done with the CFO (V.Loghem, 2022) and other problem owners, the scope could grow and we might end up analyzing the wrong problem. During the interview, the Interviewer asked some problem analysis questions, as why, when and what and that will be elaborated more on here.

1. Who's work is going to be automated ?
The CFO
2. What is going to be automated ?
The visualization of the data that the CFO has to create on weekly and monthly basis.
3. Why is this going to be automated?
As it can be seen in the chapter below 5.2.2, the BPMN process shows the bottlenecks that the CFO is struggling with and the wastes using the lean six sigma (Lean six sigma Experts, 2021). Therefore, to answer the question of why, is because the current process costs time and waste of talent.
4. When is this going to be automated ?
This is going to take 18 weeks, where the 28th of august 2022 was the first week and the 10th of January is the 18th week.
5. How is this going to be automated?
Using the business intelligence tools, some programming and research.

Appendix M: SWOT analysis

External Origin

Internal Origin

Strengths

Positive tangible and intangible attributes internal to an organisation and within the organisation's control.

1. Performance management KPI's that will keep the company in check/track

2. Everyone within the company has access to the same data.

Weaknesses

Internal factors within an organisation's control that detract from the organisation's ability to attain the desired goal. Which areas might the organisation improve?

1. Company has no tool to check the employee's performance

2. The processes are done manually to check the profitability of the clients / company

Opportunities

External attractive factors that represent the reason for an organisation to exist and develop. What opportunities exist in the environment, which will propel the organisation and facilitate identified learning outcomes?

1. Company could in the future add more KPI's to the performance management

2. Company could develop an artificial intelligence tool that could predict performances and revenues

Threats

External factors beyond the organisation's control which could place the organisation mission or operation at risk. The organisation may benefit by having contingency plans to address them should they occur. Try to identify their severity and probability of occurrence.

1. a potential risk is a client not satisfied with an employee's performance and there are by no means any tools to check employees' performance now.

2. Company could predict performances and revenues

Appendix N: Proof of concept/ prototype



PROOF OF CONCEPT

Prototype



2 DECEMBER 2022

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1. Introduction

In this document, the proof of concept will be represented and shown in details how it was built. For the proof of concept/ prototype 1 Power Bi dashboards is made. The purpose of this document is to show how the dashboard was built and what measures were used, as this prototyping method will help in reaching the end product.

2. Proof of concept

In the previous sub questions, we got to see how we collected the data, how the new process was derived from the old process and got to make a decision on why Power bi is the best tool to utilize. After the data's location was known, a connection between the Powerbi tool and the database was commenced as it was shown in sub question 1. In case there were ever any data to be added or tables to be added, just follow the first sub question, as that is the process to add a new table. After the connection was done, the data was cleaned and documented in an excel file that can be found in the appendices. After that, the data model was linked to each other with primary keys, as it can be seen below.

The connection of the tables with each other within the data model was also double checked, as apparently Qics had already a blue print to the data model, as it can be seen below.

Alex den Haan (QICS)

9 nov. 2022 11:22 CET

Hi Ramy,

Attached file contains the model which can be viewed using Power BI Desktop.



Met vriendelijke groet,

Alex den Haan
+31 71 750 54 74

Bijlage(n)

[QicsMilestones Model.pbix](#)

Ramy

9 nov. 2022 09:09 CET

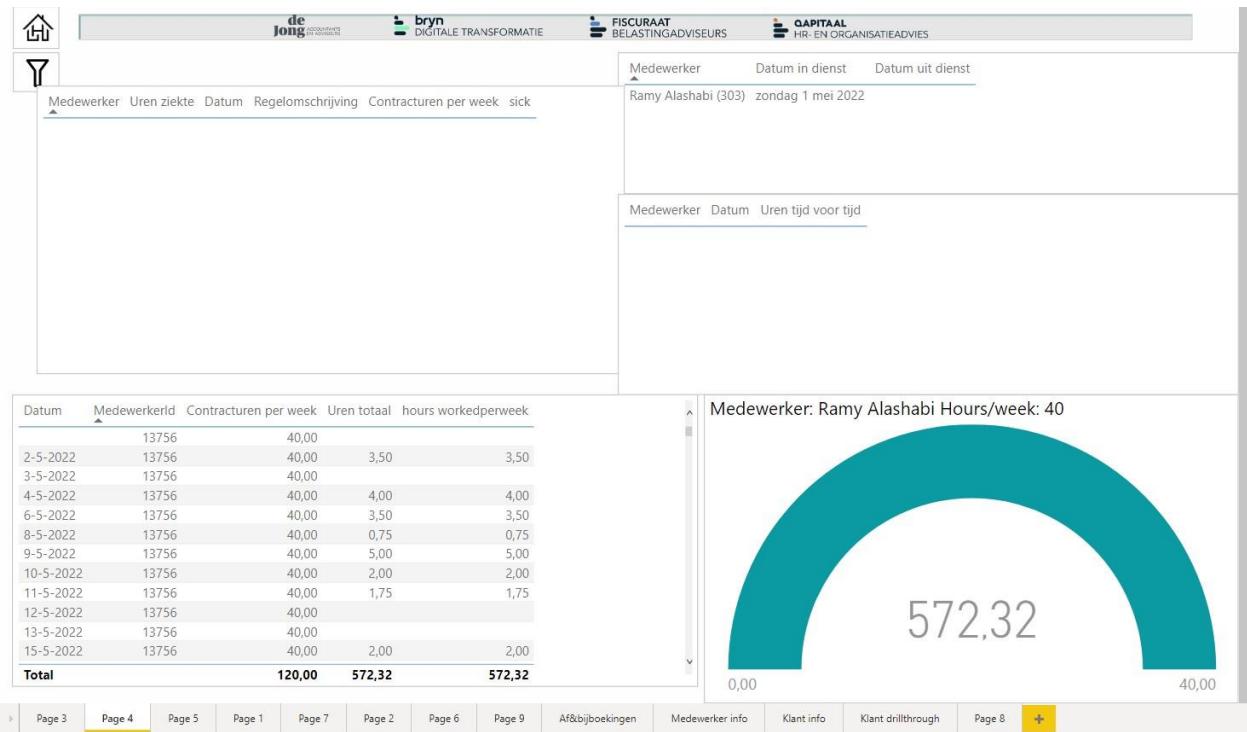
Dear sir/madam,

I have been told that you have a data model for Qics about how the tables are connected to each other, is it possible to have that information ?
As it would help a lot with my project

Thank you for your time !

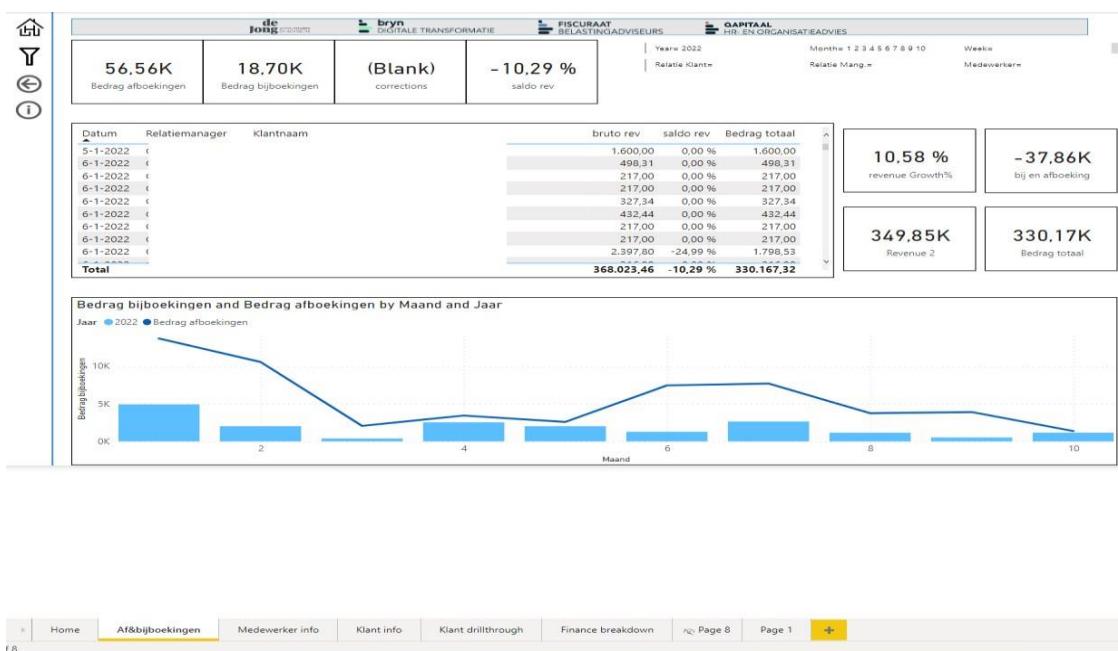
Kind regards,
Ramy Alashabi | Bryn

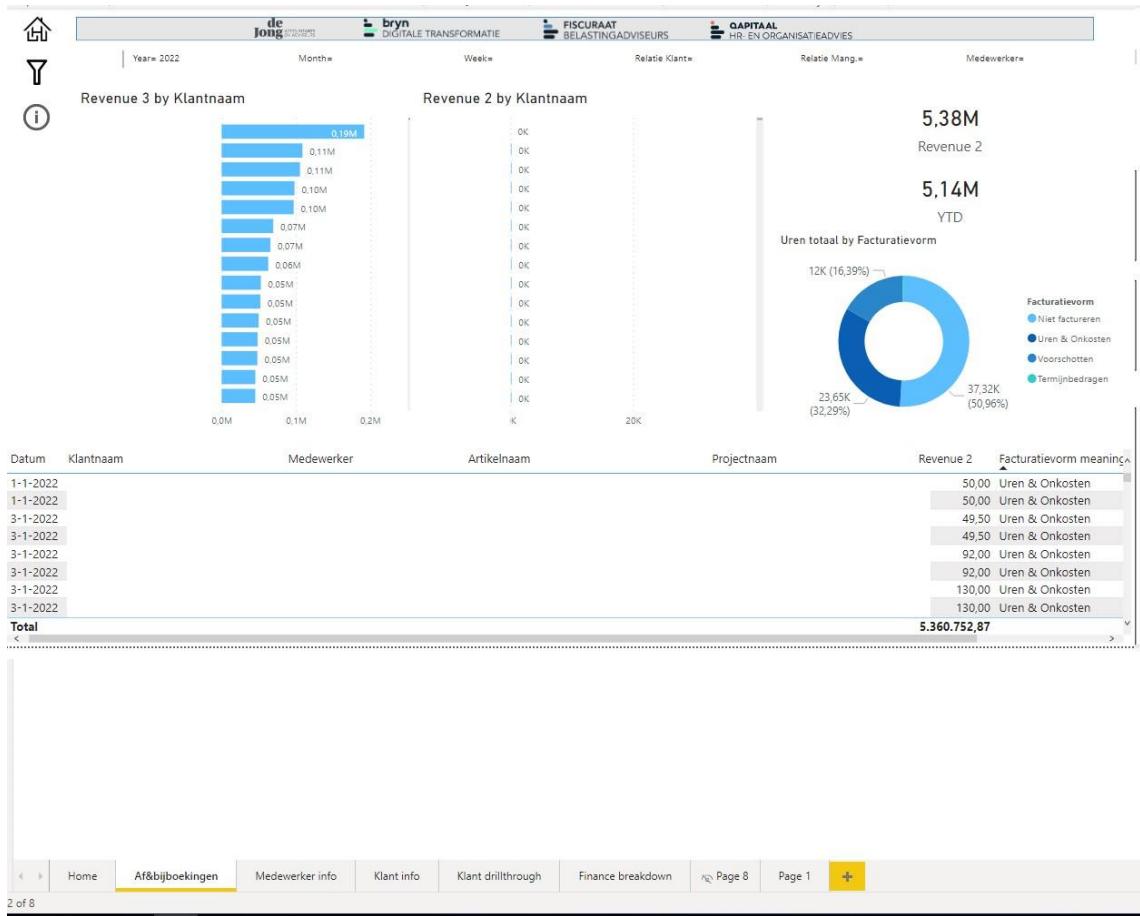
After the data model was checked, the building of the prototype was commenced. During the first weeks of the building, a template was made on how the dashboard would look like. The first template was shown to the data analyst, where some feedback was given and processed and it can be found in the appendices under interview 3.



The figure above shows the first attempt at making the prototype. In the beginning it was decided by the intern that for every subsidy within the organization, a tab/ a page will be made. That was based on the intake interview, where it was thought by the intern that every subsidy had its own KPI's to visualize, this was during the proposal time. As the time passed and the realization, that all subsidies share the same KPI's more or less, it was decided to make 1 dashboard for all the intern medewerkers within the company and another for the relation managers. This decision was made when the interview with the data analyst was made and it can be found in the appendices, as it was also part of a feedback.

This screenshot displays the initial prototype of the dashboard. At the top, there are four logos: 'de Jong ACCOUNTANTS EN ADVISEURS', 'brym DIGITALE TRANSFORMATIE', 'FISCUAAT BELASTINGADVISEURS', and 'CAPITAAL HR- EN ORGANISATIEADVIES'. Below the logos, the dashboard features a dark background with a central illustration of a person climbing a yellow arrow pointing upwards. Five white rectangular buttons are arranged in a grid-like pattern: 'Home' (dark grey background), 'Af&bijboekingen' (top right), 'Medewerker info' (bottom left), 'Klant info' (middle right), and 'Klant drillthrough' (bottom middle). The bottom navigation bar includes links for 'Home', 'Af&bijboekingen', 'Medewerker info', 'Klant info', 'Klant drillthrough', 'Finance breakdown', and 'Page 1'.





The figures above shows the newly improved prototype. Based on the feedback given by the data analyst, a home page was made that takes the user to different tabs, with the colors of De Jong that are being used. As it can be seen in the figure on the left side, there area a couple of icons. These icons are basically buttons, the first home icon takes you to the home page, as seen in figure 4 . The second icon is a filter icon, it uses slicers and bookmarks to create a separate page on the same page as it can be seen below.

The screenshot displays a Microsoft Power BI report interface. At the top, there are several navigation icons and links for 'de Jong Accountants en Adviseurs', 'brym DIGITALE TRANSFORMATIE', 'FISCURAAT BELASTINGADVISEURS', and 'CAPITAAL HR EN ORGANISATIEADVIES'. Below these are dropdown menus for 'Year= 2022', 'Month= ', and 'Week= '. The main content area features a large blue-highlighted section containing four filter dropdowns: 'Klantnaam' (with 'Inleter' selected), 'Jaar' (with '(Blank)' selected), 'Maand' (with '1' selected), 'Week' (with '1' selected), 'Medewerkernaam' (with '(Blank)' selected), and 'Relatie' (with 'Inleter' selected). Below these filters is a table with the following data:

	9,00	0,00	-9,-	3,49M (64,88%)
002-Uitkeren kolommenbalans				
003-Opstellen arbeidsovereenkomsten				
003-Uitkeren rapport	1,00	0,00	-1,-	
003-Uitkeren kolomtotaal				
Total	2.566.519,00	23.776,50	73.234,03	1.706.605,49
				859.913,51 -49,4

At the bottom of the report, there is a navigation bar with tabs: Home, Af&bijboekingen (highlighted in yellow), Medewerker info, Klant info, Klant drillthrough, Finance breakdown, Page 8, Page 1, and a plus sign.

In this filter page you are allowed to filter data on the same tab without having the slicers/ filters on the main page, as that would take so much space and design time.

3. Visual selection

In the prototype and the figures above, it can be seen that there are variety of data visualizations are being used, these visuals were researched, to ensure that the data is represented correctly.

- The first visual that can be seen is the line clustered bar visuals. According to (Mike Yi, 2019) this visual is used for the purpose of the comparison and in the case of this project it is between the bijboeking and afboeking per month.
- The second visual that can be seen is the pie chart. According to (Velarde, 2021) this visual is used for the purpose of representing parts of a whole pie and in the case of the project it represents the revenue in total between all the subsidies which are 4.
- The third visual that can be seen is the doughnut chart. According to (Velarde, 2021) this visual shares the same purpose as the pie but can be more readable incase there are more than 6 subsidies and in the case of the project it represents the total hours based on the facturatie vorm(i.e., Voorschotten, termijnbedragen and onkosten.)
- The fourth visual that can be seen is the Bar chart. According to (Velarde, 2021) this visual is used for the purpose of data comparison on 2 axis. One axis can be categorical and the other is numerical and in the case of the project it shows the revenue per client.
- The fifth visual that can be seen is the line graph. According to (Mike Yi, 2019) this visual is used for the purpose of representing change over time and in the case of the project it shows the revenue over the months.

Based on this, the visuals were made to fit the business reporting perfectly.

4. Measures

Measures are a tool within power bi that helps the user in achieving their DAX calculations (i.e., Sum of value or average). Dax is a piece of code that is commenced automatically on the spot, as it is not preloaded (i.e., calculated columns, which takes a lot of memory space), but it does the calculation on the spot (Learn Microsoft, 2022). Within the dashboard, there was a whole separate table made for the measures, to keep it tidy and traceable. Only the top 10 of these measures will be mentioned below with the formula to calculate.

Name of measure	Formula of measure
Afboekingen =	<code>CALCULATE(SUM('Reporting Facturatievoortgang'[Bedrag]), FILTER('Reporting Facturatievoortgang', 'Reporting Facturatievoortgang'[Subtype] = "Deducted"))</code>
Bijboekingen =	<code>CALCULATE(SUM('Reporting Facturatievoortgang'[Bedrag]), FILTER('Reporting Facturatievoortgang', 'Reporting Facturatievoortgang'[Subtype] = "Added"))</code>
bij en afboeking =	<code>sum('Reporting Factuurregel'[Bedrag bijboekingen])-SUM('Reporting Factuurregel'[Bedrag afboekingen])</code>
bruto rev =	<code>var val= SUM('Reporting Factuurregel'[Bedrag totaal])- SUM('Reporting Factuurregel'[Bedrag bijboekingen]) var val2 = val+SUM('Reporting Factuurregel'[Bedrag afboekingen]) return val2</code>
cumulative revenue =	<code>var todaydate = TODAY() var todaymonth = MONTH(todaydate) var todayday= DAY(todaydate) var yearfilter= GENERATE VALUES('Reporting Datum'[Jaar]), var todayincurrrentyear= DATE('Reporting Datum'[Jaar], todaymonth, todayday) return CALCULATETABLE(DATESYTD('Reporting Datum'[Datum]), TREATAS({todayincurrrentyear}, 'Reporting Datum'[Datum]))) return CALCULATE(TOTALYTD([Revenue 2], 'Reporting Datum'[Datum]), KEEPFILTERS(yearfilter))</code>
YTD =	<code>CALCULATE(TOTALYTD([Revenue 2], 'Reporting Datum'[Datum]), SAMEPERIODLASTYEAR('Reporting Datum'[Datum]))</code>
hours last week =	<code>CALCULATE(SUMX('Reporting Geboekte uren', 'Reporting Geboekte uren'[Uren totaal]), FILTER(ALL('Reporting Datum'[Datum]), WEEKNUM('Reporting Datum'[Datum])=WEEKNUM(TODAY())-1), FILTER('Reporting Geboekte uren', 'Reporting Geboekte uren'[Uren totaal]<> BLANK()), FILTER(ALL('Reporting Datum'[Datum]), YEAR('Reporting Datum'[Datum])=YEAR(TODAY())))</code>
hours current week =	<code>CALCULATE(SUMX('Reporting Geboekte uren', 'Reporting Geboekte uren'[Uren totaal]), FILTER(ALL('Reporting Datum'[Datum]), WEEKNUM('Reporting Datum'[Datum])=WEEKNUM(TODAY())), FILTER('Reporting Geboekte uren', 'Reporting Geboekte uren'[Uren totaal]<> BLANK()), FILTER(ALL('Reporting Datum'[Datum]), YEAR('Reporting Datum'[Datum])=YEAR(TODAY())))</code>
Revenue 2 =	<code>CALCULATE(SUM('Reporting Facturatievoortgang'[Bedrag]), FILTER('Reporting Facturatievoortgang', 'Reporting Facturatievoortgang'[Subtype] = "Billable"), FILTER('Reporting Datum', 'Reporting Datum'[Datum] <= TODAY())-[corrections]</code>
title hours worked =	<code>"Medewerker: " & CALCULATE(SELECTEDVALUE('Reporting Medewerker'[Medewerkernaam])) &" Hours/week: "& CALCULATE(SELECTEDVALUE('Reporting Medewerker'[Contracturen per week]))</code>

With these measures we get to achieve the required KPI's and the work of the CFO is automated, as she does not have to create this report and do the calculations weekly/monthly .

5. Conclusion

In conclusion, a dashboard was created, the top 10 measures were mentioned with their formula and the data model was made and checked via Qics. In addition to that, the visuals that are used in the dashboard were also researched and referenced. This phase was a big step in reaching the end product that needs to be delivered to the client

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USER MANUAL

The road to financial insights and performance management



21 DECEMBER 2022

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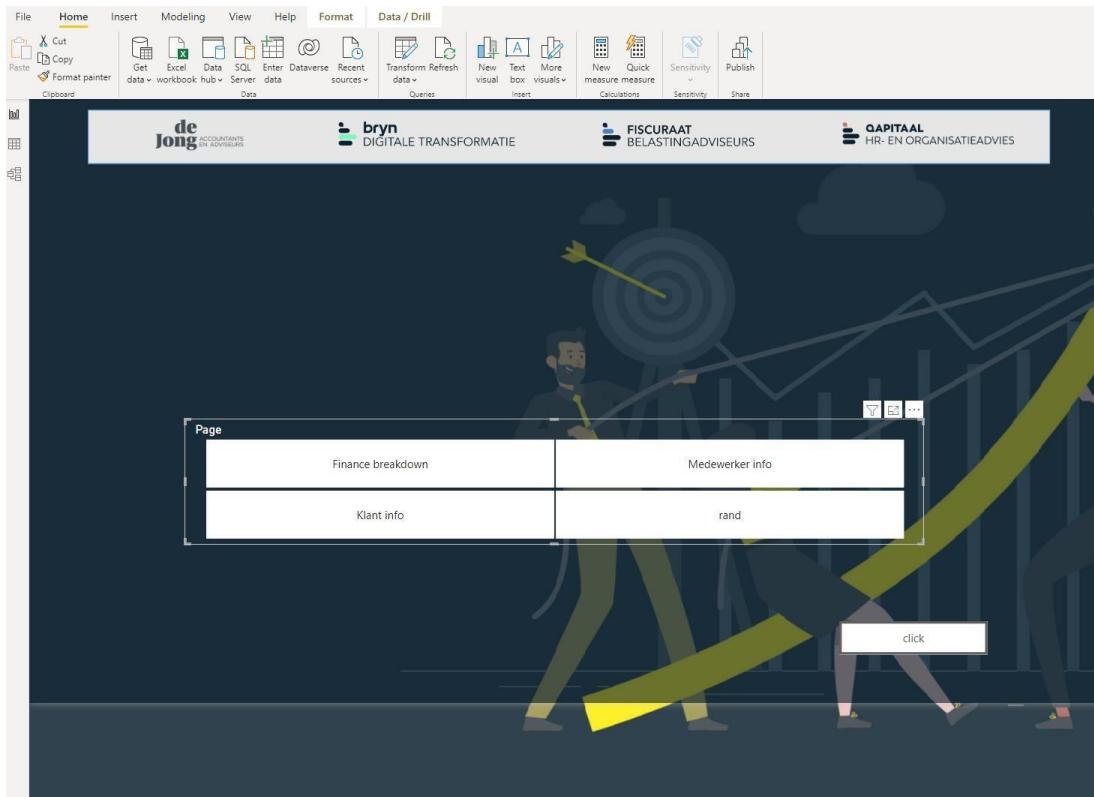
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1. Introduction

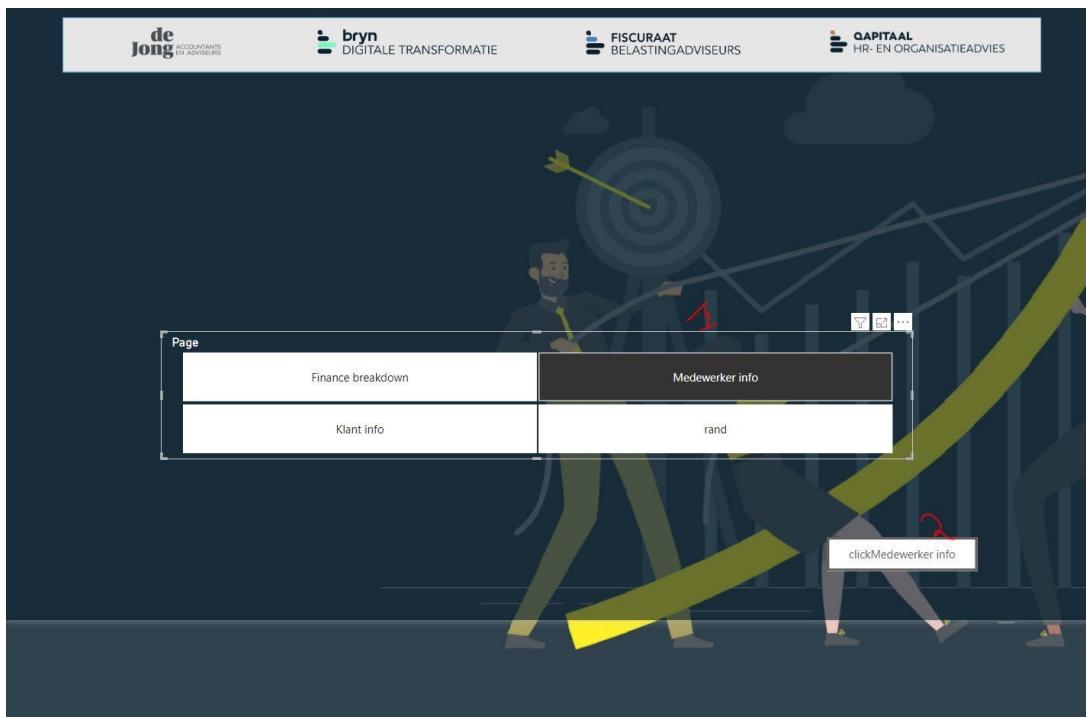
This is a user manual guide document, as it shows the user how to use the application when needed, and to do the minor necessary steps to reach their desired visuals. This user guide will elaborate only on 1 tab that is due to the other tabs having the same interaction.

2. Guide

In this chapter, the view of what the user will see and what the user needs to click will be described.

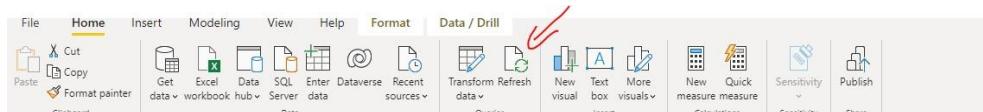


As it can be seen above, this is the home page and the first page the user will look at. In the middle of the page there are 4 tabs that the user can navigate through.



As it can be seen above, to navigate to the medewerkers info page, you will need to click on the page then click on the button that will take you to the page.

In case the data is not refreshed please click on the refresh button as it can be seen below



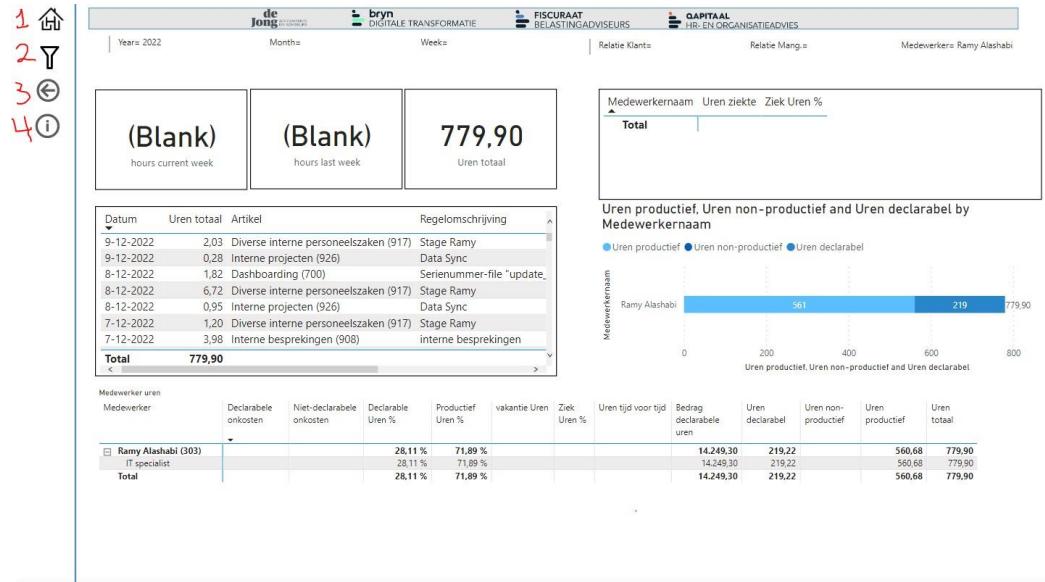
This might take 5 minutes for the whole data to be refreshed and to get the most recent data.

Once you navigate to the medewerker info page this is what you will see:

Medewerker	Declarable onkosten	Niet-declarable onkosten	Declarable Uren %	Productief Uren %	vakantie Uren	Ziek Uren %	Uren tijd voor tijd	Bedrag declarable uren	Uren declarabel	Uren non-productief	Uren productief	Uren totaal
Ramy Alashabi (303) IT specialist			28,11 %	71,89 %				14.249,30	219,22	560,68	779,90	
Total			28,11 %	71,89 %				14.249,30	219,22	560,68	779,90	

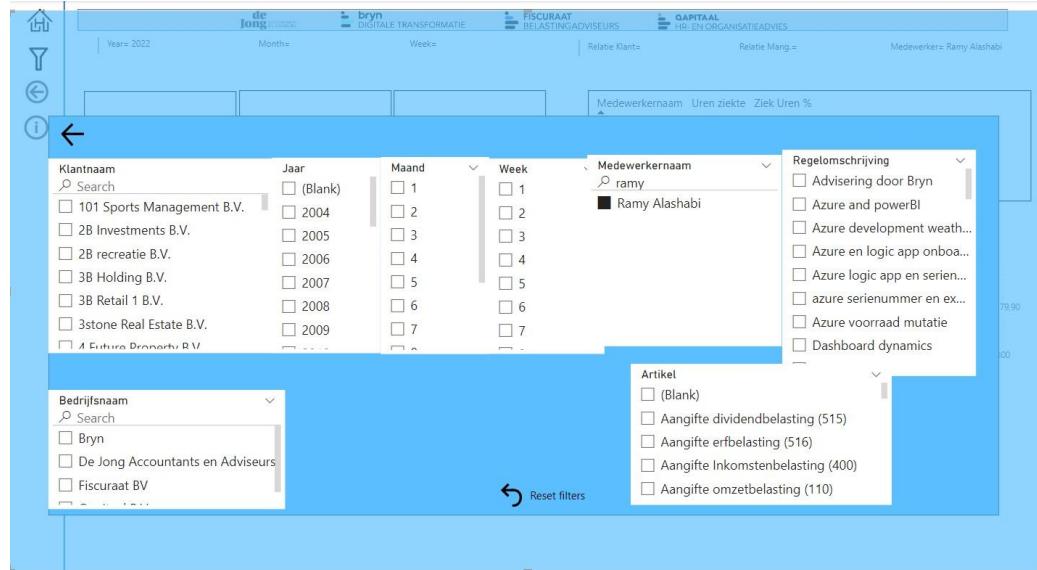
This page displays all the information about the medewerker and the hours spent on the projects.

Now if you observe the image below



You will notice that on the left side of the screen there are 4 button and they are the following :

1. The first button is the Home button that will take you back to the first screen we saw earlier.
2. The second button is a filter button where once clicked another tab will be opened with plenty of filter options to use as it can be seen below.



3. The third button is a back button that will take you back to the previous page you were in.
4. The fourth button is an information button that once clicked on, will display information about the current page and what it is used for.

Every other tab has the same logic and the same filter page and home option. When confusion appears please don't hesitate to ask the data analyst for help.

