



Improving the cash allocation process for Accounts Receivable

Department: A project for Company X

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Abstract

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<p>The purpose of this thesis is to propose different improving solutions to enhance the cash application process at Company X. The project aims to identify the current complications and challenges within the process to understand the areas of improvement and suggest suitable resolutions accordingly.</p> <p>The theoretical part of the thesis focuses on the framework of accounts receivable management and the importance of managing receivables activities. The cash allocation process is also introduced in this part. Furthermore, the concept of ERP is explained since the software is widely used in many big enterprises to support daily accounting processes. Besides ERP, business intelligence is also important for companies due to its practicality and usefulness when presenting data to users. For many organizations, robotic process automation is becoming a solution that can reduce repetitive and tedious tasks. Thus, it is highly recommended to implement automation to perform monotonous tasks.</p> <p>The project method for this study is the Lean Six Sigma methodology. This method suits the objectives of the study, which concentrate mainly on improving the process. The project is carried out based on five stages of the methodology: Define, Measure, Analyse, Improve, and Control.</p> <p>The result of the study proposes three solutions that can help to improve the cash allocation process at company X. The first solution is to build a dashboard using the BI tool to keep track of the cash application process. The second proposal is to improve the current automation process which already exists in the banking gateway. Lastly, the suggestion recommends building a robot using UiPath technology to support the matching payment process.</p>
Key words
Cash application process, robotic process automation, business intelligence, ERP, lean six sigma, process improvement, accounts receivable management

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1 Introduction

This is a project-based thesis for the bachelor's degree program in International Business in the major of Financial Management at Haaga-Helia University of Applied Sciences.

The first chapter of the thesis introduces to the readers a general explanation of the project topic, the objectives of the study, and the background of the commissioning company. Besides, there are also key concepts and benefits mentioned in this chapter.

The second chapter explains the theoretical frameworks that work as the foundation to support the studies for this project. Since the scope of this thesis focuses on receivables management tasks, the theoretical framework includes the definition of accounts receivables and their importance, followed by the definition of the cash allocation process. Afterward, enterprise resource planning, business intelligence, and robotic automation process are carried out as part of the theories.

Next, the author explains the project methodology used to conduct the study in the third chapter. In this project, the chosen method is lean six sigma due to its suitability with the objectives of the thesis.

In chapter four, the author describes the current cash allocation process in the commissioning company as well as its complexity and challenges. From the process, there are three areas that need to be improved. This chapter provides a comprehensive explanation of the challenges and complexities associated with the tasks.

After identifying the issues, the author discusses the possible solutions which can be implemented to improve the process. Each problem is targeted individually and is provided with a specific approach. These solutions are mentioned in chapter five of the thesis.

Furthermore, the author presents the estimated metrics to compare the results once the improvements have been made.

The final chapter concludes the project by summarizing its key findings and proposing ideas to sustain the process and facilitate future developments.

1.1 Background to The Topic

The author is in the third year of studying Bachelor of Business Administration, majoring in Financial Management. The author needs to find a topic for her thesis which is relevant to the specialisation field. Besides the study, the author also works as an Accounts Receivable Specialist in the Financial Services Department of the commissioning company.

The author is responsible for the GmbH unit, which is the largest unit of the commissioning company that generates more than half of the company's revenue in Europe. Daily, there is a high volume of incoming payments that need to be allocated. This is one of the most important tasks in the receivables department. Because of the heavy workload, it is very essential and necessary to improve the cash allocation process to ensure the efficiency of cash flows.

After having worked on and gained an understanding of the cash application process, the author realised there is a need for improvement. Hence, the author proposed the Team Lead of the receivables management team to conduct a study to find out which aspects can be improved and use this topic for the author's bachelor's thesis. This project can add value to the commissioning company to have a better understanding of their cash allocation process and to identify areas for improvement. Thus, the aim is to streamline the accounts receivable processes, reduce the time spent on them, and improve efficiency.

The project objective of this thesis is presented using the research questions below:

Project objective (PO): Identifying the areas which need improvements and providing solutions for the cash allocation process in Company X.

The project includes seven sub-project tasks which need to be carried out:

Project tasks (PT):

PT 1. Preparing the theoretical framework for the project.

PT 2. Researching the current cash allocation process in Company X.

PT 3. Identifying the current challenges and complications that need improvements.

PT 4. Proposing solutions for improvements on potential tasks.

PT 4.1 Developing a sample dashboard for KPI metrics.

PT 5. Presenting the proposed solution to the commissioning company.

PT 6. Self-reflection and suggestions for future research and development

Table 1 breaks down the project tasks by presenting the theoretical framework, the project management methods, and the expected outcomes of each project task.

Project Task	Theoretical Framework	Project Management Methods	Outcomes
PT 1. Preparing the theoretical framework for the project	Accounts receivable, the importance of accounts of receivable, cash allocation process, ERP, RPA and its benefits, six sigma methodology	Online research	Theoretical frameworks
PT 2. Researching the current cash allocation process in company X.	Cash allocation process, ERP system	Performing cash allocation on ERP system	Understanding the current cash allocation process
PT 3. Identifying the current challenges and complications that need improvements	Cash allocation process, ERP system, lean six sigma methodology	Analysing cash allocation process, qualitative analysis, interviews, lean six sigma methodology	Finding the areas within the cash allocation process that need improvements.
PT 4. Proposing solutions for improvements on potential tasks	RPA, benefits of RPA, UiPath, Oracle BI, lean six sigma methodology, business intelligence	Interviews, qualitative analysis, lean six sigma methodology	Guidelines and suggestions for improvements

Project Task	Theoretical Framework	Project Management Methods	Outcomes
PT 4.1. Developing a sample dashboard of the Cash Application Process			Sample of a cash receipts management dashboard
PT 5. Presenting the proposed solution to the commissioning company	UiPath, Oracle BI, Metrics for measuring performance	Lean six sigma methodology	Presenting the current challenges and proposing the solutions
PT 6. Self-reflection and suggestion for future research and development performance.	Development performance	Project metrics	Measuring the before and after metrics of the tasks which can be replaced by automation

1.2 Project Scope

This thesis aims to study what are the aspects that can be improved in the cash allocation process for the receivables management team in the commissioning company. The project identifies the current issues and suggests improvements to enhance efficiency in the cash allocation process. In this study, the author focuses solely on the cash allocation process in the designated unit which is GmbH unit.

1.3 Benefits

The project aims to bring benefits to the financial service department, specifically the receivables management team and the receivables specialists who are working directly with the cash allocation process.

By improving the process, the company can shorten the time to close open invoices, enhance liquidity time and generate more working capital to support the operations. This also helps to build a better relationship with the customers when invoices are matched on time, customer's credit is well-monitored and sales orders can be released as agreed. Furthermore, this thesis can provide recommendations for students who are interested to develop their careers in the receivables management department.

For the author, the project is an opportunity to study new knowledge, particularly on the topic of robotic automation process, that will be beneficial for her career in the financial services industry in the future.

1.4 Key Concepts

Accounts receivable is the financial record that tracks the invoicing and collection of payment from the customer for the product or services provided (Yousem & Beauchamp 2007, 199).

Managing receivables activities is a process that involves staff skills, technology tools, company culture, and changing customers' and co-workers' behaviour and flexibilities (Salek 2005, 3).

Incoming cash or receivables must be collected accordingly to ensure the company's revenue and cash flow are well managed. For many companies, increasing revenue is crucial. However, revenue should be generated into cash to support the business's operations (Salek 2005,1).

Enterprise resource planning (ERP) systems are core software programs that are widely used in many organizations. Companies utilize ERP systems to coordinate and integrate information in every area of the business. The systems use a common database and shared management reporting tools to help organizations manage day-to-day business processes (Monk & Wagner 2012).

Business intelligence is "a process for extracting, transforming, managing and analysing large data by making a mathematical model to gain information and knowledge to help make decisions in the complex" (Fitriana, Eriyatno & Djatna 2011, 96).

Robotic Process Automation is “designed to automate tasks which are performed by humans on desktops”, specifically the ones that are “high volume, repetitive and tedious” (Mahey 2020, 3).

Lean Management and **Six Sigma** combined a successful methodology that can deliver the best results when implemented together (Atmaca & Girenes 2013, 2018).

1.5 Commissioning Company

The commissioning company is a global leader in the manufacturing of plumbing and indoor climate systems for residential and commercial buildings. The company was founded in 1918 in Lahti, Finland, and has since expanded to more than 30 countries around the world. As of 2021, the company employed 3700 employees worldwide. The company is headquartered in Vantaa, Finland, and is a publicly listed company. In 2022, net sales of the commissioning company were €1,386.2 million, with an operating profit of €135.5 million or 9.8% of net sales.

1.5.1 Financial Services Department

Prior to 2019, there was a local team to perform financial activities for each country that the company operates. The situation created difficulties and complications to have a harmonized process between different countries since each unit followed its own local standards. This has caused complications for the group to compare the results and the data to determine the performance of each country.

Hence, in 2019, the company decided to transfer all its financial activities to Finland. The purpose of the transition was to build a centralized financial services team that operates as a shared service center to support the company's financial operations globally.

1.5.2 The Organizational Structure of the FSC

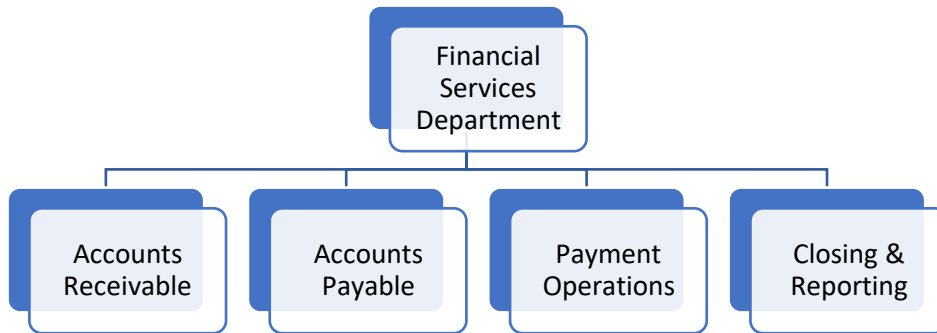


Figure 1. The organisational chart of the Financial Services Department.

The centralized Financial Services team consists of four sub-teams: Accounts Receivable (AR) Management, Accounts Payable (AP) Management, Payment Operations (PO), and Closing & Reporting or General Ledger (GL) teams.

Accounts Receivable Management is responsible for collecting all the payments from the clients and managing the incoming transactions. Accounts payable management handles all the payments and expenditures to the suppliers. Meanwhile, the payment operations team process and deliver payments via banking interfaces and manage bank reporting. The closing and reporting team ensures all transactions and events which have occurred are recorded and booked correctly, and the financial statements are performed appropriately according to standards.

The center provides specialized financial services expertise. The main objective is to support the company's business units and subsidiaries worldwide. Until now, the accounts receivable management team operates with nine units in total: Spain, United Kingdom, France, Italy, GmbH, Finland, Sweden, Norway, and Denmark. In this study, the author focuses on the GmbH unit in the receivables management team. This is the largest and the most complex unit of the whole financial services department.

Since the transition happened only in 2019 and during the corona pandemic time, the financial service department is still relatively new and young. Therefore, the commissioning company is pushing for improvements and developments in four teams to enhance the working process and

to ensure an effective and proficient operation.

1.6 Demarcation

The study focuses on the cash allocation process of the Accounts Receivable team, which is only a part of the overall responsibilities of the receivables team.

In this thesis, the author focuses only on the improvement of the repetitive, time-consuming steps which can be mimicked by robotic process automation within the cash allocation process.

Therefore, other required step such as handling deductions is not taken into consideration. The reason for this is that the concept of the deduction cases is quite complex. Thus, it does not fit into the characteristics of robotic process automation.

The project concentrates on finding the improvements and the proposals will be evaluated by the Team Lead of the Receivables Management team together with the Receivables Specialists who are working in the GmbH unit. Hence, the study does not include actual software interfaces or ERP systems. Also, the project does not include real data due to confidential policies.

2 Theoretical Framework

In this chapter, the author introduces the theoretical framework concepts which are applied to support the project. Firstly, the definition of accounts receivables and their importance are introduced. Next, an explanation of the cash allocation process is provided. Following, the author presents enterprise resource planning and robotic process automation. Finally, the theories of the Six Sigma methodology are carried out.

Yousem and Beauchamp (2007, 199) define accounts receivable as the financial record that tracks the invoicing and collection of payment from the customer for the product or services rendered. The amount of money received will eventually be converted into cash for the business, therefore, accounts receivable are considered as assets that are owned by the business.

Accounts receivable is a type of credit that happens when the firms sell goods and services and allow the customers to settle the payment later. Accounts receivable are current assets recorded in the balance sheet (Paul, Guermat & Devi 2018).

One of the main sources of cash flow is accounts receivable. The credit is held by other economic entities but belongs to the organization's property by right (Surikova, Kosorukova, Krainova & Rasskazova 2022, 1790).

Owuor, Agusioma and Wafula (2021, 81) conducted a study to find out how accounts receivable management affects financial performance. The result recommends that it is vital to develop sustainable debt collection policies and achieve collection within the shortest time, since neglecting in accounts receivable management can lead to an inverse effect on financial performance.

Holzhauser (2023, 239) describes accounts receivable management as trade credit that purchasing firm owes to a selling firm or a short-term loan that the selling firms lend to the buying firms due to the sale of goods or services without immediate payment.

From the above definitions, accounts receivables management is the credit that the sellers offer to the buyers in exchange for goods or services. It is an effective tool that allows the company to increase its sales and protect the buyer from having to pay in cash. Accounts receivable are recorded on the balance sheet under current assets since the credit is expected to be paid within a short period of time. Due to the importance of accounts receivable to the company's financial performance, companies are required to constantly manage and improve trade credits to generate more cash flow for the organization.

2.1 The Importance of Receivables Management

According to Salek (2005, 3), managing receivables activities is a process that involves staff skills, technology tools, company culture, and changing customers' and co-workers' behaviour and flexibilities. In business, companies sell goods and services in exchange for cash. In an ideal world, payment is made immediately at the time of a transaction. However, in practice, the buyers can pay by cash or credit. There are various reasons for this, for example, before making the full payment, it is important to verify that the purchase does not involve any dispute.

As stated by Beauchamp and Hurt (2007, 119), accounts receivable is a financial record that keeps track of the request and the receipt of payment for the goods or services provided, which will eventually be transformed into cash. Having more cash can help business to accrue interest and generate more opportunities for the organization. Therefore, practicing accounts receivables management is a key factor to ensure incoming receivables can be quickly liquidated into cash and increase assets as well as value for the business.

Cash is one of the most essential factors in any business. Positive cash flow supports daily operations and operating expenses such as payroll, rent, utilities, and so on. It also helps the company to grow and invest in future research and development. A company may struggle to secure financing or to respond to unexpected economic downturns or other unforeseen events which might impact the company's revenue (PWC, 2022).

For many companies, increasing revenue is crucial. However, revenue should be generated into cash to support the business's operations. Therefore, incoming cash or receivables must be collected accordingly to ensure the company's revenue and cash flow are well managed (Salek 2005,1).

Based on the Working Capital Study 22/23 report conducted by PWC (2022), working capital is becoming more essential than ever, due to the uncertainties of the current economic and geopolitical challenges. The impact of COVID-19 on the economy, followed by the increase in interest rates and inflationary pressure have caused companies to struggle with finding cheaper debt source.

Therefore, corporations are stepping up to respond to the challenges by protecting their cash flows and working capital. One of the notable components to tackle the issue is to focus on the performance of receivables' activities. The study found that sectors that experienced an

increase in net working capital days suffered a decline in return on invested capital. Thus, for many sectors, corporates are paying more focus to the improvements in receivables, which eventually drives positive impacts on overall asset days (PWC, 2022).

Hence, it is crucial and essential for companies to maintain an effective receivables process so that trade credits can be turned into cash as soon as they arrive. The faster the transaction is applied, the more working capital the company can receive to finance daily operations and business activities.

Although the receivables process has advanced a lot compared to the old time, there are still many challenges remaining that affect the efficiency and accuracy when allocating cash. Besides, there are also various repetitive tasks that are not practical. Therefore, automating the cash allocation process can play a big role in helping companies to improve not only the process but also the satisfaction of the employee and deliver better results to the whole business.

2.2 Sustainability in Accounts Receivable Management

Recently, sustainability has become the most discussed topic in the corporate world. Organizations are thriving towards being more sustainable by transforming their business activities to emerge with new trends and needs. The European Commission introduced the European Green Deal as an initiative to make Europe become a modern, resource-efficient, and competitive economy. In 2014, the EU introduced electronic invoices to ensure a smooth and efficient process of issuing, sending, and receiving invoices.

The adoption of eInvoice has helped to replace the traditional method, which is the physical paper forms. This act contributes to a better environmental impact and provides remarkable savings on human resources spent on manual work with the traditional invoice (European Commission, 2023).

To achieve the European Green Deal, companies are switching to eInvoice and adapting automation in various tasks. By using automation in accounts receivables, the cash allocation process is more efficient since it reduces the time spent on manual tasks, minimizes errors, and improves employee satisfaction. It also lessens the use of paper consumption and all the associated costs (European Commission, 2023).

Aigyl and Andrey (2019, 133) conducted a study about the impacts of accounts receivable on companies' financial sustainability. Based on the results, receivables turnover plays an important

role in the company's financial stability. Its acceleration increases the retained earnings for the company, which is also the source of revenue released that can help the company to surpass unexpected downturns.

Thus, improving the cash allocation process will bring sustainability to the company's financial stability. It is one of the most important tasks in receivables management that serves as the pillar for the company's working capital.

2.3 The Cash Allocation Process

According to Dun & Bradstreet (2023), cash application is the final step in the Order-to-Cash process. Cash application is considered as one of the most important steps. This process happens when the company receives the payment from the customer to offset their outstanding balance. This process is crucial since it confirms a successful sale.

Figure 2 below explains the typical Order-to-Cash process. The process starts when the customer makes an order. After receiving the order, the sales team creates a sales order in the order management system and contacts the receivables specialists to request for releasing the sales order before it is shipped. The AR specialists perform a credit management process to analyse the customer's financial health to determine if the sales order can be released. There are different platforms and systems to check credit information.

At Company X, the main platform is Allianz Trade Insurance Company and Dun & Bradstreet. This is where credit information and insurance coverage are stored. After checking the data, AR specialists need to make a logical decision regarding the credit terms and limits that align with the customer and their financial health. By performing a credit check, the company minimizes the risk of late payment or default.

Once the product is shipped, an invoice is generated and sent to the customer with all the necessary information about the order details. The information includes the contact of the billing and shipping parties, the name of the salesperson, descriptions of the product and its quantity, the price of the item before and after taxes, and the bank account information of the seller.

When the customer receives the order, they need to check to ensure that the condition of the product is as agreed. If there are disputes, the customer is obligated to inform the seller within the timeline written in the sales contract. Otherwise, the customer can proceed with the payments to settle the open invoice. Before the Order-to-Cash process can be completed, AR specialists apply the payment to the company's ERP system and reconcile it against the outstanding balance to

close the invoices and indicate a successful sale (Zeng, S., Melville, P., Lang, C.A., Boier-Martin, I. & Murphy, C. 2008, 1043).



Figure 2. Typical Order-to-Cash Process (Zeng, S., Melville, P., Lang, C.A., Boier-Martin, I. & Murphy, C. 2008, 1043).

As can be seen from Figure 2, cash application is the last step of the Order-to-Cash process, when the revenue is recognized and recorded. This step requires an intensive amount of manual work and often involves errors in accounts receivable management. Sometimes, the author spends a significant amount of time applying and reconciling payments, due to many incoming payments arriving daily in the GmbH unit.

The payments often arrive without remittance advice. Hence, the AR specialists need to undertake other necessary steps such as performing calculations to find out the correct invoice numbers or sending emails to the customer and asking for remittance advice. Unfortunately, remittance advice is not always included in the bank statement from the e-payment, this makes the process very time-consuming.

Besides, the cash application process can be highly prone to errors. For instance, when the invoice has the wrong digit and the payment is applied against the wrong invoice, the customer can be dissatisfied. This can lead to an unreconciled payment receipt and therefore, it is not fully applied, and the correct invoice remains as unpaid. Thus, it is very important to ensure the cash application process is performed smoothly and effectively.

2.4 Enterprise Resource Planning

Enterprise resource planning (ERP) systems are core software programs that are widely used in many organizations. Companies utilize ERP systems to coordinate and integrate information in every area of the business. The systems use a common database and shared management reporting tools to help organizations manage day-to-day business processes (Monk & Wagner 2012).

According to Oracle (2023), ERP systems are integrated platforms in the cloud or on-premises that manage and support all areas from human resources, financial management, and supply chain management to manufacturing of core accounting functions. The systems help businesses to keep track of all aspects to deliver transparency and act as a centralized hub that allows a variety of departments to access end-to-end workflow and data. ERP can be customized to make it suitable to the industry of the business and can be tailored depending on the size of the enterprise.

By implementing ERP systems, companies can optimize their business processes and transactions. The concept and systems of ERP are widely acknowledged as a practical solution for achieving integrated information systems across enterprises (Moon 2017, 235).

Companies use ERP to “collect, correlate, track and aggregate electronic transactions quickly and easily”. The systems can improve organizational efficiency and effectiveness and reduce the organization’s transaction costs. It can be valuable operational expertise for the company (An 2010, 235).

A study was conducted by Spathis and Constantinides (2004, 243) to learn how adopting ERP systems can impact the accounting process. The study suggests that companies implement ERP systems to keep themselves up to date with the competitive environment. ERP helps the organization to get real-time information that is useful for decision-making to form necessary and strategic moves. Companies that integrate accounting applications acknowledge the flexibility in generating information, improving the quality of financial reports, and making decisions based on timely and reliable accounting information.

The commissioning company uses Oracle E-Business Suite as the ERP system for the day-to-day business. The Oracle Receivables enables the company to increase cash flow, minimize bad debt, reduce operating costs, and shorten the credit-to-cash cycle. Besides, the systems’ functionality helps to simplify the cash application process by allocating and monitoring the workload of receipt efficiently (Oracle Receivables, 2020).

2.5 Business Intelligence

Along with the growth of businesses, large corporates need to process huge amounts of data to make critical decisions. To keep up with the competitors, big companies constantly find ways to leverage their unstructured data. In the old days, it was difficult and challenging for organizations to integrate data from various sources and combine them in one place.

Moreover, managers had to wait relatively long for the reports before they could review the data to generate decisions. With the help of business intelligence, data can be presented in different forms such as graphs, charts, maps, and many more. By using BI, companies can boost productivity and give predictive analysis based on the visibility of the processes. The tools can collect data from various resources and integrate them into different visual information to help organizations identify errors or find the root causes of inefficiency and act accordingly.

Olszak and Ziemba (2007, 15) define business intelligence as a mix of concepts and technologies that provides real-time data and information which can help managers to make decisions while generating added value to the business and supporting fundamental changes and new collaborations.

Fitriana, Eriyatno, and Djatna (2011, 96) explain business intelligence as “a process for extracting, transforming, managing and analysing large data by making a mathematical model to gain information and knowledge to help to make decisions in the complex”.

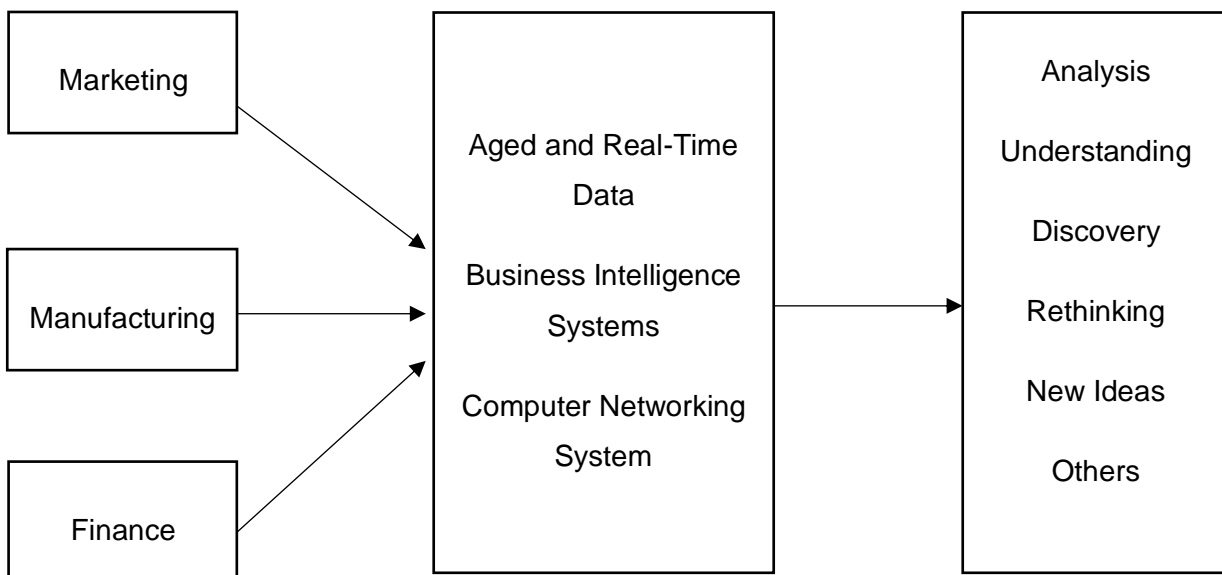
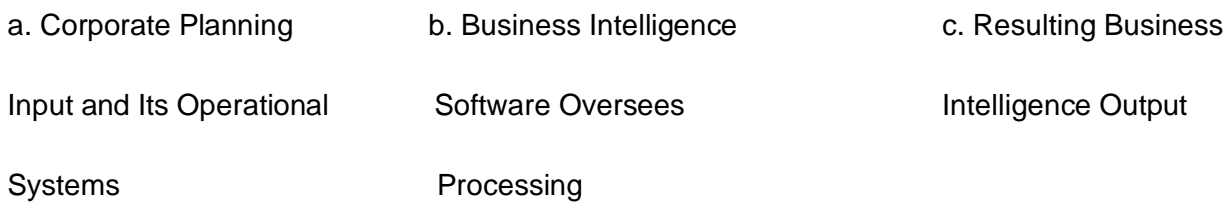


Figure 3. An Effective Business Intelligence System Framework for a Typical Company (Adaptive from Thierauf 2001, 5)

As can be seen in Figure 3, corporate planning is responsible for managing the primary operational departments within a typical company by applying an effective business intelligence system framework. By using BI software, corporates can process and manage aged and real-time data through computer networking systems. After retrieving the data, decision-makers study the results to understand, discover, rethink, and generate new ideas to improve the area (Thierauf 2001, 5).

It is important that BI applications retrieve the most accurate data to store in databases so that statistical inferences are made correctly. From there, decision-makers analyse the available data to formulate decisions and forecast trends that can generate benefits for the business (Hedgebeth 2007, 416).

2.6 Robotic Process Automation

In recent years, the term robotic process automation (RPA) has become more popular in the corporate world. Technology has been used in many aspects to support workers with their tasks. RPA is “designed to automate tasks which are performed by human on desktops”, specifically the ones that are “high volume, repetitive and tedious” (Mahey 2020, 3).

The technology functions by using a software agent called “bot” that can mimic the manual inputs through “a range of computer applications when performing certain tasks in a business process”. These tasks are typically well-structured and rule-based (Syed & al. 2020, 3).

There is no denying that such tasks tend to exhaust the employee and demotivate them since the characteristics of the task are relatively unattractive. Therefore, this is where RPA can be applied to automate these repetitive tasks so that the employees can focus on tasks that are more interesting and challenging. Besides, RPA can perform tasks faster and more accurately than humans.

The developer needs to understand the process and the necessary skills to write the correct code line and to build the solutions with traditional software development. This requires a significant amount of time to learn and master the skills. The whole process can be very time-consuming and inefficient. However, one does not need to know how to code when using RPA. The users only need to understand how the application functions and teach the bots how to perform the tasks by using “pre-defined drag and drop commands” or by “designing a workflow” (Mahey 2020, 3).

The user does not have to build or create new costly stages, since RPA is programmed on existing frameworks (Sadaf, S., Rana, A. & Pathak, A. 2021).

Cooper, Holderness and Wood (2019, 1) conducted a study to investigate the adoption and the use of RPA within the accounting profession. The authors indicate that shared services and global business services leaders rated RPA as the top technology-related priority within the next ten years.

According to Deloitte (2016), RPA follows simple rules by mimicking the way people use applications and automates routine tasks such as processing orders, gathering, and comparing data, etc. The technology is also an alternative solution to the implementation of a new business process management system or an enterprise solution.

Corporates can use RPA to perform manual, repetitive processes across several systems, without having to invest substantially in redesigning processes associated with large-scale IT initiatives (Deloitte 2016).

Mahey (2020, 4) presents a list of tasks that can be automated by RPA:

- Opening emails and attachments
- Copying and pasting
- Following "If/then" decisions/rules
- Making calculations
- Logging into web/enterprise applications
- Filling in forms
- Collecting social media statistics
- Connecting to System APIs
- Reading and writing to the database
- Moving files and folders
- Extracting structured data from documents
- Scraping data from the web

2.6.1 Benefits of RPA

According to Syed & al (2020, 3), RPA provides various benefits to corporates. The technology helps to improve the efficiency of operations as well as the quality of work produced. It is easy to implement and integrate with other systems. Besides, RPA also helps to improve compliance and risk management.

As mentioned above, RPA mimics and automates repetitive, tedious tasks which do not require a lot of mental effort, human can spend their time in tasks that require intellectual analysis or creative thinking. Instead of taking over human jobs, bots can support tasks that are time-consuming and have less contribution to the workflows such as pre-processing information or collecting documents.

Although RPA is an advanced technology, it still requires human-robot interaction, since it is not able to handle exceptional cases which require some situational decisions or cognition. Therefore, humans have to step in and manage these exceptions to ensure the tasks are performed correctly (Hofmann, Samp & Urbach 2019).

There are several benefits that automating cash allocations can provide to the process. The first advantage is to increase the efficiency. By automating the process of cash allocation, the team can eliminate manual data entry, and reduce errors.

Besides, it helps to ensure accuracy and consistency in the allocation of cash and minimize the risk of misallocations. Another benefit is time-saving since automation can complete the process quickly. This provides faster access to funds and improves cash flow.

Cash allocation automation also helps to save costs, because organizations can reduce labour costs associated with manual activities, which might delay the allocation process. When an allocation is performed by automation, it provides transparency by allowing stakeholders to view the allocation process and ensure that cash is allocated according to guidelines. In terms of audit trail, automation allows easy tracking of transactions and makes sure the process complies with regulatory requirements.

3 Project Management Methodologies

In this chapter, the author introduces the chosen methodology for the study, as well as provides an explanation of why this particular method serves the purpose of the project. The first part is the definition of the Lean Six Sigma Methodology and its characteristics. After that, the author defines the stages of the project by using five basic phases of the Lean Six Sigma Methodology: Define, Measure, Analyse, Improve, and Control.

3.1 Lean Six Sigma Methodology

Lean management was being used by Toyota Motor Corporation to drive its production system for over three decades. The lean design encourages the removal of unnecessary waste and activities that do not add value to the process (Freire & Alarcón 2002).

Cohen (2018) indicates that the lean method focuses on studying a process to eliminate or reduce the steps that do not provide added value to satisfy the customer's needs. The lean strategy aims to achieve high responsiveness to customer demands, while minimizing human effort, inventory, space requirements, and time consumption to develop products. It helps to produce top-quality products in the most efficient and economical way (Karim & Arif-Uz-Zaman 2013, 170).

According to Patel and Patel (2021, 632), Six Sigma is a metric, a methodology, and a management system that computes the measure of performance to identify the extent to which a process fulfills its criteria.

Atmaca and Girenes (2013, 2018) illustrate the combination between Lean Management and Six Sigma as a successful methodology that can deliver the best results when implemented together. While Lean Management concentrates on removing unnecessary costs and delays in processes, Six Sigma enhances the effectiveness of every step that adds value. This method can be implemented in various business areas.

LeMahieu, Nordstrum and Greco (2017, 78) explain the concept of the Lean approach and Six Sigma as “involves decreasing variability or unreliability in organizational work processes; eliminating waste or activity that does not add value to outcomes; identifying defects and decreasing their incidence; reducing the cost of work processes; and improving beneficiary/client satisfaction levels”.

The author decided to choose Lean Six Sigma as the method for this study since the aim of the project is to improve the cash allocation process, and Lean Six Sigma aligns with this objective. Adapting from the above definitions, Lean Six Sigma can be understood as the improvement method which can help to identify the activities that do not add value to the allocation process. It diagnoses the defective areas that need improvements and minimizes the incidence. Through this, the company can find solutions to reduce the cost and time spent on the process, measure the performance, and thus, improve the satisfaction levels of all the stakeholders.

Selvi and Majumdar (2014, 17) illustrate the five phases of DMAIC below:

- Define the problem to find opportunities for improvement and establish the project goals.
- Measure the performance of the process.
- Analyse the process to identify the defects or the root causes of the poor performance.
- Improve the process by identifying and eliminating its underlying causes.
- Control the improved process and monitor its future performance.

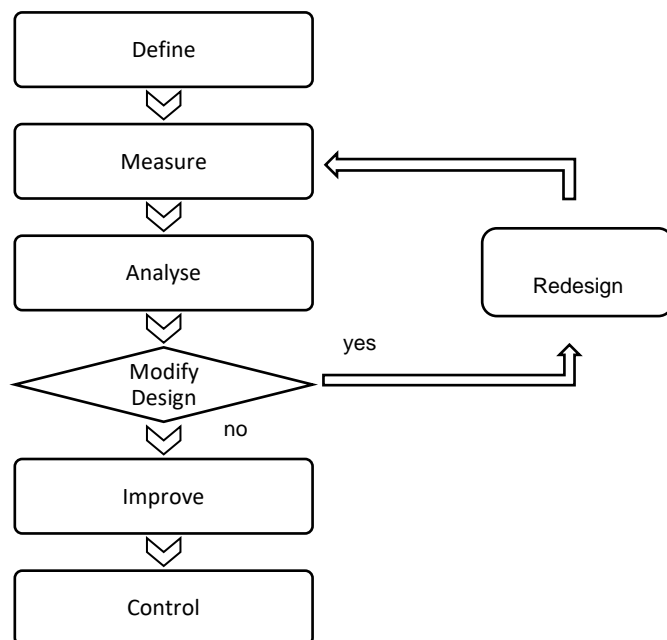


Figure 4. DMAIC process adapted from Selvi and Majumdar (2014,17).

3.2 Defining Project

The thesis project's research and implementation are planned to last for eight months. The project is executed by the author of the thesis, together with the cooperation of colleagues from the receivables team, the financial services development team, and the payment operations team. The author is responsible mainly for researching and investigating the process to identify areas of improvement, while other colleagues oversee programming robots and making the changes according to the findings.

The project is expected to last until August 2023. This timeline was chosen because all the project participants are required to carry out their daily job responsibilities in addition to the development project. The main costs of the project consist of labour costs and the RPA system license.

Following the chosen methodology, the author applies DMAIC process of Six Sigma to create a project plan for the study. The project is divided into five phases as adapted from the method: Define, Measure, Analyse, Improve, and Control.

Table 2 below presents the five phases of the project plan according to DMAIC process. The project starts by defining the objective of the study, which is to study the potential improvements for the current cash allocation process. The used tool is the project charter which helps to indicate a whole picture of the project, such as project name, participants, project goals, time, budget, etc (Appendix 3).

In the measuring stage, the author executes the actual process in the ERP system to collect necessary data from the current process to measure the baseline performance. The author creates a data collection plan to determine which areas need to be evaluated. The data collection plan is generated by measuring the results of the current baseline process and its capability. The author conducts the study by performing the daily cash allocation process. During the study, the author records all the steps that happen within the process.

After the data is collected, they will be analysed and validated to identify the causes of the problems. The author designs a process flow chart to get a clear picture of the current process, determine the critical factors, detect the issues, and recognize the areas that need improvements. The flow chart contains all the steps needed to match open invoices against payment receipts. These activities are executed in the analysing phase.

Once the process has been analysed, the author identifies the issues which are causing ineffectiveness and discovers the waste that can be eliminated to streamline the process. This is the improvement phase of the project. After the issues have been recognized, the author proposes

solutions that can help to improve the process. The solutions are then presented to all the project members to gather more input.

Since the development team is responsible for building the RPA, it is important to explain thoroughly all the steps in the cash allocation process to the team, including showing the repetitive activities which can be replaced by robots. Besides, the author creates a sample dashboard to introduce which information should be included in the BI dashboard. The information is essential for the AR specialists to monitor the cash application situation so that necessary actions are carried out in time. These activities are done in the improvement phase.

In the controlling phase, which is also the last phase of the study, the author proposes a control mechanism to ensure the improvements are sustainable. The tool for this phase is to ensure that there are standard work instructions to guide the specialists on how to give the command to the robot so that it can execute the order. It is also necessary to provide basic RPA knowledge to the AR specialists and if volunteered, the specialists can learn to build the robot by themselves so that they can modify the robot according to their needs.

	Define	Measure	Analyse	Improve	Control
Step	- The current cash allocation process needs improvement due to many manual, repetitive steps.	- Collect data from the current process to measure and understand the baseline performance of the process	- Identify the potential causes of the problems and validate them to find areas that need improvements	- Develop solutions and formulate an implementation roadmap based on the identified solutions	- Propose a control mechanism to sustain to the improvements
Tools	- Project charter - Project team - Project goals	- Data collection plan	- Process flow chart	- Identify waste and issues	- Standard work instructions
Deliverables	- Project charter created - Project team formed - Project goals defined	- Data collected & validated - Baseline performance measured, and process capability evaluated	- Issue identified - Critical factors identified	- Future solution designed - Solutions selected - Pilot dashboard conducted	- Standard work instructions created

Table 2. Five phases of the project plan according to DMAIC.

4 Cash Allocation Process at Company X

In this chapter, the author briefly introduces the tasks of AR specialists and the current cash allocation process which is being executed in GmbH and GmbH Principal units at company X.

4.1 Receivables Management Tasks in GmbH and GmbH Principle

Currently, there are three team members who are handling GmbH and GmbH Principal units. The tasks of AR specialists are divided into three categories:

- Daily tasks: Consists of tasks that need to be done daily. The tasks include allocating payments, invoicing, credit controlling, maintaining customer accounts, following up overdue invoices, contacting clients for payment solutions, recording, and reconciling payments, and assisting with debt collection.
- Development tasks: Participate in development projects to improve the receivables process.
- Month-end closing activities: Perform necessary tasks to ensure month-end activities can be carried out in time, generating AR reports.

In this study, the author focuses on researching the process of cash allocation. This is a repetitive task with a high amount of workload that needs to be performed daily. Therefore, being able to improve this process can generate significant benefits for the receivables team, including improving efficiency, shortening the liquidity process, increasing the satisfaction of the employees and the clients, and creating sustainability in the long term.

4.2 Current Cash Allocation Process

The author divides the cash allocation process into two phases: The payment uploading process and the cash allocation process. The cash allocation process requires input not only from the Accounts Receivable (AR) management team but also from the Payment Operations (PO) team. The cash allocation process can be performed by both teams.

However, there are still some differences to distinguish which payments can be handled by PO specialists, and which payments require AR specialists' input. The cash application process can be conducted by using an Oracle AR system, or by banking gateway APRO.

The author clarifies the difference between matching payments in the AR team and the PO team in the following chapter. By studying the steps taken by both teams, the author gets a clear picture of the whole process from start to finish. This not only helps the author to identify critical factors which are affecting the cash allocation procedure but also to avoid neglecting any potential steps that can be improved.

4.2.1 Payment Uploading Process

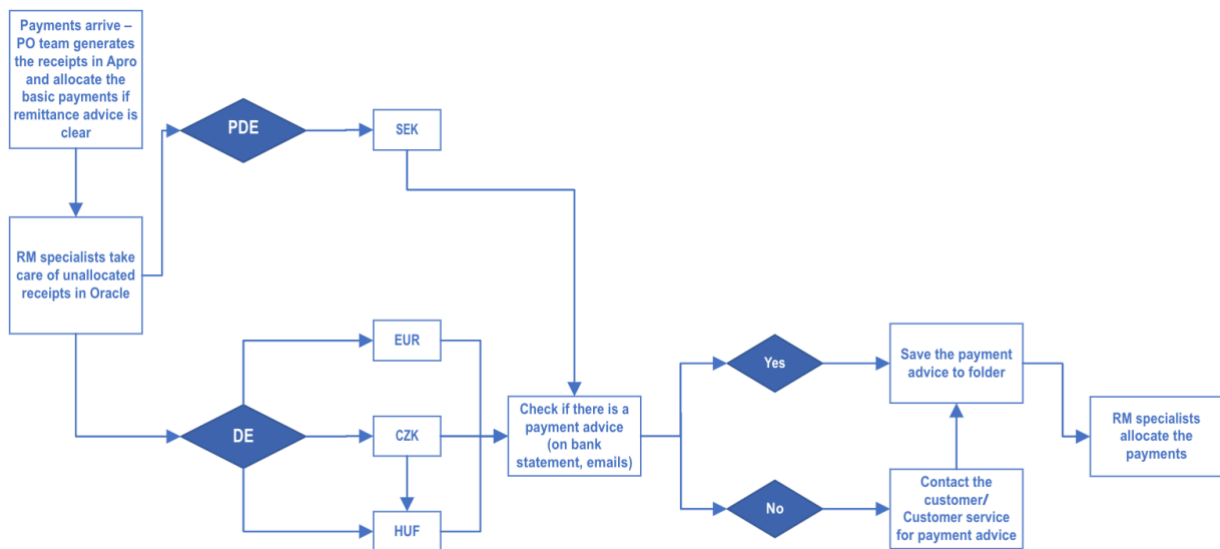


Figure 5. Payment arrival process for GmbH unit at Company X

Figure 5 explains the process when the payment arrives from the customers to the company's bank account. As can be seen from the figure, the payments are divided into two entities: PDE which stands for GmbH Principal, and DE for GmbH. GmbH Principal is a branch of the GmbH unit. The payment operations team is responsible for all the activities which are related to payment processing, from incoming payments to outgoing payments.

Once the customer has made the electronic payment and the money arrives in the company's bank account, the payment operations team will identify the transaction using the bank statements. Based on the information, PO specialists identify, exclude irrelevant transactions, and assign the payments to the right customer's account.

Sometimes, the bank statement provides information that contains the invoice number that the customer included in the payment receipts. If the information is clear, the payment operations team allocates the invoice directly in APRO. The payment operations team generates all payments into different receipts and uploads them to the Oracle AR system. After that step is done, the receipts are shown in Oracle, and the receivables team continues to allocate the remaining open receipts.

According to Accountingtool (2023), remittance advice is a document established at the initiative of the utility, which indicates information about what was paid. Based on the remittance advice, the supplier can allocate open receivables in its accounting system so that the open invoices are marked as paid. A remittance document is very helpful in the cash allocation process. Sometimes, a payment with high value can contain a large number of paid invoices, which makes it challenging to determine which invoices are included in the payment.

Usually, the remittance advice is sent as an attachment in an email. In the GmbH unit, the payment advice can be sent directly from the customer's email account, or via an intermediate bank which the customer uses to transfer the payment. If the remittance advance email arrives before the payment, specialists save the advice in a shared folder. However, it is very frequent that the payments come without the payment information. In this case, AR specialists need to contact the customer to ask what was included in the payment.

4.2.2 Payment Matching Process

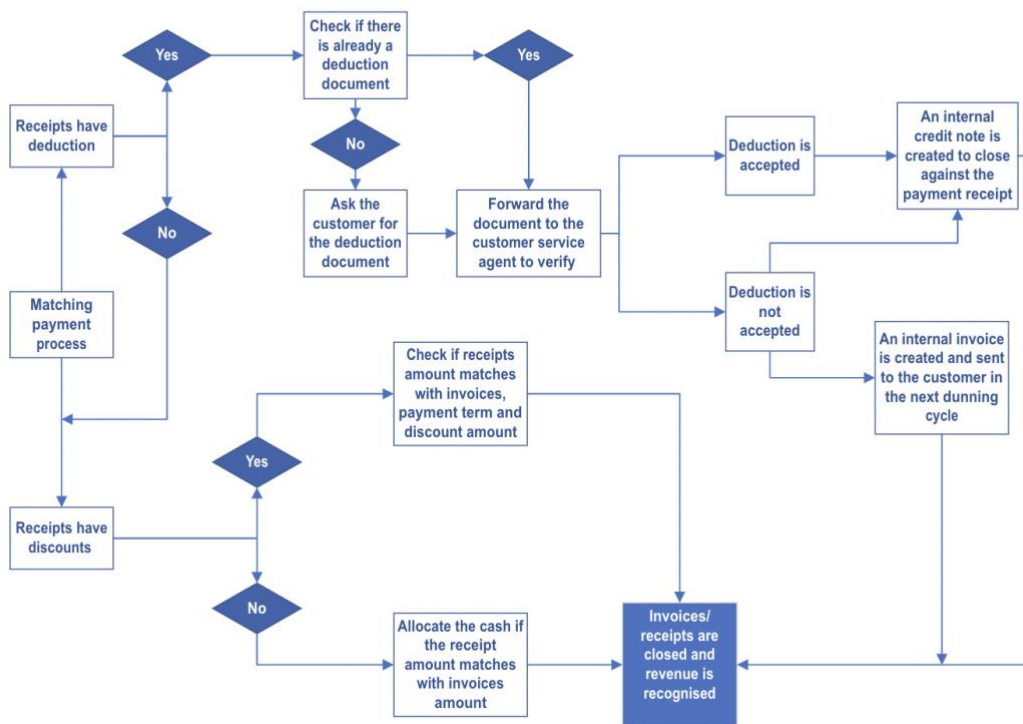


Figure 6. Matching Payments Process in GmbH unit at Company X

After the receipts are uploaded into Oracle AR, AR specialists check the unallocated transactions and find the corresponding invoices to match them. If the amount of the payment is high, it usually indicates that the payment contains many invoices. In this case, a remittance advice is used to ensure the accuracy of the allocation. When matching a payment, AR specialists need to pay attention to the amount of the invoice, the discounted value, the deduction value, the cost of bank charges, and the profit earned/lost from the exchange rate.

The ERP system is designed to identify which invoices belong to a specific account, this means that if an invoice from another customer is applied to the receipt, the system will not recognize the activity. This helps to eliminate the risk of mismatching. Once the invoice is matched against the receipt, the system shows the original value of the invoice, the applicable discounted value, and the actual applied amount.

Currently, the process is quite tedious and ineffective. The AR specialists need to copy the invoice number from the payment advice and paste it into the receipt on Oracle AR. If the payment does not contain any discount value or bank charge, the AR specialists can close the invoice

immediately. However, if there are other values to be considered, the AR specialists have to ensure that the customer has taken the correct discount term.

During the Order-to-Cash process, there are various risks that can happen to the sales order before it reaches the customer. A deduction is made when there is a dispute in the sales order. For instance, the order arrived with short quantities, an incorrect price, or the wrong product was delivered. When this situation happens, the customer deducts a partial amount from the total price of the order to compensate for the dispute. This process is called deduction.

Usually, the deduction document is sent to the mailbox of the AR team before the next payment arrives. Another way is to see the deduction amount in the remittance advice. However, if the invoice number of the deduction is missing from both the deduction document and the remittance advice, then AR specialists need to send an email to the customer to ask for the deduction document.

A deduction document contains information about the sales order, the reason for deducting, and the customer's profile such as the customer's name, address, etc. However, for big customers, each of them can have multiple accounts in the ERP system. Therefore, AR specialists have to ensure that the deduction is booked to the correct account.

For now, the only way to check for the correct account is by searching for the customer's name in the ERP system and looking for the address that is shown in the deduction document. Once the correct deduction is provided, an AR specialist forwards the deduction information to the customer service team to clarify the authenticity of the deduction.

If the deduction was correctly drawn, the customer service agent creates a credit note corresponding to the deduction amount and informs the AR specialist so that the remaining open receipt can be fully closed. If the deduction is not justified, the customer cancels the deduction from their side and sends a cancellation document. In this case, an internal invoice is created and sent to the customer so that they can pay it in their next payment. There have been a few times when the customers deducted very small amounts, sometimes even less than one euro.

In general, the cash application process is considered the most repetitive and time-consuming process for AR specialists. Sometimes, it can take several days or weeks to close the payment due to the complexity of the process. Therefore, it is crucial to improve the process to save time and resources so that AR specialists can dedicate their effort to more cognitive tasks.

4.3 Current Challenges and Complications

In this chapter, the author introduces three areas that can be improved in the cash allocation process. The first one is the complication to follow up and keep track of open cash receipts in the receivables management. The second challenge is the process of saving remittance advice attachments. Lastly, the author describes the manual task when copying invoices to clear a receipt.

4.3.1 Tracking Open Cash Receipts

In GmbH and GmbH Principal, there are a lot of incoming payments arriving daily. If the payment is clear, it can be closed easily against the open invoices. However, there can be a lot of complications in the payment, for example, wrong digit number in the invoice, lack of payment advice, mismatch with the discount term, etc.

In this case, the AR specialists need to contact the customer to ask for more information. In the meantime, the cash receipt is opened and booked with an “On account” status. “On account” is a clearing account or open items account specially created for miscellaneous payments, or payments that cannot be cleared.

By booking the open receipts into “On account” account, the payments are cleared from the unapplied payments list. The reason for performing this step is to ensure that all the clearing items are shown in the system and reported correctly by the end of the month when the company needs to perform month-end-closing activities.

It is critically important to close the overdue open items as soon as possible since they have a direct impact on the receivables reports and aging reports. If the items are not closed on time, it can also affect the customer’s credit report. For instance, if the customer transfers to pay for the invoices, but due to some complications, the payment and the invoices cannot be offset on time, then the invoices are considered as overdue items.

In the Oracle system, it is designed so that once the customer’s credit limit is enough to cover the value of the sales order, the system automatically releases the order’s hold. However, if there is a past-due item, the system will not release the sales order, and the AR specialists need to spend more time investigating before releasing the order. This can lead to delays in deliveries even though the customers are up to date with their payments. Furthermore, it can prevent the customers from being able to order more purchases which then affects the company and also the customer’s business.

Currently, AR specialists can keep track of open cash receipts by downloading an open items report from Oracle AR. The reports present all the open transactions and items which include invoices, cash receipts, credit memos, and chargebacks.

Although the report can be retrieved from the ERP system, it needs to be extracted and modified in Excel before the AR specialists can get the list of open items. The process is simple but can be time-consuming and inefficient. Besides, it is not easy to follow up on the open items since they are shown as “already applied” once they are put as “On account”. The AR specialists can unintentionally overlook the open items which can stay as open for a long period of time.

4.3.2 Saving Remittance Advice Attachment

As mentioned above, saving remittance advice attachment task is one of the steps in the cash allocation process. The remittance advice is always sent as an attachment via email. There are multiple senders who are responsible for providing the remittance advice. They can be sent directly from the customers, the customer service agent who is in direct contact with the customer, or the respective banks that handle the payment transactions.

The advice document can have different formats, for example, in PDF, Excel, scanned format, or even a picture. Once the remittance advice arrives, the specialists name it by the total amount of the payment followed by the name of the company and save it in a SharePoint folder.

Daily, there are many remittance advice sent to the mailbox. Although the process is simple, it is time-consuming when the amount is high. For instance, on average, each payment advice takes two minutes to complete the process. However, the volume of incoming emails for this purpose is around ten to fifteen emails per day per unit. There are multiple units in the AR team, therefore, the amount of payment advice emails can be challenging for the AR specialists.

Sometimes, the email can be missed or mixed up with other emails, because they arrive in the common mailbox of the receivables team. When this scenario happens, the AR specialists might think that the advice was not sent, and thus, send an email to the customer to ask for the advice document. This will create more unnecessary time to allocate for the tasks.

4.3.3 Manual Invoice Matching

Once the payment receipts are generated and loaded into Oracle, the AR specialists identify which invoices are included in the payment and apply the invoice to close the open receipt. When the payment is straightforward, the task does not take so much time. However, some payments can contain up to a few hundred invoices. In this case, the AR specialists need to retrieve the invoice numbers from the remittance advice and copy them manually to Oracle.

Previously, one payment could take up to several hours to proceed, because it contained up to a few hundred invoices that needed to be copied one by one to the system. Later, a macro Excel file was built to speed up the process. “A macro is an action or a set of actions that you can use to automate tasks” (Microsoft 2022).

The macro was automated to perform the copy-paste task. Nevertheless, the AR specialists still need to ensure all the invoice numbers are modified in the macro file before giving the command to the function. As mentioned above, remittance advice can come in PDF format. Hence, they need to be converted into Excel before transferring to the macro file.

Furthermore, a macro file does not integrate with other products which are outside the Microsoft Office suite. Hence, if the process requires a combination with another non-Microsoft Office program, using macro alone cannot solve the issues.

Sometimes, the customers send the remittance advice under the scanned format. In this case, it is not possible to convert the payment advice into Excel format. Hence, the AR specialists need to manually type each invoice number into the receipt to match them against the payment.

5 Solutions for Improvement

In this chapter, the author introduces the solutions for improvements to the potential tasks. Firstly, the team can consider building dashboards by using business intelligence systems to make it easier to keep track of the cash application status. The second solution is to implement automation that can automatically save the attachments of the payment advice to the designated shared folder. The last proposal is to use RPA to detect the invoice number from the attachment and match it against the receipts to minimize the manual workload.

5.1 Oracle BI

There is multiple software that provides business intelligence tools to support day-to-day business activities. Since the commissioning company is using Oracle as their ERP system, Oracle Business Intelligence can be chosen as the business analytics software.

Oracle BI offers a variety of BI services that provide an integrated array of tools such as reporting, analysis, data integration, and management, alerting, category-leading financial performance management applications, and operational BI applications (Oracle 2023).

Oracle BI Dashboards allow the users to view live data reports which are displayed in charts, graphs, tables, and graphics in a Web architecture. The user can create new dashboard pages or modify the existing ones. Besides it is possible to perform drilling and navigating with the results. Oracle BI Dashboards can gather and consolidate information from a diverse range of sources such as from the internet, shared file servers, or repositories of documents (Oracle 2023).

Furthermore, it is possible to navigate the displayed results to view the desired data. All the information is collected from the actual ERP system and is updated constantly. For example, when a payment is closed in Oracle, the result is recorded and renewed in Oracle BI so that the users can always get the latest information.

By using Oracle BI, the commissioning company can save a lot of time to acquire, integrate, distribute, review, and respond to new data. The faster a business reacts to data, the more advantages they can gain from those in-time data to make the correct decision and deliver efficiency to the organizations. The AR specialists can build their own dashboards to monitor and gain better visibility into the current situation of the cash application process. Hence, the specialists can identify and reduce inefficiencies or follow up on the unapplied cases which are accidentally neglected.

Besides Oracle BI Dashboards, Oracle BI (Oracle 2023) includes other services:

- Oracle BI Server: Offers centralized data access and calculation.
- Oracle BI Answers: Provides true end-user ad hoc capabilities.
- Oracle BI Delivers: Helps to monitor and alert users via multiple channels.
- Oracle BI Publisher: Offers efficient reporting solutions for distributed environments.
- Oracle Real-Time Decision Server: Combines rules and predictive analytics for decision management.
- Oracle Scorecard and Strategy Management: Provides the framework to define strategic goals and objectives for the enterprise.

5.2 Building BI Dashboards to Monitor the Cash Application Process.

Currently, the receivables management team does not have the tool to monitor the latest situation of the cash application process. Because of that, it is time-consuming for AR specialists to retrieve the latest data from the customer's account to detect unapplied receipts.

As previously stated, using BI systems can help the AR specialists to track and analyse the metrics at a glance and therefore, not miss out on the unapplied receipts which are in the "On account" status. Moreover, it is common to underestimate the number of open receipts if they are not visible to the AR specialists.

Below, the author built a sample of a cash application dashboard using Excel tool and summarized a list of the necessary information that can be helpful to monitor the process. The purpose of the dashboards is to collect all the latest data on Oracle and display them under different graphs, charts, and tabular formats so that AR specialists can understand the full picture of the situation.

Figure 7 displays an example of a pie chart that shows the transaction status of the receipts. In total, there are five transactional statuses:

1. Fully applied: Indicates the receipts that are fully allocated and closed.
2. Partially applied: Indicates the receipts that are partially allocated and are still in progress.
3. Unapplied: Indicates the receipts that have not been applied.
4. Unidentified: Indicates the receipts that are not able to allocate due to different issues.
5. Remitted receipts: Indicates the receipts that are created for direct debit payment, but the money has not arrived.

The data can vary depending on the chosen period. For example, AR specialists can choose to view the receipts in a specific time range. The dashboard provides a quick overview and resolves a large cache of receipts at one place with sort and search capabilities. It is recommended to try to maintain a good ratio between unapplied and applied receipts to ensure sustainable cash flow.

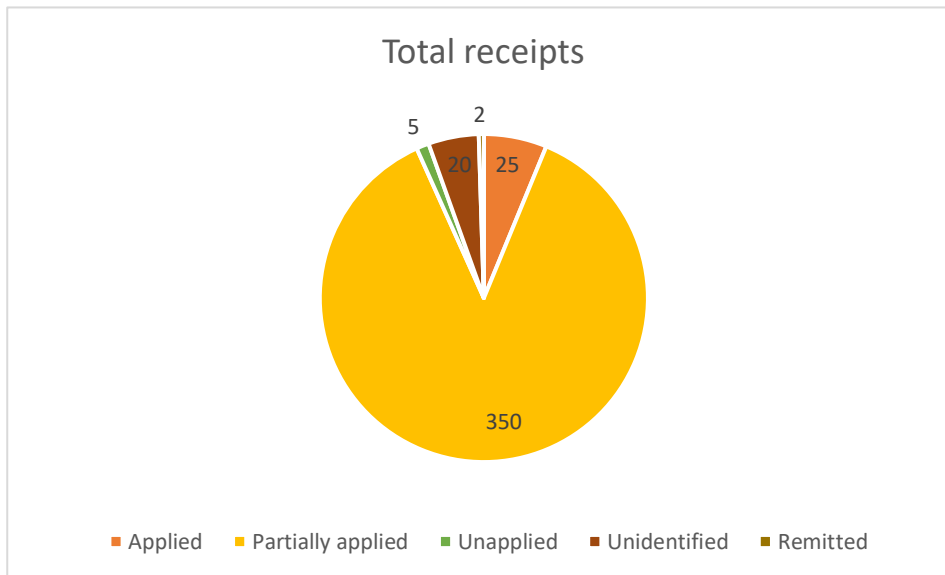


Figure 7. The pie chart displays the receipts' status.

Firstly, the AR specialists select the unit (1) that they want to view from the unit section, choose the appropriate date range (2,3), then click Load Transactions (4). Once loaded, the transactions are displayed in both graphical and tabular format with the following information:

- Receipt number: The unique receipt number that distinguishes between the payments.
- Transaction date: The day the payments arrived and were loaded into the ERP system.
- Receipt currency: The currency of the payments.
- Receipt amount: The amount of the transaction.
- Applied amount: The amount that has been allocated in the receipt.
- Unapplied amount: The amount that has not been allocated in the receipt.
- Receipt status: Indicates the current situation of the receipt.
- Customer number: Customer's information.
- Customer name: Customer's information.
- Status reason: Shows the comments to explain the reasons for the receipt's status.

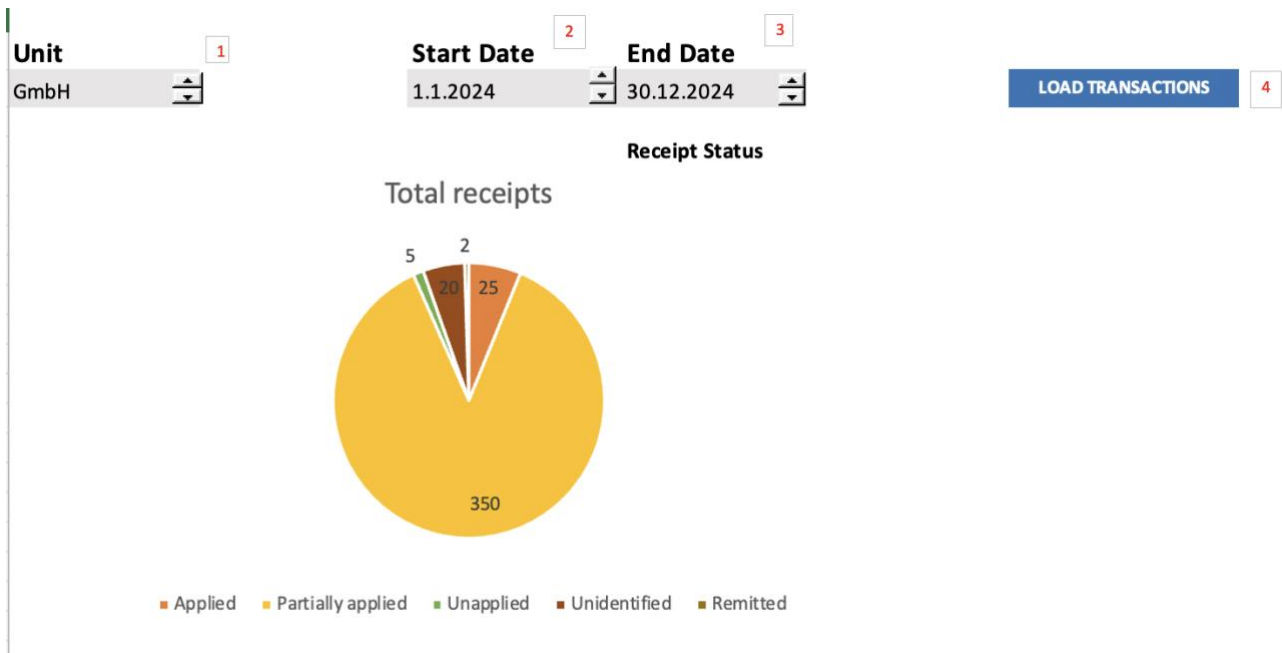


Figure 8. The dashboard provides an in-depth display of the cash application situation.

As stated in Figure 8, the users can click on the edit button (5) to change the dashboard to edit mode and update or change the contents of the fields, for example, currency, amount, or customer. The refresh button (6) allows the users to refresh the dashboard to bring it back to the original search results. If the viewers would like to view more transactions, they can choose the number of entries by changing the show entries (7) field. Lastly, the search function (8) allows the users to perform a quick search based on alphanumeric strings, customer numbers, or customer names.

Besides the pie chart, a tabular format is created to deliver in-depth information on the receipt.

Figure 9 is an example of what types of information can be useful for AR specialists.

5 EDIT
6 REFRESH
7 Show 10 entries
8 Search:

Receipt No.	Transaction Date	Receipt Currency	Receipt amount	Applied amount	Unapplied amount	Receipt status	Customer number	Customer name	Status reason
100001	4.10.2024	EUR	100	100	0	Fully applied	100523	Mass Limited	
100102	5.10.2024	SEK	233,2	100	133,2	Partially applied	145112	Ordinary	
100203	6.10.2024	HUF	405	0	405	Unapplied	169854	Remo Limited	
100304	7.10.2024	CZK	1005	55	950	Unidentified	112234	Reko	
100405	8.10.2024	EUR	700,6	0	700,6	Remitted	103232	EAM	

Figure 9. Information of the payment receipt.

The cash application dashboard supports AR specialists to monitor the situation with up-to-date information. It enables the members to quickly address the situation by looking into the status of the exceptional cases. By reacting promptly, the AR specialists can minimize customer account

delinquency, ensure the overdue invoices are closed on time and release the customer's credit limit.

The dashboard also helps the AR specialists to have a user-friendly experience and easy-to-use interface to review the data. Figure 9 displays the status of the payment receipts. The users can view all the relevant information to help them have a general overview of the current situation.

Moreover, the users can also view the top customers with the most unapplied receipts through a column chart which is displayed next to the pie chart. This allows the AR specialists to pay more attention to the customers who often have complexity in their payments and investigate what can be the root causes.

Top unapplied receipt customers

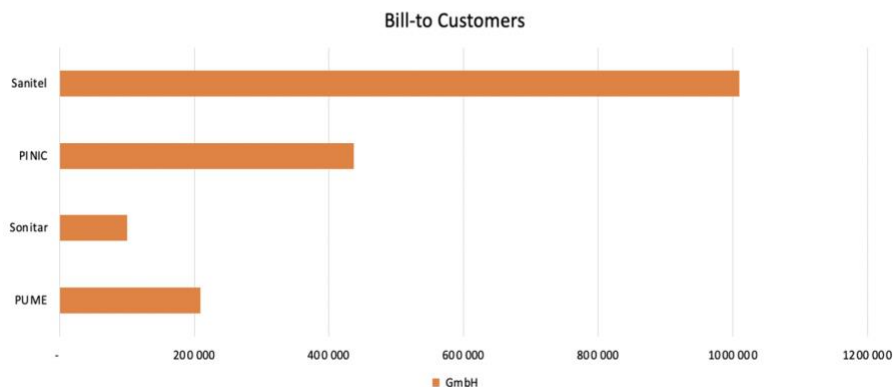


Figure 10. Top customers with high unapplied receipts.

5.3 Using RPA for Repetitive Tasks

As explained above, RPA is an ideal solution to replace repetitive, time-consuming tasks. In this study, the author introduces UiPath technology that can be used to improve the current process.

5.4 UiPath Technology

UiPath is a technology company that provides software to help company automate their process. It is headquartered in Burcharest, Romania. The company was launched in 2005 with the goal to create automation libraries. UiPath has grown significantly since then and becomes one of the

leading technologies in RPA. Today, UiPath has a Business Automation Platform that allows everyone to be involved in building automation processes (UiPath 2022).

The company has offices in multiple cities worldwide, such as London, Bucharest, Tokyo, Paris, Singapore, Melbourne, Hong Kong, and Bengaluru. With the growing demand for automation, UiPath's technology is being used by clients from all over the world. The company has achieved remarkable growth in terms of workforce and revenue. Its technology is widely applied in different industries, for example, telecom and media, healthcare, retail, and manufacturing (UiPath 2022).

The company's objective is to replace repetitive and tedious tasks away so humans can invest more time in creative and logical-thinking activities. Currently, there are three UiPath platforms: UiPath Studio, UiPath Robot, and UiPath Orchestrator. The clients can go to these platforms and program the robots to mimic the action on the interface of computer systems (Tripathi 2018).

UiPath Studio is the place where users can design robotic processes without having to know coding skills. It is a tool for modelling based on flowcharts, so it is convenient for different users to follow and keep track of the same workflow. There is a visual signal that identifies errors in the model. Once the process is built, users can use the recorder function to examine the process and correct it if needed. UiPath Robot executes the designed process in UiPath Studio. Meanwhile, UiPath Orchestrator is a web-based platform that deploys, monitors, and inspects multiple Robots (Tripathi 2018).

The commissioning company has chosen UiPath technology as the pioneered software to build automation for various process development projects in the financial services department. The author proposes using UiPath technology to support two repetitive steps in the cash allocation process: saving remittance advice attachments and performing manual matching tasks.

5.5 Implementing UiPath to Save Remittance Advice Attachment

Among many functionalities that UiPath offers, saving email attachments is one of the features that can be used to support the cash allocation process. Javed, Sundrani, Malik, and Prescott (2021, 220) published the book "Robotic Process Automation using UiPath StudioX" to guide how to configure the robot to save email attachments.

Based on the instruction, the robot can be programmed to recognize the emails from which the attachments need to be saved. The command is set up on an activity card. There are three main categories:

- Emails that the users want the attachment to be saved.
- The file name.
- The folder of the saved remittance advice.

Besides, UiPath also allows the activities to be performed on the Desktop Outlook app. The software can be linked to Outlook and let the users select the emails. If there are different formats of the attachment, it is possible to set up the activity for each email so that the robot can specify various file names. This feature enables the users to save the attachment under the preferred file name with different formats such as pdf, xls, etc. Once the activity card is built, the robot will automatically save the attachment whenever the email arrives in the receivables team's mailbox.

Moreover, there is a common shared network folder where the AR specialists save the remittance attachments. Thus, the folder can be added to the activity card to signal the robot to save the attachments to this specified folder.

Sometimes, the customer mentions the invoice numbers directly in the email. UiPath technology also allows the users to save the email message as a .msg or a -eml file in the specified folder which is used to save the remittance advice attachments. The activity is also configured on an activity card, in which the users can input an email message that will be saved as a .msg file or as a .eml file. Since the commissioning company uses Outlook, the email message will be saved as .msg file.

By using the UiPath robot to save the attachment advice, the AR specialists do not have to check the mailbox constantly due to not knowing when will the customer send the payment advice. Furthermore, it is very common for AR specialists to neglect the remittance advice emails because they are sent to the common receivables team's mailbox. Thus, using automation can mitigate the risk of missing emails since the robot will always detect and save the attachments once it is being configured.

5.6 Using Automation to Perform Manual Matching Task

As stated previously, there are payments that contain a long list of invoices that the AR specialists need to copy manually to Oracle. Currently, a Macro is being used to support the process. However, the AR specialists still need to modify the Macro file. Therefore, building a robot that can mimic human action to match the invoice numbers against the receipts is a possible solution for this task.

After gathering the opinions from the other team members, the author suggests programming two robots: a robot that is specifically designed to support the cash application process in the Payment Operations Team. The other robot is dedicated to assisting the Receivables Management Team.

5.6.1 Improving the Automation in APRO

Based on the information provided by the PO specialist (Appendix 2), automation is already being used in the cash application process on their side. While the AR team uses Oracle as the main system, the PO team is using APRO to perform daily tasks. APRO is a SAAS banking gateway software that assists in processing invoices and building custom banking solutions to create a global payment process (APRO 2023).

APRO is built-in with Oracle AR which helps all data to be interfaced to Oracle easily to create the receipts on the AR side and apply the paid invoices. The software uses custom-configurable matching rules and automation learning features to identify customer information provided in the bank statement and match it against open transactions in the AR team (APRO 2023).

The automation is highly beneficial for the cash application process when the customers provide information on the invoice number on the bank statement. For example, if an invoice has a number of 1000, and the customer stated the full number 1000 in the bank statement, APRO will automatically recognize the invoice in Oracle AR and offset the paid invoices.

If there are more invoices in one receipt and all the numbers are clearly mentioned, such as 1000, 1001, 1002, 1003, etc, then the system will immediately match them off. Sometimes, the customers provide the payment information in different formats, for instance, the format of invoice numbers comes in a range of 1000-1003, or as ending digits such as 00,01,02,03. In these cases, APRO cannot detect the remittance advice and thus, it is not able to match the invoices automatically.

The author noticed that there are about 15% of the receipts arrive with the payment advice in the bank statement, but the invoice numbers are not fully stated. When this happens, the AR specialists need to view the full list of the invoices from the customer in Oracle AR and manually click on each of them to match against the payment.

Thus, the process is very time-consuming. Therefore, the author proposes to upgrade the features of APRO's automation so that the robot can recognize different invoice formats. By implementing this, the software is capable to close all the invoices when the payment arrives, and the receipt is created. Hence, it will save a lot of time in the cash application process because the AR specialists do not need to apply the invoices manually.

5.6.2 Building the Robot to Match the Payment Using Remittance Advice Attachment

Apart from the payments which have the invoice numbers mentioned in the bank statement, there are multiple ones that have the remittance advice sent as an attachment via email. In these cases, APRO cannot match anything due to a lack of information in the bank statement, so the cash application process will be transferred to the AR team.

The author proposes to build a robot that can mimic the matching process. It can be programmed by using UiPath technology. The matching process needs to be clear and repetitive to make the robot follow all the steps.

Firstly, the robot identifies the total amount of each receipt and starts matching them according to vertical order when the payment receipts are uploaded in Oracle AR. As mentioned in Chapter 4.3.3, the AR specialists need to retrieve the remittance advice from the correct shared folder. Thus, this is one of the initial steps that the robot has to do.

After scanning the total amount of the payment, it will open the folder that the advice was saved, and search for the payment advice. Since the remittance advice is named according to the total amount of the receipt and the name of the customer, this is the signal to the robot to pick up the correct one.

Following that, the robot will scan through the payment advice to detect the invoice numbers which are included in the receipts and begin to copy and paste the invoice numbers against the receipts. Once all the invoices are copied, the robot will save the transactions and close the receipts.

Since the robot can only perform simple tasks, it is not possible to implement this robot to close receipts that are more complicated, such as receipts that contain deductions. Therefore, the primary plan is to use this robot only for customers who have clear and straightforward payment terms.

6 Estimated Project Metrics

In this chapter, the author presents an estimation of the improvements in the cash application process when all the proposed solutions are implemented.

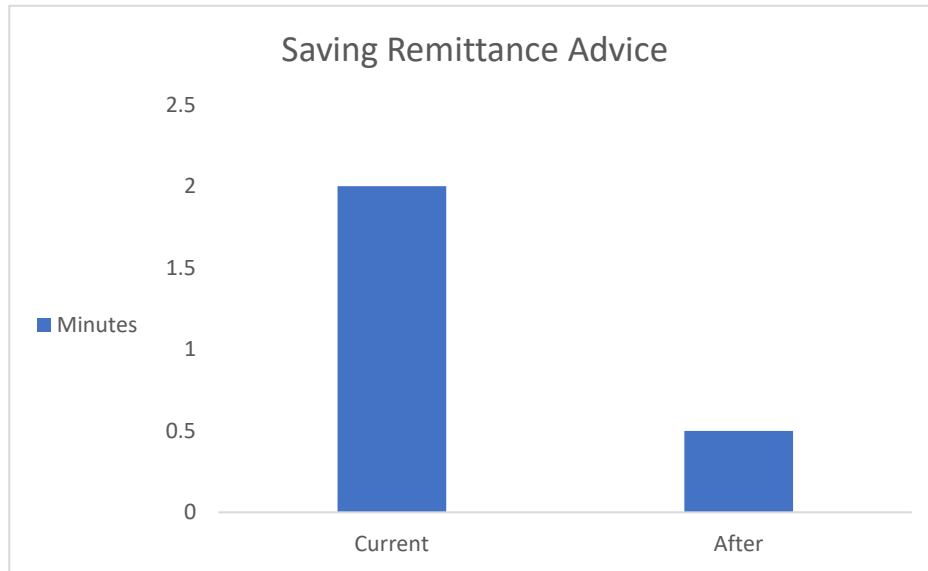


Figure 11. Estimated current and after time spent on saving remittance advice.

As can be seen from Figure 11, using automation to support saving remittance advice tasks can shorten the time spent on this step. On average, it takes about two minutes to complete the task manually. Meanwhile, using a robot will take approximately half a minute to perform the task, which is only 25% of the baseline process. Moreover, the robot will not miss emails since the email address is attached to the UiPath activity's card, so it will minimize the risk of neglecting the payment advice.

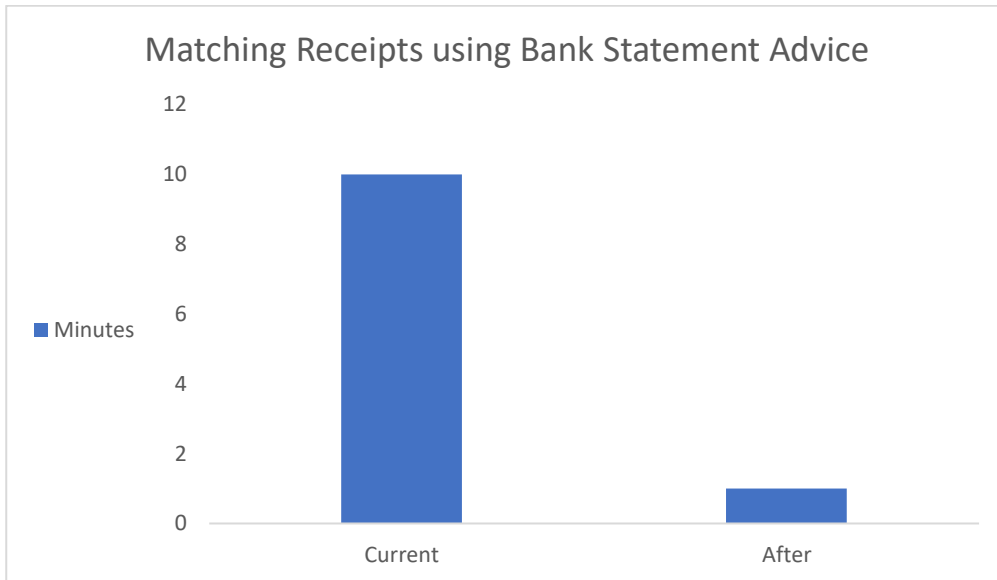


Figure 12. Estimated current and after time spent on matching a receipt using bank statement advice.

Figure 12 indicates the estimation of time spent on matching a payment receipt by retrieving information from a bank statement advice. Each payment is applied differently depending on its complexity. In this example, the author assumes that the customer included fifty invoices in one receipt, and they provided the invoice numbers according to a range format of 1000-1050.

Since the current automation in APRO cannot detect the range format, the receipt would be handled by the AR specialists. It takes approximately ten minutes for the AR specialist to click on the invoices manually from Oracle AR.

However, if APRO's automation can be improved so that the software can read different invoice formats, the task requires only one minute to complete. It is a decrease of 90% in time spent on the process. Moreover, AR specialists will not need to dedicate the time to do this task since the process is already completed by APRO in the PO team.

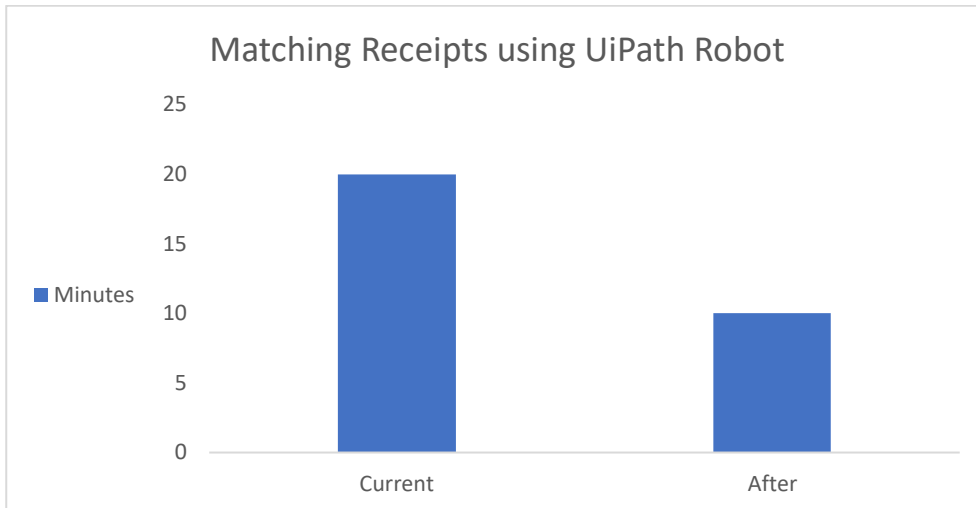


Figure 13. Estimated current and after time spent on matching a receipt using UiPath Robot.

Figure 13 presents the changes regarding the time spent between the current manual process and the process after using UiPath Robot. Similar to Figure 12, the author assumes that the receipt contains 50 invoices. The difference here is that the customer sent the remittance advice as an email attachment. With the current process, the AR specialists need to open the remittance advice, then convert the file into Excel format before copying the invoice number to the Macro file and running the robot.

The estimated time spent on this task is around twenty minutes. On the other hand, if a robot is used for this process, it can detect the correct payment advice in the folder, fetch the invoice numbers directly from there and match them against the receipt. It is estimated that the robot will spend roughly ten minutes performing the task. This represents a 50% of improvement in the time required to complete this process.

6.1 Efficiency comparison between the current payment allocation process and the automated process in GmbH unit

On average, there are about 1500 incoming payments in GmbH unit in a month. Roughly two-thirds of the payments cannot be processed automatically through Apro automation due to either requiring remittance advice input or because the bank statement has different invoice formats. Within those receipts, the author divides them into two categories: payments that can be matched using remittance advice and payments that can be matched via APRO.

Two third of 1500 payments account for 1000 receipts that the AR specialists need to allocate manually monthly, in which 750 receipts are matched via remittance advice and the rest via APRO.

The author created a table to summarise the data regarding the hours that need to be spent to complete the payment matching process and compare the amount between the current process and the automated one.

	Matching payments via attachment advice	Saving remittance advice	Matching payments via APRO	Total
Average monthly amounts	750	450	250	1450
Aver time with the current process (minutes)	20	2	10	32
Aver time with the new process (minutes)	10	0,5	1	11,5
Total time with the current process (hours)	250	15	41,7	306,7
Total time with the new process (hours)	125	3,75	4,17	132,9
Efficiency improvement by total hours (%)	50%	75%	90%	57%

Table 3. Efficiency comparison between the current payment allocation process and the automated process in GmbH unit.

As can be seen from Table 3, there are three categories that need to be examined. The first one is the matching payment process which requires attachment advice. It is estimated that this process takes around ten minutes to complete one payment. Therefore, 750 payments will require the AR specialists to spend 250 hours to complete all the matchings. For those receipts that are closed via APRO, the matching process takes about 41,7 hours. On the other hand, the AR specialists need to spend 15 hours to save all the remittance advice attachments. Monthly, the AR specialists dedicate approximately 306,7 hours to perform all the tasks.

The time used for those tasks can be shortened if the proposed solutions can be implemented. The robot will do the payment matching using remittance advice instead of the AR specialist. It will take 125 hours to complete the tasks. That is 50% less than the current time used for this process.

Not only that, but the robot will also spend only 4,17 hours to match the payments via APRO baking gateway. This is considered as the most significant improvement with a 90% decrease in the time spent. Finally, the robot will take about 3,75 hours to save the payment advice in the correct folder, which is a 75% time improvement compared to the manual way. In summary, the improvements will result in a 57% reduction in time for the cash application process compared to the manual process. All the calculations are executed by calculating the difference between the total hours spent on the automated process with those spent on the current process.

Each AR specialist works for a total of 150 hours per month. Thus, it takes two full-time AR specialists to complete the cash application process manually every month. By utilising the features of automation, the receivables team can decrease their work labour spent on the cash application process by two headcounts. The adaptation of the robot does not entail that the robot will replace the employees but rather allows the AR specialists to allocate their time to perform other tasks that are more interesting and require intellectual expertise.

7 Conclusion and Feedback from the Commissioning Company

In conclusion, improving the cash allocation process is an important objective of the Receivables Management team.

Firstly, it is one of the most important tasks that belong to the prioritized categories. The process directly impacts the customer's credit situation. Therefore, once the payment arrives, it needs to be matched against open invoices immediately so that the customer's financial performance is up to date.

Secondly, the cash application process is time-consuming, high-volume, and repetitive. The task carries all the traits that are suitable to apply automation in the process. Automating the process helps to improve the company's cash flow, reduce operating costs, minimize mistakes, and save time.

Lastly, by improving the process, it generates higher employee satisfaction because the AR specialists can spend more time to dedicate to more advanced tasks compared to repetitive, tedious steps which are monotonous.

After conducting the research, there are three areas that can be improved in the cash application process in the commissioning company. The first proposal is to build a dashboard by using Oracle BI technology. The dashboard will help the AR specialists to have clear visibility of the cash application status, thereby they can take prompt actions and control the situation.

Next, the robot can be built to support the AR specialists in saving remittance attachments. Finally, automation can be used to support the matching process on the Payment Operations side and Receivables Management side. The chosen technology is UiPath, which is also the initial choice of the commissioning company in the process of RPA.

Besides, it is vital to provide training and knowledge to the employees who will be using the robots in their daily tasks. The AR specialists need to have a clear understanding of executing the robots so that they can perform the work correctly and eliminate errors. Before building the robot, all the steps within the process need to be identified thoroughly. Therefore, all the team members involved in the project should share the same goals and objectives so that the project can be carried out successfully.

After reading the outcomes of the study, the representative of the commissioning company has given positive feedback on the findings. The company acknowledged the usefulness of the recommended solutions since they can improve the process and add more value to the process.

Also, it is necessary to find solutions to replace repetitive tasks and improve the process. Currently, the project is in the testing phase of building a robot that can save payment advice attachments using UiPath technology. Once this robot is in use, the company will measure the exact effectiveness that it brings to the process. Regarding the other suggestions, the company will also investigate their usefulness to decide if they should be implemented in the future.

8 Self-reflection and Suggestions for Future Research and Development

As an AR specialist who is working directly with the cash application process daily, the author can clearly see that there are possible improvements to enhance the process. This is one of the tasks that consume a big amount of time for all the AR specialists within the RM team. Thus, applying the suggested solutions can deliver benefits not only to the process but also to the employees who are handling the process.

The author acknowledges the frustration when having to perform multiple repetitive tasks which do not require any advanced knowledge. Meanwhile, there are a lot of other important responsibilities waiting to be solved. The workload in the GmbH unit in the AR team is high and demanding. Therefore, finding solutions to minimize monotonous, tedious tasks can improve employee satisfaction.

Personally, the author realized that she enjoys the work more when she can spend the time to solve more complicated tasks, especially the ones which require problem-solving skills. By conducting this study, the author understands the necessity of using automation and advanced technology to support daily tasks and replace the old working method.

The author recognised that the project has helped her to discover the ability to investigate the process's waste and deliver improvement solutions. Prior to the study, the author had limited knowledge regarding automation. During the project, the author has had a lot of opportunities to learn about robots and their benefits through conducting research and gathering expertise from other project members.

The acquired understanding can be valuable to the author's career development, especially in the process improvement field. On the other hand, the author also got a chance to investigate BI software and UiPath technology and achieve new skills for herself.

It is important to ensure all the employees who are working with the process have a general understanding of RPA and BI. Therefore, the author recommends the commissioning company provide training to the employees so that everyone can share the same knowledge.

Regarding the cash allocation process, it is crucial to have documentation to instruct the employees on how to run the robots. Besides, the AR specialists should also be shown to modify the cash management dashboard using Oracle BI.

The plan is to implement the proposals in the GmbH unit. After the initial test, if the cash allocation process shows clear signs of improvement, the same solutions can be implemented in other units. The goal is to have a harmonized process among all the units. Once the cash allocation process is enhanced, it will have a positive impact on the company's cash flow and liquidity.

Thus, the author thinks that it is important for the commissioning company to invest in building RPA and in the BI dashboard. The author acknowledges that the commissioning is very open to new ideas and changes. The company just finished all the transitions to the shared service center; hence, the next step is to focus on improving and developing the current process to enhance efficiency, and practicality as well as to save time and cost for the organization.

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Appendices

Appendix 1. Interview with the Accounts Receivable Specialists

Author: What is your opinion about the current cash allocation process in the GmbH unit?

Senior AR Specialist: The process is one of the most time-consuming tasks because there are a lot of steps involved. Also, there are a lot of exceptional cases that have to be considered, from discounts to currency differences. Ah, especially the deduction handling. In general, it is a very interesting process that needs a lot of time to handle.

Author: Do you think the process needs any changes or improvements?

Senior AR Specialist: Definitely. There are quite a few things that we can improve. At the moment, there is already a project going on to improve the deduction process. Also, the company is promoting to use of automation to support the work, so we can always think about what tasks can be replaced by a robot.

Author: How much time do you spend on your cash application process daily?

Senior AR Specialist: As you know, I am handling the big payment one, and those arrive only a few times a month. However, they are all very complicated and unique, so it is not easy to use automation for them. On the other hand, the daily payment is definitely something that can be considered using automation.

Author: What is your expectation regarding the improvement of the cash application process?

Senior AR Specialist: The first expectation is to shorten the time spent on the task. The second expectation is to use robot to do all the repetitive tasks so that we do not have to spend so much time on those. I mean, we have to deal with a lot of things in receivables team, so if robot can help out, it will be a great support. The third expectation is of course to make our jobs easier.

Author: Do you think robot will take over human's tasks?

Senior AR Specialist: I think the robot will support us with the repetitive tasks so that we are not frustrated to do the same thing all over again. Instead, we can have the time to perform more demanding tasks. We are always kept busy with many things to do, so there is currently no risk that the robot will replace us, but definitely they are becoming more and more advanced in the future.

Author: Thank you for your perspectives. I will note down these opinions and come up with useful ideas to support our daily jobs.

Senior AR Specialist: I am looking forward for that. If you have any other questions just ask me.

Appendix 2. Interview with the Payment Operations Specialists

Author: Hello! Thank you for having the interview with me today. Although we are working in different teams, but we share some common tasks together, especially the cash application process. I am doing a project to find out what are the improvements that we can make to the process. Therefore, I would like to hear some input from you. First, could you please briefly describe the process when the payments arrive in our company's account?

Payment Operation Specialist: Thank you for asking me. Yes, we are working in different teams. As you said, the payment application process combines both of our team's inputs. On our side, APRO identifies the customer from the bank statement based on the invoice number that they provide us and creates the receipts. The initial allocation will be done automatically by our bank statement process software. The customer gives us the invoice numbers that they want to allocate in different formats. The automation in APRO identifies all the invoices based on those, and it will do the initial matching to the receipts. If the customer does not provide us any invoice number, then we will transfer the responsibility to the receivables team.

Author: How long does it take for APRO to perform the matching process?

Payment Operation Specialist: APRO matches the invoices almost instantly. The automation features in APRO are quite advanced. While generating the receipt, the software also closes off the invoices in Oracle AR at the same time.

Author: Do you have any tasks in your cash application process that you would like to be automated?

Payment Operation Specialist: That is a good question. We are already having the automation because the invoices are automatically matched when the payment arrives. But the process does not work if we are missing the invoice number. If the customer can comply with us to give the invoice number, that will be a great help. Another idea is to develop the robot so that it can identify different formats of the invoice number. Sometimes, the customer provides us not the full invoice number, but only a range, for example, instead of 100,101,102, they provide 100-102 and the robot cannot read this format. Therefore, I think that it is necessary to have a robot that can read multiple formats.

Author: Thank you so much for your input. I found a lot of useful information here since I am not familiar with PO tasks. This is very helpful for my project.

Appendix 3. Project Charter

Team Charter

Receivables Management	Author (AR) , 1 Senior AR Specialist, 1 PO Specialist, 1 Automation Developer
Improving the cash allocation process	Duration: 8 months
Background	<ul style="list-style-type: none"> Identifying the areas which need improvements and provide enhancing solutions for the cash allocation process The projects involve the member of RM teams, PO teams and Development teams.
Mission And Objectives	<ul style="list-style-type: none"> AR and PO specialists identify current challenges and propose improvements. Development teams build the robots. A successful outcome is to come up with proposals that can add value to the process and to the team. The objective is to streamline and improve the process, save time, and cost, and also support the specialists in doing the repetitive tasks.
Budget And Resources	<ul style="list-style-type: none"> The budget of the project includes fulltime salaries of the involved specialists and the license for the robots. <p>The project is managed by the team members of the receivables' team and the Team Lead.</p>

Roles And Responsibilities	<ul style="list-style-type: none">• The project involves 2 AR specialists, 1 PO specialist and 2 automation developers.• AR specialists: Identify current challenges and propose solutions.• Automation developers: Build robots based on the proposal of the AR specialists.
Operational	<ul style="list-style-type: none">• Improve process and operational efficiency.• Reduction in liquidity process• Enhance work satisfaction of the staff.