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Business Process Improvement: Accrual Process

Case: Company X

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TIIVISTELMÄ

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Tämän opinnäytetyön tavoite on parantaa suoriteperusteista kirjanpitomenetelmää ostovelkaosastolla käyttäen liiketoimintaprosessien parantamismenetelmää. Projektin tavoitteena oli automatisoida prosessin tehtäviä, vähentää prosessiin kuluvaa aikaa ja yhdenmukaistaa prosessi läpi koko Yritys X:n.

Opinnäytetyön teoriaosio tutkii suoriteperusteisen kirjanpitomenetelmän tarkoitusta ja prosessia kahdessa luvussa, antaakseen lukijalle käsityksen projektin aiheesta. Teoria avaa liiketoimintaprosessien parantamismenetelmää ja sen työkaluja, joita hyödynnettiin opinnäytetyön projektiosiossa.

Palautetta kerättiin kyselyjen avulla, jotka lähetettiin kirjanpitäjille, jotka osallistuivat projektin koekäyttöihin ja sen käyttöönottoon. Kyselyjen tulosten lisäksi käytännön havainnot ja prosessin anti analysoitiin, jotta parannetun kirjanpitomenetelmän laatu pysyisi vaaditulla tasolla.

Kirjoittaja täytti projektin tavoitteet luomalla ja suunnittelemalla Excel tiedoston, jonka makrot automatisoivat kolme suoriteperusteisen kirjanpitomenetelmän tehtävää. Tämä luotu tiedosto otettiin käyttöön korvaamaan edellinen menetelmä Yritys X:n ostovelkaosastolla.

ABSTRACT

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This thesis project focused on improving the accrual process at accounts payable through the five phases of business process improvement. The objectives of the project were automating the process activities, reducing the process time, and standardizing the process for all entities of the case company X.

The theoretical framework studied the purpose and process of accruals in the topics accounting and accrual accounting. The theory discussed the phases of business process improvement and its tools, which were utilized throughout the improvement project.

Feedback was collected through questionnaires sent to accountants who participated in the trial runs and rollout. In addition to the results, practical observations and output of the process were analyzed to ensure consistent quality of the improved process.

The objectives of the project were fulfilled by creating and designing an Excel file with macros that automated three activities of the accrual process. The created file was implemented as the new accrual process in the department of accounts payable at the case company X.

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LIST OF ABBREVIATIONS

AP	Accounts payable
BPI	Business process improvement
CSV	Comma Separated Values (Excel file format)
FI	Invoice document type
G/L	General ledger
GR	Goods receipt
IFRS	International Financial Reporting Standards
MM	Invoice document type
SSC	Shared Service Center
VBA	Visual Basic for Applications

1 INTRODUCTION

The introduction chapter provides the reader with the background, objectives, and limitations of the project, as well as the structure of the thesis.

1.1 Background of the project

At the beginning of each month, accountants perform the task of accruals for the period's financial statement. Several different functions within the organization are involved with the accrual process, with a strict deadline demanding that the accruals are finished quickly and precisely. The performance in speed and accuracy of accountants affects the time to complete the process throughout all the functions involved. This thesis project focuses on the process directly performed by the accountants of company X in the department of accounts payable.

The author is a fulltime accountant at the case company X with work responsibilities that include the monthly accruals. The author recognized that the process includes unnecessary, ineffective, and time-consuming tasks that accountants perform manually each month. Being self-taught in VBA, the author started planning methods to improve the process by utilizing his own interest in, and knowledge of Excel.

The choice of topic was based on the impact it would have on the author's own and others' work if the project was implemented.

Any confidential information about the case company X and its operations is not disclosed in this thesis, and may be reworded or left out.

1.2 Objectives of the project

The aim of this thesis project is to design and create an Excel file supporting the accountants at the case company X by automating the current manual tasks that slow down the accrual process. The three objectives of this project are as follows:

1. Automate time-consuming process activities
2. Reduce overall process time
3. Standardize the process

The project will follow the five phases of business process improvement to create an improved version of the accrual process. The current process will be analyzed for time-consuming activities performed by accountants, in order to find ways of automating the tasks. The automation aims to reduce the process time of accruals by removing manually performed tasks from the process. The final objective is for the Excel file to standardize the accrual process at accounts payable, so that every accountant can post accruals for any entity of company X without the need of additional training or instructions.

1.3 Limitations of the project

The project has certain limitations that apply to the improvement of the accrual process. The project is limited to Microsoft Excel and its capabilities. The second limitation is the VBA knowledge of the writer of this thesis. Lastly, the monetary and time resources available for this thesis project are limited since the author and test users are working fulltime at case company X.

1.4 Structure of the thesis

This thesis is divided into a theoretical and an empirical section. The theoretical chapters cover topics related to the thesis project. Chapter 2 introduces the case company and the department involved in the project. Chapters 3 and 4 describe accounting with the focus areas that concern accruals. The final theoretical chapter explains the business process improvement-theory and key terms associated with it. Chapter 6 offers a summary of the theoretical chapters and explains their relevance to the thesis project.

The empirical section begins from chapter 7, discussing the background of the accrual process at company X. Chapters 8 to 12 follow the project from beginning to end through the five phases of business process improvement. Feedback and results of the project are found in chapter 13, with the final chapter 14 containing the conclusion of the thesis.

2 CASE COMPANY X

This chapter shortly presents the case company that the project is created for. The first subchapter provides brief background information on the case company X. The scale of the organization and the amount of employees directly involved with the end product of this project is found in the subchapter of company X Shared Service Center. The main responsibilities of accountants at the department accounts payable are described in the final subchapter.

2.1 Company X

Company X is an organization that operates in the marine and power generation business. As of 2018, company X covers its sales and services in over 80 countries and more than 200 locations around the world, with approximately 18,000 personnel employed. (Company X 2017; Company X 2018a) The financial reporting of the organization is obliged to comply with IFRS standards, with the shares of company X listed to the NASDAQ Helsinki stock exchange. (Company X Reports 2018) Additional background on the case company X is not disclosed in this thesis.

2.2 Company X Shared Service Center

The Shared Service Center (SSC) for company X was established with the aim to centralize the financial accounting of the organization. The objective is to optimize and harmonize the global processes through standardization, innovation, and stronger performances at lower costs. (Company X Intranet 2018)

SSC has several departments with accounts payable as the focus of this thesis. Accounts payable employs over 50 accountants that handle over 100 entities of company X. The entities are located globally throughout Europe, Asia, Africa, Americas and Australia. The accountants are divided into several teams that each handle specific entities. Accountants are responsible for, and specialize in, the entities assigned to them. SSC assists the entities in matters of financial accounting, such as travel expense reports, incoming and outgoing payments, period end closing and accounts payable. (Company X Intranet 2018)

2.3 Accounts payable department

Accounts payable (AP) is a business department within SSC with the responsibility of handling purchase invoices of suppliers and other creditors for payment. The software used by accountants at SSC and by the organization globally is SAP ERP system.

The main responsibilities of accountants working at the AP department of SSC are:

- Booking purchase invoices to their respective general ledger accounts and with their correct tax codes
- Booking of purchase invoices to their correct items and purchase orders
- Providing assistance to purchase invoice approvers
- Assisting supplier and customer representatives
- Ensuring the legal requirements of purchase invoices are met
- Assuring the approved invoices are paid at due dates
- Recording all incurred expenses for the financial statements

The accounts payable accountants at SSC are responsible for the accrual process that takes place on the first day of each new month. (Company X 2018b)

3 ACCOUNTING

The chapter on accounting features key terms and elements of financial accounting that are related to the thesis project. In addition, the chapter aims to familiarize the reader with accounting and its purposes and standards.

3.1 Introduction to accounting

Accounting communicates the financial health of an organization to various interested parties. It is a key function in providing insights on the economic events within a business. The three basic activities of accounting are to identify, record, and communicate the financial information to interested users. First, the organization identifies economic activities relevant to the organization. The activities are then recorded to provide a history of its financial events. Finally, the recorded data is communicated to users in the form of accounting reports and analyses. (Weygandt, Kimmel & Kieso 2015, 4)

Financial statements are the most common accounting reports and they are presented in a standardized way for users to understand and trust the financial information. Other reports, that include estimates and projections based on assumptions, are kept within the organization and are not distributed to external parties (Averkamp 2018a). Any interested parties make decisions based on the reports and analyses provided by the organization. (Weygandt et al. 2015, 4)

3.2 Accounting concepts and standards

Accounting concepts are rules that organizations are advised to follow with the recording and presenting of the accounting records. The concepts provide an organization with guidance at times when a decision must be made concerning the financial records and statements. (Horner 2017, 92)

Some accounting concepts are formalized within the accounting industry in the form of accounting standards. The accounting standards are adopted on both national and international level to which an organization must comply. The set of official rules that the European Union follows is International Financial Reporting Standards (IFRS). IFRS specify how organizations must maintain and report their financial data. These international accounting standards were established to create a common language in account-

ing, so that financial statements are understood and easily compared between different countries and organizations. The standards ensure a formative, understandable, relevant, reliable, and comparable presentation of an organization. (Investopedia 2018a)

3.3 Objectives of accounting

The importance of accounting is seen at two levels; that of an organization and that of an individual. An individual may use the accounting information to control the amount of expenditure, assisting the person in estimating and planning the finances ahead. The three functions that accounting has at the level of an individual are planning, controlling and decision support. (Berry 1999, 3)

Accounting at the level of an organization consists of the same three functions, with an additional fourth function, which is reporting the information to external users through financial statements. External users evaluate the decisions and status of an organization based on the reported financial information to conclude the performance of the organization. External users may consist of shareholders, bankers, suppliers, customers, employees of the organization, government, and the general public. (Berry 1999, 3–4)

3.4 Financial statements

Financial statements are the documents that an organization publishes to report the financial results to both internal and external users (Harrison, Horngren, Thomas & Swardy 2011, 2). Financial statements are the final accounts of the organization that consists of a balance sheet, an income statement and a cash flow statement (Horner 2017, 34). It presents the revenues, expenses, assets, liabilities and equity of the organization (Investopedia 2018b).

The balance sheet publishes the results of everything the organization owns and owes at a specific moment in time, as well as the amount shareholders have invested. The balance sheet provides an overview of the organization's current assets, liabilities, and equity. The balance sheet will always balance with the assets matching the combined liabilities and equity. A change in the value of assets will see an equal change in either the liabilities or the equity, as an organization must have financed its assets from either outside the organization or from within it. (Horner 2017, 34–35, 41; Investopedia 2018c)

The income statement displays an organization's success or profitability during a specific financial period by reporting the net income, including earnings per share, of the organization. The report is a primary means of evaluating an organization's performance. (Weygandt et al. 2015, 22, 234)

The cash flow statement presents where an organization's money came from and how it was used. The three main purposes of the statement are to predict the organization's future cash flow, evaluate decisions made by management, and display the connection between the organization's net income and its cash flow. (Berry 1999, 266; Weygandt et al. 2015, 25)

The performance of an organization is analyzed from the financial statements, and predictions are made on the future direction of the stock prices of the organization. It is standard practice that government agencies and firms audit the financial statements to ensure that the documents are accurate for financing, investing and tax purposes. (Investopedia 2018d)

3.5 Accounting equation

The assets, liabilities and equity measure the financial position of an organization. The accounting equation of these three items is shown in Figure 1.



The diagram illustrates the accounting equation. It consists of three blue rounded rectangular boxes arranged horizontally. The first box on the left contains the word "Assets". To its right is an equals sign (=). The second box contains the word "Liabilities". To its right is a plus sign (+). The third box contains the word "Equity".

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

Figure 1. Accounting equation.

The equation displays what an organization owns (assets) and what it owes (liabilities). Any assets an organization owns are either paid by shareholders equity or financed by borrowed money. The accounting equation forms the base of double entry accounting, which is presented in the next subchapter. (Weygandt et al. 2015, 12)

Assets are resources that have economic value and are expected to provide benefits, such as improved sales, reduced expenses, and increased value of the organization. Asset resources can be equipment, inventory, buildings, stocks, trademarks or brands. (Investopedia 2018e) Equity stands for funds shareholders currently have invested in the

organization and represent the net value of an organization if all liabilities were paid off and assets were sold for money. (Investopedia 2018f)

The amounts that the organization has outstanding are the liabilities. Liabilities are divided into the classifications of current liabilities and non-current liabilities. Obligations that are settled within a year period are current liabilities. (Harrison et al. 2011, 470) Accruals are of short-term nature and are likely settled by the organization within a year period, therefore, accruals fall under the classification of current liabilities. (Horner 2017, 38–39)

3.6 Double entry accounting

The recording of transactions is most commonly made with double entry accounting. The term double entry is a debit and credit system that registers each transaction to two or more different accounting records. In accounting, the terms debit and credit are used to describe to which accounts transactions are recorded in an equal but opposite way. The two sides of debit and credit must always balance, thus following the accounting equation of assets equaling the sum of liabilities and equity.

Cash		Equipment	
Debit	Credit	Debit	Credit
	6,000	6,000	

Figure 2. T-account.

In Figure 2, an organization bought equipment worth 6,000. The cash account is credited 6,000 while the equipment account is debited the same amount, resulting in the two accounts balancing each other out. The account in Figure 2 has a title with a debit and credit side in a format that resembles the letter T, and is therefore commonly referred to as a T-account. Errors in accounting are more easily noticed when registering transactions using double entry accounting. A difference in the balance indicates that an error has occurred, because the accounts must always balance. (Weygandt et al. 2015, 54)

A general ledger (G/L) maintains the accounts of an organization and contains the accounts of assets, liabilities, equity, expenses, and revenues. A ledger provides the data needed to prepare the financial statements by showing a complete record of all the organization's transactions. Accountants record transactions to the general ledger accounts, which generate a trial balance that shows the balances of each and all accounts. The trial balance is incomplete by only including the recorded transactions, and accrual adjusting entries are made to rectify the finances to generate the financial statements according to the accounting standards. (Investopedia 2018g; Weygandt et al. 2015, 62)

4 ACCRUAL ACCOUNTING

The accrual accounting chapter introduces the reader to the main subject that this thesis is centered on, the accrual process. The concepts of accruals are explained with the reasons for organizations utilizing accruals.

4.1 Financial statement concepts

Two concepts exist for recording financial statements: cash basis and accrual basis. Smaller organizations with a low number of payables and receivables generally use cash basis accounting, while medium and large sized organizations use accrual basis accounting. (Weygandt et al. 2015, 102)

In cash basis accounting, the organization only records an expense once cash has been transferred. This method is simpler than the accrual method, but often leads to incorrect financial statements. As the cash basis does not record expenses for services that are not yet paid for, the organization's expenses will not match with its revenue. (Weygandt et al. 2015, 102)

Accrual basis accounting recognizes revenue when a transaction, service, sale or a similar event occurs, and not only when cash is paid or received, and thus accrual basis accounting complies with IFRS. (Harrison et al. 2011, 11) Accrual accounting gives all parties that are interested in an organization a clearer and truer understanding of the organization's performance during a financial period. (Harrison et al. 2011, 138)

4.2 Accruals concept

According to Horner, "the accruals concept is centered on ensuring that the income statement includes all the relevant expenses and incomes generated for a period of time and that these are correctly recorded". This still applies if an income or expense has not yet been settled and is therefore still outstanding. (Horner 2017, 48)

An organization will occasionally not pay an expense precisely on time. Some expenses will not be paid before their due period and some expenses will be paid after their due date has passed. Regardless if the organization has paid for an expense yet or not, the amount must be charged to the income statement of the current period. During the end of a financial period, the accrued expenses are added to the actual amount paid when

charged to the income statement. The accruals concept applies to both incomes and expenses. (Horner 2017, 48–51)

4.3 Accrual adjusting entries

Adjusting entries convert the trial balance accounting records to the accrual basis of accounting. The adjustments align the financial results more precise with the requirements of IFRS. It is generally not possible to produce financial statements that fully comply with accounting standards without applying adjusting entries. Recording accruals affects the asset and liability accounts of the organization, as an accrued expense increases the liability account. The balance sheet is directly affected by the adjusting entries. (Bragg 2017)

Organizations make adjusting entries in order to record revenue in the period a transaction, sale or service is performed, and to recognize expenses when they are incurred. The process of adjusting entries ensures that expenses and revenues are recognized according to the accounting standards. (Weygandt et al. 2015, 104) Generally, an adjusting entry is made at the start of the month prior to publishing the organization's financial statement. (Averkamp 2018b)

Organizations are required by the IFRS to perform adjusting entries when preparing their financial statements. Adjusting entries are necessary, as not all recorded data may be complete and up-to-date. Due to practical reasons, certain transactions, such as employee salary and the use of supplies, are not recorded on a daily basis, and therefore still require adjustments to the current recordings. (Weygandt et al. 2015, 105)

Accrued expenses are liabilities that are incurred and are not yet paid for. Common accrued expenses are that of salaries, interest, and taxes. To recognize these unrecorded obligations in the financial statements, the organization makes adjusting entries for accruals. The expenses are otherwise without the adjustment understated. (Weygandt et al. 2015, 113–114)

4.4 Types of adjusting entries

Adjusting entries are classed as either accruals or deferrals. Deferrals are categorized into either prepaid expenses or unearned revenues. Prepaid expenses are expenses that

have been paid before the product or service has been consumed or used, while un-earned revenues are cash that has been received before a service is performed. (Weygandt et al. 2015, 105)

Accruals also have two subcategories, which are accrued revenues and accrued expenses. Accrued revenues are revenue from a service that has been performed, but not yet recorded or paid in cash. An accrued expense is an expense that has not yet been paid for. Accrual accounting is performed at the end of a financial period by using an adjusting entry in order to update the accrued expenses for the financial statements of the organization. (Harrison et al. 2011, 149; Weygandt et al. 2015, 105)

4.5 Advantages and disadvantages of accrual accounting

An organization's performance is measured more accurately if its cash transactions are recorded based on when goods are delivered or services are performed and incurred, as is the standard in accrual basis accounting. Accrual accounting is especially helpful for determining an organization's profitability during a specific financial period, if the organization expects payment for delivered goods or performed services at a date that is past the current period. The main advantages of accrual accounting are therefore its accuracy of showing an organization's profitability and long-term expenses and revenues. (Intuit 2017)

Accrual accounting has some disadvantages as well. It is not precise in tracking an organization's cash flow, as the financial reports may say the organization has a large amount of revenue, when the actual bank account might have a much smaller balance, because some of the services and goods have not yet been paid for. Accrual accounting also creates more expenses in employee salaries and paperwork, as the cash flow has to be tracked separately to gain an understanding of the organization's true balance. Smaller companies do not have much to gain from accrual accounting, because of the increased workload and more complicated way of working, and most of the times prefer the easier cash basis accounting. (Intuit 2017)

5 BUSINESS PROCESS IMPROVEMENT

This chapter goes into detail about business process improvement (BPI) and its most relevant elements concerning this thesis. The thesis project will follow the five phases of BPI described in this chapter. In addition, the chapter clarifies terms such as waste, flowchart and standardization, which are essential in the thesis project.

5.1 Business process

A process can be explained as an activity or a set of activities that adds value to an input and creates an output of greater value for a customer. The customer can be external or internal within an organization. A process is defined by a clear starting and ending point, and aims to end with a higher value than the initial input. (Harrington 1991, 9; Melan 1993, 14)

A business process is a series of services conducted by employees or machinery to create a specific product or service for the end user. As an example, a financial report is an output that is created by adding value to the existing recorded data (Melan 1993, 15). Business processes play a crucial part in the organization's economic survival, as most organizations run hundreds of business processes on a daily basis. Different functions within an organization have their own department specific business processes. Typical functions could be purchasing, accounting, sales and marketing, development engineering, and quality assurance. (Harrington 1991, 9–11)

5.2 Process improvement and its benefits

Process improvement is the act of upgrading a process by making it more transparent, efficient or effective. It can be challenging for the employees involved to realize how much business processes impact their work and performance, since the processes are usually invisible. Processes eventually degrade and become outdated over time, meaning that process improvement is beneficial and relevant in almost all areas of an organization. Improving a business process often means to fine-tune an organization's basic operations and systems, making employees able to work at full potential and discover simpler and better methods of working. (Boutros & Cardella 2016, 7)

The costs of organizations consist for a significant part out of business processes. Focusing on improving these processes allows businesses to stay competitive and improve their market share. Business process improvement helps to control and improve the operations, as well as implementing better business decisions. (Harrington 1991, 19)

The aim of BPI is to make sure that the business processes in the organization:

- Maximize the use of assets
- Eliminate errors
- Minimize delays
- Promote understanding
- Are customer friendly
- Are easy to use
- Are reliable
- Are adaptable to customer's changing needs
- Reduce waste
- Reduce excess head count
- Provide the organization with a competitive advantage

(Boutros & Cardella 2016, 9; Harrington 1991, 21)

An organization gains important benefits each time a business process is improved, such as cost savings, greater profitability, or employees that are more efficient. A seemingly small improvement to a minor process can greatly benefit the organization. According to Boutros and Cardella, process improvement is “the act of making any business process or procedure more effective, efficient, or transparent”. (Boutros & Cardella 2016, 8)

In order to make the improved business process beneficial for the organization, all parts of the organization, including management and leadership, have to understand the reasoning behind the effort of ongoing improvements and support it. Lowered costs and increased efficiency are the organization's short-term benefits of process improvement. A series of successful process improvements can lead to the organization gaining major competitive advantage by being more agile and effective in its operations, since the

tasks that were unnecessary have been removed, leaving only the relevant tasks to be done. (Boutros & Cardella 2016, 9)

Improving an organization's business processes enables employees to keep their focus on the processes with a streamlined method of working. Processes can be improved by simplifying them or by providing guidance in written form to support the employees through more complex and demanding activities, resulting in completing tasks faster with a similar or higher success rate. Organizations save money and the culture within the organization could also see a positive impact as morale among employees can improve by removing frustrating obstacles from the process. This reduces waste and the time spent on the improved process, which enables the saved time to be put into other work tasks. (Harrington 1991, 16–19)

5.3 Waste

Waste, in process improvement terms, is defined as resources that are used up by irrelevant or unproductive activities. Business process improvement aims to minimize the amount of waste from existing processes in order to eliminate errors, increase productivity and to reduce costs. The eight types of process waste, including examples, are:

1. Transportation: moving paperwork, several steps of approval, needless email attachments
2. Excessive inventory: large amounts of unread email, producing or purchasing items before they are needed
3. Unnecessary motion: walking to a printer or a copier, walking between different offices, moving between different computer screens
4. Waiting: waiting for something not caused by the employee, such as approvals, information, corrections or slow computer speed
5. Over processing: depending on approvals and inspections instead of improving processes to minimize errors, entering the same data into several systems
6. Overproduction: processing orders or printing paperwork in advance when they may change before the due date
7. Defects: any errors, such as data entry and invoicing errors, that are passed further in the process only to be returned to the sender for correction

8. Underutilization of employee skills: having employees work in roles that do not use their full potential, wrongly appointing employees to projects

(Boutros & Cardella 2016, 17–19)

5.4 The five phases of business process improvement

This subchapter explains how a BPI project can be completed at a high success rate from start to finish. The five phases of this method in order are planning, analyzing, designing, implementing and continuous improvement.

5.4.1 Phase one: Planning

The first step towards improving a business process is to understand the starting point and define what needs to be reworked and fixed. Methods of determining if a process needs improvement at all is to listen if employees complain about frustration, errors or bottlenecks, and find out if work tasks seem too complicated, tasks take too long to complete, or if the results of a task are lower than the expected standard. (Boutros & Cardella 2016, 77–79)

After a problem has been identified, it has to be defined. Questions such as who is affected by the problem, where the problem is, and how big the problem is, will help with defining the problem. Once the problem has been defined, the next step is to set a goal for the improvement. Identifying where the work has to be done, what will and will not be included in the project, and on what scale does the improvement affect the organization, sets a base for the improvement project. When planning the improvement, a set starting and ending point must be identified, as well as the processes within. (Boutros & Cardella 2016, 79)

Once the problem and the suggested improvements are identified, they need to be presented to and approved by the manager responsible. The presentation should include an overview of the BPI project, an example of the issues with the current process, a timeline for the project, and a request to approve the suggested improvements. A process owner has to be selected or appointed by management once the project is approved. The process owner should operate on a high enough level to see how the improved process would affect the organization and is the person responsible for the process in question.

Additionally, the process owner monitors the progress and effectiveness of the improvement project. (Harrington 1991, 27, 46–47)

The planning phase is completed once a problem has been identified and defined, an improvement plan has been made, management has approved the project and a process owner has been appointed.

5.4.2 Phase two: Analyzing

The aim of the second phase is to gather information and analyze how the process works in its current state. One of the methods for analyzing a process is called process mapping, which is explained in more detail in chapter 5.5 of this thesis. In short, process mapping means laying out all the steps of a process to gain an overview of how the process functions. Creating a process map forces the process owner and everyone involved in the project to mentally walk through the entire process, gaining an understanding of what activities and tasks the process in its current state includes. Asking employees involved with the process about how they feel about the process in its current state, what works well and what does not, as well as observing employees complete the process will give valuable information about the current process. Each employee may have a different way of completing the same process, so it is imperative to gather feedback and observe several methods of working, to gain information about steps in the process that else may go unnoticed. In order to document the current state of a process completely, all available data has to be gathered, including who is involved, how long the process currently takes to execute, and how often the process has to be done. (Boutros & Cardella 2016, 85–86; Harrington 1991, 57)

With the process mapped out, the project team can start analyzing the process to find issues, roadblocks and areas of inefficiency. Questions such as where the process experiences delay, which tasks take too long to complete, and what parts of the process causes frustration will assist in finding waste in the current process. Once all parts of the process in its current state have been thoroughly analyzed and all unnecessary tasks have been identified, the findings are summarized and presented to the process owner and management for approval. Once the analysis has been approved, the next phase may begin. (Boutros & Cardella 2016, 88–89)

5.4.3 Phase three: Designing

During the designing phase, either a completely new process is created, or the existing process is reworked, according to the agreed solution made in the previous phase. The output of this phase determines whether the improvement will be taken into use or not. Process mapping is an important tool in this stage as well, as is proper documentation and producing training materials for the employees. During this stage, each change has to be carefully tested in order to minimize errors and ensure the process works optimally. (Boutros & Cardella 2016, 89–91)

The objective of this phase is to improve the effectiveness, adaptability and efficiency of the business process, by:

- Eliminating bureaucracy, such as unnecessary approvals, paperwork and administrative tasks
- Removing identical activities that are executed at different points of the process
- Evaluating each activity and determining what value it gives to the process
- Reducing the complexity of the process and make it as simple as possible
- Finding ways to reduce the total amount of time it takes to complete the process
- Error proofing the new process

By removing all waste and unnecessary tasks, the process gains improved quality and performance. The process should flow smoothly and perform with minimal amount of effort. (Harrington 1991, 131–132)

Simplifying the process and its activities is one of the biggest time savers, as it leads to fewer steps and fewer tasks, which makes completing the process faster. Having a simple process greatly reduces the possibility of making errors, and helps the employees perform better. (Harrington 1991, 144)

While working on the new improvements for the process, the team must think about topics such as; can the cycle time be further reduced, has quality increased, does the new process remove the issues, and how will the new process affect employees. Other things to keep in mind are how the employees feel about such a significant change to the current way of working, and whether the organization feels ready to adopt the improvements. When an employee has gotten used to their way of working, it can be diffi-

cult for them to accept a new way performing tasks. It is then important to ensure that the improvements give more value to the employees and make them understand how the new process is better than the previous one. (Boutros & Cardella 2016, 90–93)

When the team feels confident the new process has been polished to perfection, it must once again be presented to and approved by the process owner and management. A green light from the management lets the team proceed to the next phase.

5.4.4 Phase four: Implementing

During the implementation phase, the actual changes are made to the existing process or the new process is put to work. This is when the project and improved process goes from a development state to the production state. This transition is called rollout, go-live, deployment, or installation, depending on the project. No single guideline for this transition exists, it all depends on what the improvements were, and what kind of process is being put to use. For larger projects, the implementation phase itself can be seen as a project and can take up to weeks of planning. (Boutros & Cardella 2016, 93–94)

It is important to recognize any obstacles that might hinder the transition when implementing the new process. Some common obstacles during this phase of the project are employees or managers expressing resistance and lack of support, involvement, resources, or awareness. (Boutros & Cardella 2016, 93–94)

During this phase, the employees are given a demonstration on the improved process and training materials to go along with it. The team needs to carefully monitor how the employees are faring with the process, and be ready to support them when the need arises. The aim is to make the transition as smooth and easy as possible for everyone involved. Feedback from the employees using the new process is valuable, as some unknown issues may arise that the team failed to recognize. These issues should be addressed and fixed as soon as possible. (Boutros & Cardella 2016, 94)

Once the project has been rolled out and the employees have an understanding of how to work with the new process, it is wise to remove any trace of the old process, in order to reduce temptation to go back to the old process. Doing this reinforces the support for the new and improved way of working. When the project has been implemented, the team who worked on it should write a review and other notes of how the rollout was

received, as well as all the feedback gained from participants. These documentations can be used later on in similar situations with new projects. (Boutros & Cardella 2016, 95–96)

5.4.5 Phase five: Continuous improvement

At the final phase of BPI, the task is to ensure the process changes continue delivering the required results. The focus in this phase is put on continuous improvement of the employees' skills and behaviors concerning the project. The team needs to make a plan on when to review and measure the process performance to make sure the new process is still working as intended. At regular intervals, the process has to be scanned for issues and examined for possible further improvements. (Boutros & Cardella 2016, 96)

5.5 Process mapping

A process must be defined before any improvements can properly be made. A systematic description of all the activities and tasks in a process is referred to as process mapping. The process maps show the process's inputs, performers, the series of activities the performers make, and the outputs of the process. When a process is mapped, meaningless and non-value adding activities can be identified. (Boutros & Cardella 2016, 36; Melan 1993, 45)

During process mapping, work activities and tasks can be described in words or by combining words and simple graphics. Descriptions containing only words are called instructions, while descriptions using words and symbols are called flowcharts. (Melan 1993, 45) The aim of process mapping is to identify all the decisions made and steps taken in a process. (Boutros & Cardella 2016, 36)

Process mapping creates a graphical overview of the process and all elements involved, which promotes understanding if the process and its activities seem too abstract otherwise. When a process is mapped out, it is possible to start analyzing and improving it. (Boutros & Cardella 2016, 38)

5.6 Mistake-proofing

Almost nothing is error free, so one of the goals of improving a process is to make it difficult to create mistakes. Some mistake-proofing methods are:

- Using different colors for different jobs, which tell the employee differences in tasks. A correct use of color codes will significantly reduce mistakes.
- Spellchecking and making sure that each letter and number is on its correct place. Double-checking everything saves time in the end, and minimizes misunderstandings and the opportunities of making mistakes.
- Making a list of all the things that could go wrong during the process and then eliminate or minimize those possibilities. This method is called a negative process analysis.

Making sure the amounts of potential mistakes are at a minimum ensures that those involved in the process can work fast and efficiently. (Harrington 1991, 150)

5.7 Flowchart

A flowchart is a simple and straightforward diagram showing how the activities in a process fit together. Using flowcharts is an excellent way of explaining how a process works and how to complete a process correctly. The simplicity of a flowchart helps those involved to understand the process better. A flowchart can be used in various useful ways, such as; analyzing and defining processes, explaining activities to those involved with the process, identifying bottlenecks and roadblocks, standardizing and improving the process, and troubleshooting a problem. (Boutros & Cardella 2016, 49–50; Harrington 1991, 86–87)

The aim of a flowchart is to visualize every step in the process, using shapes, words and arrows. A short written note near each shape provides details concerning that specific activity. According to Melan, the basic purpose of flowcharts is to “provide a symbolic representation of all the activities performed in the sequence in which they are conducted”. Flowcharts depend on the user recognizing the specific shapes for a certain task or activity, so that the information can be understood and processed quickly. In order to create a flowchart successfully, the process and its starting and ending point has to be identified. Then the required activities have to be arranged in the correct order, using arrows to demonstrate the flow of the diagram. Finally, the flowchart’s creator must come to an agreement with those involved that the flowchart is correct and understandable. (Boutros & Cardella 2016, 50; Melan 1993, 46)

A good flowchart should be easy to understand for everyone involved in the process. The flowchart should be read either from top to bottom, or from left to right, and include arrows to direct the user through every step of the process. Simple shapes and text indicate actions, decisions, and the beginning and end of the process. Arrows represent relationships between actions and the direction of the process. Diamond shapes are used to indicate a decision, which leads the process into one of two directions and an oval shape indicates the start or end of a process. A rectangle represents a specific action and arrows indicate the output and input from activities. (Boutros & Cardella 2016, 50; Melan 1993, 48)

5.8 Control and measurements

It is common for an organization to measure the performance of a process only at the end of it, when it is too late to react to errors or gain feedback from individual activities. Process control is a vital set of tools to ensure a process runs smoothly and correctly. The three main steps of process control are:

- Creating points of control, such as counting, auditing, and inspection
- Applying measurements
- Standardizing the process, by collecting feedback and making corrections

Creating control points is needed in order to make measurements, which serve as a basis for making corrections in the process. (Harrington 1991, 169; Melan 1993, 59)

After establishing clear control points, the next step in managing a process is to set the bounds for measurement based on the points of control. Measurements are used to determine if the process is performing according to its requirements, as well as to detect errors and bottlenecks. In order to gain the most valuable data, the person performing measurements should be the one who is performing the activity that is being measured, as the person in question gets feedback immediately and is the one who has the best understanding of the task. In business processes, five kinds of measurements can be performed; conformance, response time, service level, repetition, and cost. (Harrington 1991, 170; Melan 1993, 65)

Measurements can be made by collecting either attributes data or variables data, or both. Attributes data is simpler to collect and usually provides an answer similar to a “yes” or

a “no”. An example of a question that will yield attribute data is “Did an employee perform his task faster?”. Variables data measurements involve collecting data in the form of numeric values to give a more in depth view of the results. Continuing on the previous example, in order to get variables data the question could be “How many minutes faster was the employee?”. (Harrington 1991, 174–175)

An analysis can be made once enough of the relevant data has been collected. Measurement has little purpose without feedback, since feedback is needed to give the employees an opportunity to actually improve their way of working. The feedback must be of a high quality presented in an understandable format, containing meaningful and accurate data based on a correct analysis of the measurements. (Harrington 1991, 184)

5.9 Standardization

Boutros and Cardella describe standardization as “the formulation and implementation of guidelines, rules, and specifications for common and repeated use, aimed at achieving optimum efficiency or uniformity in a process, organization, or system”. Standardization is accomplished by setting unified guidelines and instructions on how a process should be carried out correctly. Standardizing processes is important for an organization, because it minimizes waste, maximizes efficiency and leads to a consistent level of quality. The objective of standardization is to make a process more efficient and eliminate communicational issues and errors from occurring. (Boutros & Cardella 2016, 22–24)

A standardized process needs clear and user-friendly instructions, so that every employee involved in the process follows the tasks in a unified manner. The instructions tell employees how a process works and how the activities have to be completed. According to Harrington, the instructions should be easy to understand and not be open to different interpretations. The instructions need to be based on careful analysis of the process. In addition to written instructions, a flowchart is often included to make an overview of the process and its activities. When a process is properly documented by showing exactly how the process needs to be completed, it has been standardized. (Harrington 1991, 153–155)

5.10 Streamlining

A process becomes streamlined once it is analyzed and standardized. A streamlined process reduces a great amount of waste, such as; the time needed to complete the process cycle, the number of approvals and steps required, the amount of input, as well as the cost of management and the process itself. Streamlining a process essentially eliminates non-value adding components of the original process, such as meaningless activities, roadblocks and frustration. The work can be done more easily, more safely, and more efficiently, with a minimum amount of possible errors. (Harrington 1991, 161–163)

The long-term effects of streamlining processes can be summarized as follows:

- Reducing activities that add no value decreases the amount of meaningless tasks, makes the work more productive and useful.
- Simplifying the process and its activities makes employees understand their work better, while also reducing the time it takes to complete the process.
- Error proofing the whole process and its activities reduces the overall probabilities of errors and crises from occurring, while also reducing the amount of help needed from management.

In addition to the benefits mentioned above, each one of them reduces costs, making streamlined processes highly valuable and profitable for the organization. (Harrington 1991, 161–163)

6 THEORETICAL FRAMEWORK

The theory of this thesis is divided into four main topics that are relevant to the project. The chapters are laid out in an order that starts with the widest area where the project takes place and narrows down to the main subject of this thesis, the accrual process.

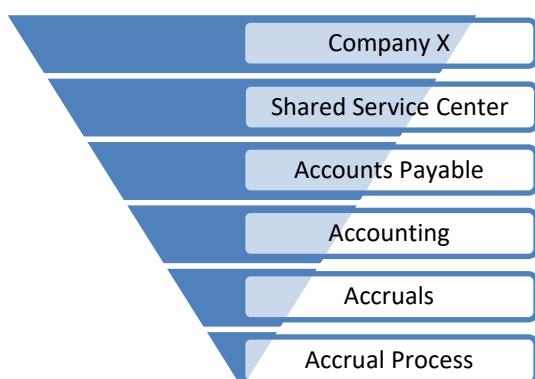


Figure 3. Theory mapping.

The first chapter after the thesis introduction presents the case company and SSC, where the accrual process takes place at the department accounts payable. The chapter is relevant as it gives the reader an understanding of the scale of the organization and the impact the project has on it and its employees. The author familiarized himself with the size of the organization and the amount of employees at SSC. The amount of entities affects the improved process, which needs to consider the differences between each entity. Some facts the author discovered about company X and its operations provided grounds for the improvement process, but this information is confidential and not disclosed in this thesis.

The following chapter introduces the reader to the basics of accounting that are relevant to the project. The chapter gives insight to the objectives of accounting, IFRS, financial statements and the accounting equation, that are all connected to the accrual process. It could be challenging to comprehend the specialized nature of the project without explaining the aforementioned topics first. The author studied IFRS to ensure the improved process follows its standards. The double entry accounting method is required and included in the improved accrual process, as the recording of transactions should always balance the debit and credit accounts.

In the chapter of accrual accounting, the theory delves deeper into accounting with the focus on the subject accruals. The chapter gives the reader an understanding as to why organizations have an accrual process and to what its significance is. The aim of this chapter is to provide context for the process described in the chapters ahead. The author researched the different methods of accrual accounting and the theory of accruals to understand the accrual process fully. The improved process could result in a faulty or unusable project if the author did not explore the areas the process affects, and why it exists.

The final theoretical chapter focuses on the practical method of improving a business process. The chapter includes key terms and tools needed to improve a process successfully. The theory on the five phases of BPI, process mapping, and flowchart creation were utilized in this thesis as guidelines to improve the existing accrual process. The whole thesis project revolves around utilizing the five phases of BPI to improve the current accrual process. Reducing the overall process time is achieved by eliminating the discussed excess waste, and creating the process map and flowchart for both the current and improved accrual process. Mistake-proofing was essential to ensure the project's functionality with regular updates to the improved process. The final objective of the thesis was to standardize the accrual process of company X, which is achieved with researching the relevant theories in the final subchapters.

7 IMPROVING THE ACCRUAL PROCESS

The accrual process in the department AP is performed on the first day of each month. The process as a whole involves other departments and functions that can generally begin their tasks only once the process at AP is completed. It is therefore important that the tasks of the accountants are performed in a timely manner at high accuracy, to ensure the process does not experience a halt during this stage. The process should take no longer than one working day, with some entities of the case company X requesting deadlines within that same day to allow the locals of the entities to begin their tasks at specific times. The accrual process affects the accuracy of financial statements for the entities of company X, with more entities entering the scope of SSC periodically.

The five phases of BPI described in chapter five were followed to improve the current accrual process at SSC. Chapters eight to twelve describe the progress of the thesis project through the five BPI phases. The project revolved around simplifying and accelerating the process by automating certain activities with macros in Excel. The Excel file created and studied in this thesis will be referred to as the Accruals file in this thesis.

8 PHASE ONE: PLANNING

This chapter clarifies the starting and ending point of the accrual process at AP and defines the issues within it. An improvement plan with suggested solutions is created during the planning phase with management subsequently approving the plan.

8.1 Starting and ending point

The starting point of the accrual process at AP begins with an Excel file that accountants receive by email on the first day of the month. The received Excel file contains a list of all the invoices that accountants check whether the invoices require accruals or not. The accrual process for the accountants ends the moment the accruals are marked as completed in the SAP system. Once the process performed by the accountants is completed, the local employees of the company X entities can begin their procedures of the accrual process.

8.2 Defining problematic process areas

The author envisioned possible improvements to the current process through experiencing hindrances that slow down the accountants. Accountants describe the received input of the Excel file with invoices as unorganized and containing an excessive amount of unnecessary data. One accountant in each entity's team sorts out and organizes the relevant data needed for the accrual process while the other team members sit idly waiting.

Accountants have processed most of the invoices included in the received Excel file previously in their daily work by inserting information, such as gross amounts and tax values of each invoice to the SAP system. In the current process, accountants do double work by opening each invoice to determine the net amount again, when the net amount can already be calculated with the values previously inserted to the system.

The received Excel file is converted into CSV format in order to upload the data to SAP. A premade template is used to which accountants copy and paste the data over to a layout that the system can interpret. The data is copied cell by cell as the layout of the two files is different. Since the accountants are copying data that they previously inserted, this activity of the process is essentially double work. Accountants also expressed concern that the CSV template is confusing and challenging to use.

8.3 Improvement plan

Three activities were identified in the current accrual process as unnecessary manual work. The first activity of sorting the input currently has waste in the form of waiting and transportation of data. The second activity of inserting net amounts contains waste of over processing the data in both SAP and Excel. The final activity of converting to CSV format includes waste of unnecessary transportation, motion, and over processing. The three main improvement areas identified in this thesis are:

1. Sorting invoices
2. Inserting net amounts
3. CSV creation

The project will be centered on improving the current accrual process instead of creating a new process. The process starting and ending points will remain the same, while the activities of sorting, inserting net amounts, and CSV creation will have their tasks mostly replaced with macros, greatly reducing the amount of waste within each activity. The first aim of the improvement project is to automate the three activities by creating a macro for each of them, resulting in reduced amount of waste, speeding up the accrual process. The second aim is for the process to be standardized so that any accountant is capable of making accruals without the need for additional training or instructions for any company X entity.

8.4 Management approval

An early demo version of the Accruals file was created with the two activities of sorting and CSV creation automated. An email with a summary of the improvement plan was sent to an AP manager and the accrual expert at SSC to inquire if there is interest in the improvement suggestion. The manager scheduled a meeting with the author, accrual expert and the other managers of the AP department to see a presentation of the improvement plan. Management saw great potential and approved the improvement plan, and appointed the accrual expert as the process owner to the project. With the management's approval, the author could progress to the analyzing phase of BPI.

9 PHASE TWO: ANALYZING

The aim of this chapter is to analyze thoroughly the current accrual process. This is achieved by creating a process map and visualizing the process through a flowchart. The three activities selected for improvement are timed and analyzed.

9.1 Describing the current process

The accrual process begins with accountants receiving an email from the system on the first day of the month. The email contains an Excel attachment with a list of invoices for accruals, as well as invoices already accrued by the system itself. Each entity of company X has its own Excel file that the accountant handling that entity saves to the PC. If several accountants make accruals for an entity, only one accountant performs this first and the following two activities, while other team members sit idly waiting.

The second activity of the process is organizing the invoices of the Excel list into tabs according to document type (FI and MM) and currencies. The purpose of the list is to serve as future reference for how the invoices were accrued and why certain invoices were not accrued. The first task is for accountants to delete twenty unnecessary columns from the received Excel list and create two new columns named “Comments” and “Net amounts”. The invoices are then sorted to one of two tabs according to their document type. The invoices in each tab have to be further divided into new tabs based on their currencies. The accountant manually creates and renames the tabs. The next task is to hide the rows of invoices that are accrued by the system and to resize the columns to fit the data in every tab. Finally, the accountant deletes the original unnecessary tabs that the Excel list contained. One accountant per entity completes the whole activity of sorting invoices, with the other team members waiting for the activity to be finished.

The third activity is a decision point during which the accountant reviews the created tabs to ensure the invoices are sorted correctly by type and currency. In the event of an error, the accountant must return to the previous activity for correction. Once the Excel file is organized correctly, it is sent to the other team members to begin with the next activity.

The fourth activity is inserting the net amounts for FI invoices by loading and opening the invoices in the SAP system one at a time. The accountant searches through each in-

voice image for the net amount and inserts it to the Excel file. The total sum of all the FI invoices with the net amount below X are accrued to a default cost object and profit center for that specific entity. FI invoices with the net amount over X are accrued to their respective cost object that the cost belongs to. These invoices have the G/L account, profit center and cost object added to the Excel file. The fourth activity ends once all the FI invoices are processed.

The fifth activity is opening every MM invoice in the SAP system to check for the status of goods receipt (GR). The GR status of the invoice determines whether the accountant must make accrual for the invoice or that no accrual is required. The MM invoices that need accrual have the net amounts, G/L account, profit center and cost object inserted to the Excel file.

The next activity is to compose an Excel file in CSV format for each document type and its currency. Accountants use a second Excel file in this activity as the SAP system retrieves data from specific cells in the CSV file. The accrual expert provides a premade Excel template to insert the necessary accrual data. The header data of accruals consists of the entity code, document type, currency, and dates specifics.

	A	B	C	D	E	F	G	H	I	J
	Company code	Document	Currency	Document Date	Posting Date	Reference	Document Header Text	Exchange Rate	Calculate Tax	Posting Period
	Delete header type						(first 25 characters visible to approver in inbox)			
	line and save	M1 = G/L								
	as csv before	document								
	upload!	M2 = G/L								
		document								
1										
2	Entity X	M2	EUR	31.03.2018	31.03.2018	Accruals 03.18	Accruals Mar 2018		yes	3

Figure 4. CSV header data.

FI invoices with net amounts below X are added together and posted as a lump sum to the default account specifically used by the entity. An example of a lump sum posting is seen in Figure 5 where the confidential information is in italic text form.

	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
	Posting	GL Account	Net amount	Tax Code		Text			Cost Center	Order	Profit Center	WBS Element	Network	#
	Key													
	debit /													
	credit													
	debit	<i>G/L accrual account</i>	1,23			lump sum					<i>profit center</i>			
	credit	<i>G/L cost account</i>	1,23	<i>tax code</i>		lump sum			<i>cost center</i>		<i>profit center</i>			

Figure 5. CSV lump sum.

FI invoices with net amounts over X and MM invoices are accrued to their own assigned cost account. The G/L account and cost objects are searched and taken from the system for each invoice and inserted to the Excel file accordingly. A single invoice may require multiple lines if the expenses are divided to different cost objects. An example is shown in the figure below with the second invoice consisting of two different cost objects that are inserted to four lines.

K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Posting	GL Account	Net amount	Tax Code		Text			Cost Center	Order	Profit Center	WBS Element	Network #	
Key													
debit / credit													
debit	G/L accrual account	1,23			invoice 1					profit center			
credit	G/L cost account	1,23	tax code		invoice 1			cost center		profit center			
debit	G/L accrual account	4,56			invoice 2					profit center			
credit	G/L cost account	4,56	tax code		invoice 2				order	profit center			
debit	G/L accrual account	7,89			invoice 2					profit center			
credit	G/L cost account	7,89	tax code		invoice 2			cost center		profit center			

Figure 6. CSV separate account lines.

The activity of Create CSV ends with deleting the blue header row of the Excel file and saving the file in the format CSV (comma delimited). A decision point follows with the accountant checking whether the inserted data to the CSV file is placed in the correct cells.

The final activities are to upload the CSV file to the system and attaching both Excel files as attachments to the posting of the accruals. A local person of the entity is selected as approver for the accrual posting, whose name is found in Intranet with the entity specifics.

Once the data is uploaded to SAP, the accountant presses a button for the system to check for errors. If an error message is displayed, the accountant traces the error back to the activities of either FI invoices or MM invoices. The correction is then made in the Excel file and the CSV file, for the data to be uploaded back into the system and finally posted. The accrual process ends when all the accruals are posted and the accountant has marked the process as completed in the system.

9.2 Current process map and flowchart

The process map listed below is the result from the author's own experience and from observing four accountants of separate teams performing the current accrual process.

One of the accountants did not follow the correct guidelines of accruals set by company X, which shows that a standardized process is necessary to ensure the standards and rules of accrual accounting are followed. Confidential information is reworded or left out from the map.

9.2.1 Receive email

- Open Outlook
- Open the inbox of company X entity
- Open the email received from SAP
- Open the Excel attachment
- Save the Excel attachment to the PC with the name of entity and date

9.2.2 Sort invoices

- Delete 20 unnecessary columns
- Create a new column with the title “Comments”
- Create a new column with the title “Net amounts”
- Create a new tab with the title “FI”
- Copy and paste all FI invoices to the FI tab
- Sort the column with gross amounts from smallest to largest in the FI tab
- Create a new tab with the title “MM”
- Copy and paste all MM invoices to the MM tab
- Sort the column with gross amounts from smallest to largest in the MM tab
- Create new tabs for each different currency of FI invoices
- Copy and paste the FI invoices to their currency tabs
- Create new tabs for each different currency of MM invoices
- Copy and paste the MM invoices to their currency tabs
- Hide in every tab the invoice rows that are already accrued (do not delete these)
- Resize the columns to fit the data in every tab
- Delete the tabs that the Excel file started with

9.2.3 Review tabs

- Check that every tab has the correct invoice document type (FI / MM)

- Check that every tab has the correct currency
- If incorrect: Return to the activity Sort invoices
- If correct: Send the file to colleagues and continue with the next activity

9.2.4 FI invoices

- Copy and paste the document numbers from Excel into the SAP system
- Load the invoices in the SAP system
- Open the invoice image and search for the net amount
- Insert the net amount to the Excel file column Net amounts
- If the net amount is over X amount:
 - Insert the G/L account to the Excel file
 - Insert the profit center to the Excel file
 - Insert the cost object to the Excel file
- Repeat for the next invoices until all FI invoices are processed

9.2.5 MM invoices

- Copy and paste the document numbers from Excel into the SAP system
- Load the invoices in the SAP system
- Open the invoice purchase order and check the status of goods receipt
- If accrual is needed:
 - Open the invoice image and search for the net amount
 - Insert the net amount to the Excel file column Net amounts
 - Insert the G/L account to the Excel file
 - Insert the profit center to the Excel file
 - Insert the cost object to the Excel file
- Repeat for the next invoices until all MM invoices are checked and processed

9.2.6 Create CSV

- Open the Excel template provided by the accrual expert
- Insert header data
 - Insert entity
 - Insert document type

- Insert currency
- Insert document date
- Insert posting date
- Insert document header text
- Insert “yes”
- Insert posting period
- Insert item data
 - Add the FI net amounts that are below X as a total sum
 - Insert the total net sum to two lines
 - Insert the net amounts over X for each invoice to two lines below the previous invoice
 - Insert the text “credit” and “debit” to the correct lines for each invoice
 - Insert the G/L accrual account to the correct line for each invoice
 - Insert the (default) G/L cost account to the correct line for each invoice
 - Insert the default tax code to the correct line for each invoice
 - Insert the text “lump sum” to the two lines of the total FI net sum
 - Insert the document number to the two lines for each invoice that is not a lump sum
 - Insert the (default) cost object to the correct line for each invoice
 - Insert the (default) profit center to the two lines
- Delete the first header row of the Excel template
- Save the Excel template as CSV (comma delimited) with the name entity, document type and currency
- Repeat for every document type and each currency

9.2.7 Review CSV

- Check that all the data of every invoice is correctly inserted to the CSV file
- Check that the debit and credit lines are inserted to the correct rows
- If incorrect: Return to the activity Create CSV
- If correct: Continue with the next activity

9.2.8 Process accruals

- Upload the CSV file into the SAP system

- Attach the Excel file with all the FI and MM tabs and their currencies
- Attach the CSV file
- Choose approver (information found in Intranet)

9.2.9 Check for errors

- Click the button Check Errors in the SAP system
- If error: Delete the CSV file and return to the activity FI invoices or MM invoices depending on which contains the error
- If no error: Post the accrual and repeat the activity Process accruals until all document types and currencies are posted

9.2.10 Complete process

- Mark the process as completed in the SAP system

9.2.11 Flowchart

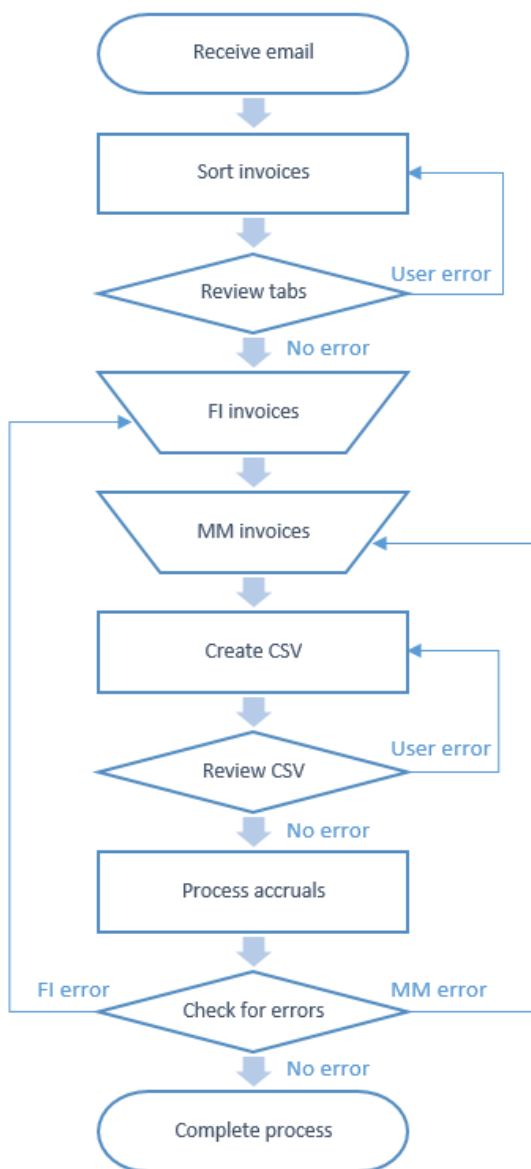


Figure 7. Flowchart current process.

9.3 Activity time measurement

The time to complete the accrual process varies heavily depending on the amount of invoices that require accrual. The entities of company X are of different sizes with invoice volumes that vary each month, thus no exact process time can be measured.

Three accountants were timed completing the activities of sorting invoices, inserting net amounts, and creating the CSV file. The actual number of accruals and entities of company X is confidential and is not disclosed in this thesis.

The sorting of invoices for a small sized entity takes approximately 5 minutes, with the average time of 10 minutes for a medium sized entity. The average time an accountant took to find the net amount for a single invoice in SAP and inserting it to Excel was timed at 35 seconds. Filling in the CSV header and saving the file to the correct format took an average of 2 minutes, with the copy and pasting of the invoice data to the CSV template timed at an average of 90 seconds per invoice.

9.4 Analyzing the current process

The first activity of receiving the email and saving the attachment has a timespan of less than a minute. It is a minor activity that could be automated with a macro, but the time spent creating a macro for this activity would not be profitable in relation to the time saved by automation. This first activity is not automated in this thesis project, but could possibly be developed in the future during the continuous improvement phase.

The current activity of sorting invoices contains an excessive amount of tedious tasks of copying data from one tab and pasting it into another. The received file is a clutter of unorganized data from where the accountant needs to single out and transfer the data relevant for the accruals. Accountants describe the activity as a preparatory step needed to begin the actual accruals of invoices. It is apparent during the early activity that the current process is not standardized. The sorting of invoices is prone to user errors with the possibility of losing invoices in transfer. Accountants have different ways of completing the tasks of the activity, with some deleting data needed for future reference. Organizing data into a standardized presentable layout is possible to automate with macros. The macro could sort the invoices correctly with a press of a button, saving a considerable amount of time and greatly reducing the possibility of user errors.

Inserting net amounts for FI invoices repeats previously completed work. Accountants already processed most of the FI invoices once in the system, and have inserted the gross amounts and tax percentages for each invoice. Inserting the net amounts to the Excel file is essentially double work, as it is possible to calculate the net amounts with the existing data. However, the Excel file accountants receive does not include the tax data needed to calculate the net amounts from the gross amounts. Accountants must open each invoice in the system and extract the relevant data to the Excel file, while a macro could automate this task in mass amounts at once if the tax data was extracted

from the system. The time spent on retrieving the data from the system would justify the time accountants spend on the activity for each invoice at a time.

The Excel file contains all the data needed to complete the accrual process once the net amounts and cost objects are inserted to the file. The final time consuming activity is to create a CSV file to upload the data into the system for accrual posting. The creation of the CSV file is essentially moving the data to predetermined positions from one Excel file to another, without adding any new data. The activity holds a large amount of tedious manual tasks and has a high risk of user errors that could be prevented with the use of a macro fully automating the CSV creation.

The areas mentioned in this chapter currently give accountants many opportunities for errors, which leads to loss of credibility in the financial statements.

10 PHASE THREE: DESIGNING

This chapter describes the improved process in detail with the new process map and flowchart listing the activities and tasks of accountants. The existing process is re-worked with the activities of accountants now simplified, automated, or eliminated from the accrual process. The automations and contents of the Accruals file are explained and illustrated towards the end of this chapter.

10.1 Describing the improved process

The first activity of receiving and opening the Excel file remains virtually the same in the improved process, as the process mapping shows that little time would be saved by automating the few swift tasks. The only task difference between the current and improved version is that the received attachment is no longer saved or used at all. The received file is opened briefly for extracting the invoice data to the Accruals file in the improved process.

The second activity of sorting the invoices is fully automated in the improved process. The Accruals file initially contains a single tab labelled “Contents” with a blue button as depicted below. The accountant performs two simple tasks during this activity: open the Accruals file and click the button “Insert invoices”.

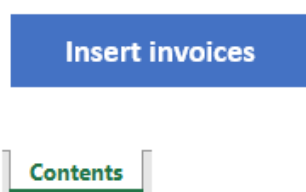


Figure 8. Sorting invoices.

The button is assigned to a macro that extracts the data from the Excel file of the first activity into the Accruals file. The macro sorts all the invoices by document type and currencies, which are listed into separate tabs labelled accordingly. The macro completes this previously lengthy manual activity in a few seconds. The user is notified once the invoices are sorted with the message shown in the figure below.

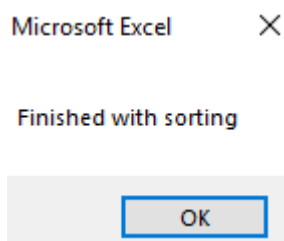


Figure 9. Sorting message.

The decision activity of reviewing the tabs is removed from the improved process as the invoices are sorted by automation, thus removing the possibility of user errors.

After confirming the message that sorting is completed, a new button labelled “Insert FI net amounts” appears below the approver panel. The button is assigned to a macro that can automatically insert the net amounts for the invoices based on invoice roles, gross amounts, and tax percentages. The tax percentages are not provided in the received file, therefore an Excel list of the invoices with the tax data needs to be obtained from SAP. The accountant may press the button Insert FI net amounts with both the Accruals file and the tax data file opened simultaneously. The time saved in this activity increases exponentially the higher the volumes of FI invoices are.



Figure 10. Inserting FI net amounts.

The macro checks the status of each invoice to determine whether the net amounts can be calculated with certainty, and for this reason, some net amounts may be left out and are to be checked manually.

The tasks of the activity FI invoices remains similar in the improved file as in the current process. The difference is that the number of FI invoices that still need the net amounts inserted manually is greatly reduced.

The activity of MM invoices also remains similar, but gained a timesaving improvement with the GR column displaying whether the invoice requires accrual or not. Accountants do not have to waste time investigating the invoices now accompanied by a “Not req” comment.

When the accountant has filled in all the missing data of net amounts and cost objects to the list of invoices, the accountant presses the button “CSV” located in the top row of the Text column to create the CSV file of all the invoices in that tab automatically. The macro saves the created CSV file to the same folder destination as the Accruals file. A message informs the accountant that a new CSV file is created and informs the name of the document. The CSV creation can be repeated for any number of tabs that include invoices that need accrual.



Figure 11. Creating CSV.

The uploading of the CSV file to SAP remains the same in the improved process as the tasks are performed within the system and cannot be automated with the assistance of macros. A quality of life difference is that the approver of the entity is visible in the Contents tab, as opposed to the current process, where the name must be looked up from the entity’s specific instructions found in Intranet.

The second to last activity is for SAP to check for errors and to post the accruals. The final activity is for the accountant to mark the accrual process as completed in SAP, upon which other functions of company X and the local entity can proceed with their activities.

10.2 Improved process map and flowchart

A large amount of waste is removed from the accrual process, resulting in a shorter process map. All accountants may begin the accrual process immediately as the improved process contains no idle time. Confidential information is reworded or left out from the map.

10.2.1 Receive email

- Open Outlook
- Open the inbox of company X entity
- Open the email received from SAP
- Open the Excel attachment

10.2.2 Sort invoices

- Open the Accruals file
- Click the button “Insert invoices”

10.2.3 Automate net amounts

(Skip this activity if FI volumes are lower than six invoices)

- Export Excel spreadsheet from SAP to obtain the tax codes
- Click the button “Insert FI net amounts”

10.2.4 FI invoices

- Copy and paste the document numbers from Excel into the SAP system
- Load the invoices in the SAP system
- Open the invoice image and check for the net amount
- Insert the net amount to the Excel file column Net amounts
- If the net amount is over X amount:
 - Insert the G/L account to the Excel file
 - Insert the profit center to the Excel file
 - Insert the cost object to the Excel file
- Repeat for the next invoices until all FI invoices are processed

10.2.5 MM invoices

- Copy and paste the document numbers from Excel into the SAP system
- Load the invoices in the SAP system
- Check the status of goods receipt
- If accrual is needed:
 - Open the invoice image and search for the net amount
 - Insert the net amount to the Excel file column Net amounts
 - Insert the G/L account to the Excel file
 - Insert the profit center to the Excel file
 - Insert the cost object to the Excel file
- Repeat for the next invoices until all MM invoices are checked and processed

10.2.6 Create CSV

- Click the button “CSV” and repeat for every document type and each currency

10.2.7 Process accruals

- Upload the CSV file into the SAP system
- Attach the Accruals file with all the FI and MM tabs and their currencies
- Attach the CSV file
- Choose approver (information found in the Accruals file for convenience)

10.2.8 Check for errors

- Click the button Check Errors in the SAP system
- If error: Delete the CSV file and return to the activity FI invoices or MM invoices depending on which contains the error
- If no error: Post the accrual and repeat the activity Posting accruals until all document types and currencies are posted

10.2.9 Complete process

- Mark the process as completed in the SAP system

10.2.10 Flowchart

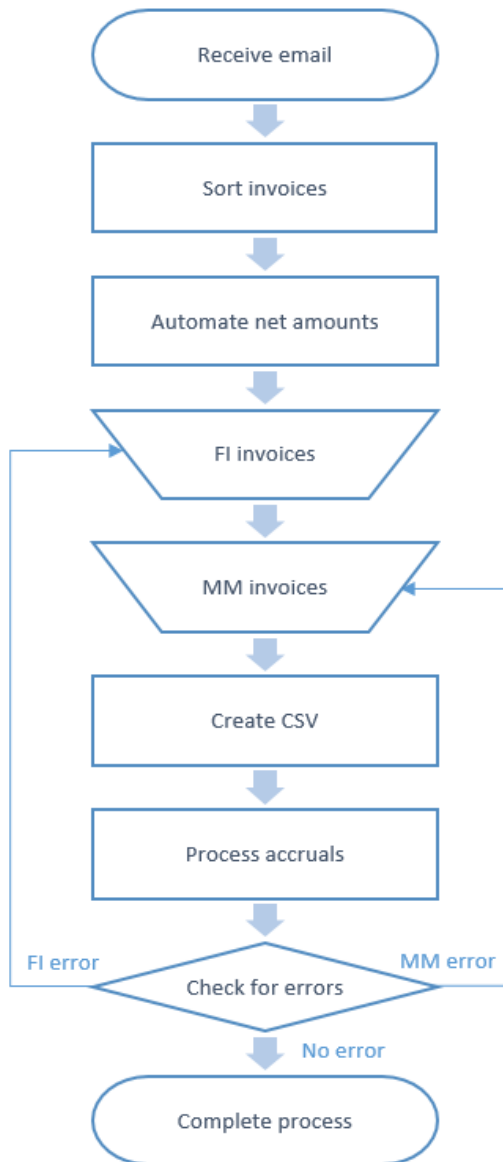


Figure 12. Flowchart improved process.

10.3 Improved Accruals file

The improved process contains several macros that are created to speed up the process and to convenience the accountants. In addition to macros, the Accruals file contains data of each company X entity, which the macros utilize for their actions. The Accruals file and the macros have been thoroughly mistake-proofed, and the improved process is simplified and standardized for the AP department.

10.3.1 Entity specifics tab

The Accruals file contains a protected hidden tab with all the data specifics of the entities of company X. The macros retrieve in the background the entity specific information from the tab. The entity name and entity code, as well as the name of the entity's approver are displayed in the tab Contents once the invoices are sorted into the Accruals file. The tax code, profit center and cost object are used in the creation of the CSV file, and by the macro that inserts the default profit center and cost object. It is possible to exclude entities from the automation of net amounts with a dropdown list in column Calculate net, if ever requested by management.

Entity name	Entity code	Tax code	Profit center	Default cost object	Type cost object	Calculate net	Approver
Entity full name X	Entity code X	AB	123	456789	Cost center	Yes	USER - Name of approver X
Entity full name Y	Entity code Y	CD	456	789101112	Order	Yes	USER - Name of approver Y
Entity full name Z	Entity code Z	EF	789	101112	Cost center	No	USER - Name of approver Z

Figure 13. Entity specifics.

In addition, the Entity specifics tab lists all the tax codes with percentages that are used by the entities. The macro uses data from this list to calculate the net amounts.

10.3.2 Sorting macro

The macro created for sorting invoices is activated once the button “Insert invoices” is pressed. The macro's first action is to verify whether the attachment the accountant received by email is opened. Without the attachment opened, the accountant is prompted with a message reminding to open the email's attachment.

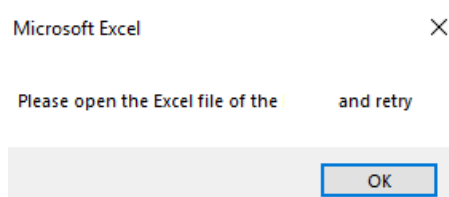


Figure 14. Open attachment message.

With the attachment opened and the button pressed, the macro extracts the data and inserts it to the Accruals file. A new document is saved to the same folder as the Accruals file with the name format “*entity Accruals date*”. The received attachment file and the original Accruals file, in which the button was pressed, closes with the contents remaining unaltered. The creation of the new document allows the accountant to re-use the Ac-

accruals file for another accrual process without the need to download several copies of the Accruals file. Users will not notice the change in document beside the name alteration at the very top of the Excel file.

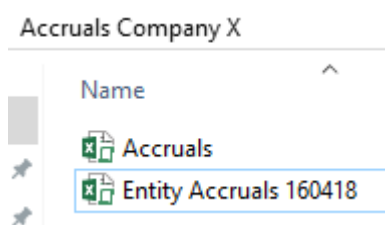


Figure 15. Change of files.

The next action the macro takes is removing the button “Insert invoices” and inserting five panels to the Contents tab. The macro locates the entity code from the extracted data and inserts it to the entity panel. With this information, the macro retrieves the name of entity and approver from the Entity specifics tab. The macro adds every unique currency that is present in the list of invoices to the three invoice panels. The panels display the volumes of invoices by document type and currency.

Entity code	Volumes	Total #	FI	Total #	MM	Total #
Entity full name	EUR	#	EUR	#	EUR	#
Approver	GBP	#	GBP	#	GBP	#
USER - Name of Approver	USD	#	USD	#	SEK	#
	SEK	#				

Contents	FI EUR	FI GBP	FI USD	MM EUR	MM GBP	MM SEK
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Figure 16. Contents tab.

The macro creates tabs of the FI and MM invoices and their currencies colored yellow and blue respectively as seen in Figure 16. The created tabs contain the list of invoices of the specific document type and currency. The top row and its contents serve as a header that remains visible when scrolling downwards. The first nine columns in the list are colored dark blue and contain data the macro extracted from the email’s attachment. The macro only displays columns that are relevant for accruals and thus reduces the amount of columns from 28 to nine.

A	B	C	D	E	F	G	H	I
Vendor	Reference	Text	EUR	Role	FI doc #	Doc #	Accrued	GR
Vendor X	Invoice 1		-1,49	Role X	Invoice 1	Invoice 1		Req
Vendor X	Invoice 2	Note by accountant or local entity	4,83	Role X	Invoice 2	Invoice 2		Req
Vendor X	Invoice 3		5,01	Role X	Invoice 3	Invoice 3		Req
Vendor X	Invoice 4	Note by accountant or local entity	7,89	Role X	Invoice 4	Invoice 4		Not req
Vendor X	Invoice 5		12,23	Role X	Invoice 5	Invoice 5		Req

Figure 17. Invoice list SAP data.

The first column titled Vendor lists the vendor account numbers and the second column titled Reference lists the invoice reference numbers. Accountants may use the data in the first two columns as a reference in SAP if desired. The third column Text contains notes that accountants or local employees may have written while processing the invoice in SAP. The next column lists the currency in the header with the gross amounts automatically sorted from lowest to highest amount. The column Role presents the invoice status, which is used to determine the credibility of the invoice data displayed in the columns. Accountants may use the document numbers in the following two columns to locate the invoice in SAP for any missing data. The eighth column holds information on whether the automated system has accrued the invoice already. The invoices that are already accrued are automatically hidden, as accountants do not need to process these further.

The final column, GR, informs the accountant if an MM invoice requires accrual or not. The macro decrypts the data from a tab that was present in the received Excel attachment. The tab lists the document numbers with three columns that are either blank or have an “X” marked in the cells. The GR status is determined based on combinations of the marked cells in the three columns. Accountants do not utilize the GR tab in the current process, as the list is unorganized and difficult to read. The improved process clearly states in the GR column if an accountant needs to process the invoice for accruals or if the invoice does not need to be investigated for G/L account, profit center and cost object, thus saving a considerable amount of time.

DocumentNr	PONr	LineItem	GR_Required	GR_NonVal	DeliveryCl
Document 1	PO #	10	X	X	X
Document 2	PO #	100			
Document 2	PO #	110	X	X	X
Document 2	PO #	130	X	X	X
Document 3	PO #	120	X		X
Document 4	PO #	20			
Document 5	PO #	580			X

Figure 18. GR status tab.

To the right of the nine dark blue data columns are nine more columns, colored either yellow or blue depending on whether it is a tab for FI or MM invoices. These columns require manual input, which is the reason for the different color schemes. In the first column, the accountant has the possibility to insert a comment regarding the invoice and subsequently insert the relevant invoice data to the remaining columns. The sorting macro does not have the necessary data to fill in these columns, which remain blank once the sorting is finished.

Comments	Net amounts	G/L	Pcenter	CC	Order	WBS	Network	#
Comments	Net amounts	G/L	Pcenter	CC	Order	WBS	Network	#

Figure 19. MM (blue) and FI (yellow) headers.

All columns are at a fixed width that fits the maximum amount of characters that SAP allows for that field. The total width of the invoice list is designed to fit the screen width at company X, to prevent the need of horizontal scrolling. Due to this, the text in the header may be abbreviated, but is displayed when the header cell is selected as shown in the figure below.

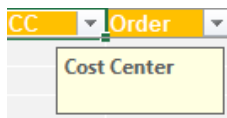


Figure 20. Header description.

The final action of the sorting macro is to insert a new macro button that will automatically insert the known net amounts for eligible invoices. The macro prompts a message to inform the user that the macro has finished sorting the invoices. The volumes of invoices and the performance of the PC affect the timespan of the sorting macro, which completes its run in one to five seconds.

10.3.3 Net amounts macro

A new button appears below the panels in the Contents tab once the sorting macro has completed its run. The button is assigned to a macro that inserts the known net amounts to the FI invoices. The first action of the macro is to determine whether the invoice data extracted from the system is reliable, based on its role. Invoices with an unsuitable role require a manual check to confirm the net amount, thus the macro keeps the Net amounts cell blank for that invoice.

The macro's second action is replacing the column Role with the tax codes of the invoices, retrieved from the Excel file that the accountant exported from SAP. The macro confirms the entity and tax codes to obtain the tax percentage from the hidden tab Entity specifics. With the percentage, the net amounts are calculated from the gross amounts and inserted accordingly. The macro is capable of confirming the correct tax percentage if entities have identical tax codes with different percentages.

D	E	F	G	H	I	J	K
EUR	Tax	FI doc #	Doc #	Accrued	GR	Comments	Net amounts
-1,49	21%	Invoice 1	Invoice 1				-1,23
4,83	6%	Invoice 2	Invoice 2				4,56
5,01	0%	Invoice 3	Invoice 3				5,01
7,89		Invoice 4	Invoice 4				
12,23	21%	Invoice 5	Invoice 5				10,11

Figure 21. FI net amounts automated.

The net amount macro completes its run in two seconds. The duration of retrieving the list with tax codes from the system and the run of the macro is a minute on average. The greater the amount of listed FI invoices, the more time is saved utilizing the net amounts macro.

10.3.4 CSV creation macro

The CSV macro is a button located in the header which, when activated, automatically creates the CSV file required for uploading to SAP.

The first action of the CSV macro is to examine all the listed invoices if any are already included in an existing CSV file, or accrued by the automated system. The macro confirms this criterion from the column Accrued and excludes these invoices from its run.

Secondly, the CSV macro decides for each invoice if it is accrued as a lump sum to the entity's default account or if the invoice is accrued to its own cost account that the accountant specified. The macro includes invoices that have the net amount inserted without a G/L account or profit center to the lump sum. If an accountant has inserted the net amount, G/L account, profit center, and cost object, the macro will accrue the invoice accordingly. The macro excludes invoices without a net amount from the CSV file, as these do not need accrual or still require input by an accountant.

The invoices eligible for accrual are inserted to their respective debit and credit rows in a new Excel file. The macro organizes the invoice data to the correct columns as required by SAP, and inserts the entity's tax code and default accounts from the Entity specifics tab.

K	L	M	N	O	P	Q	R	S	T	U	V	W	X
credit	G/L accrual account	5,01			LUMP SUM					default pcenter			
debit	G/L default account	5,01	tax code		LUMP SUM				default order	default pcenter			
debit	G/L accrual account	1,23			Invoice 1					pcenter			
credit	G/L account	1,23	tax code		Invoice 1					pcenter		network #	
credit	G/L accrual account	4,56			Invoice 2					pcenter			
debit	G/L account	4,56	tax code		Invoice 2			cc		pcenter			
credit	G/L accrual account	10,11			Invoice 5					pcenter			
debit	G/L account	10,11	tax code		Invoice 5				order	pcenter			

Figure 22. CSV invoices automated.

The macro automatically retrieves and inserts all data required for the header in columns A to J.

	A	B	C	D	E	F	G	H	I	J
1	Entity X	M2	EUR	31.03.2018	31.03.2018	Accruals 03.18	Accruals Mar 2018		yes	3

Figure 23. CSV header data automated.

Once the macro has inserted all the data for accrual, the file is automatically saved in CSV (comma delimited) format and stored in the directory with the Accruals file. The created CSV file is named with the abbreviations of entity, document type, currency, and current time, for convenience. The time and accrual type are inserted to the column Accrued in the Accruals file for the invoices that were included in the CSV file. The timestamp and accrual type are for reference to identify which CSV file contains the accrued invoice.

H	I	J	K	L	M	N	O	P	Q	R
Accrued	GR	Comments	Net amounts	G/L	Pcenter	CC	Order	WBS	Network	#
12.05 lines			-1,23	g/l account	pcenter				network	#
12.05 lines			4,56	g/l account	pcenter	cc				
12.05 lump			5,01							
12.05 lines			10,11	g/l account	pcenter		order			

Figure 24. CSV timestamp.

The whole activity of CSV creation is automated with the press of a button and takes a few seconds to complete in the improved process.

10.3.5 Insert row macro

Certain invoices may have costs that must be accrued to different G/L accounts. Multiple rows are necessary for the accountant to divide the costs over to different G/L accounts, because each invoice is listed in a single row. The insert row macro creates an additional line for the selected invoice and inserts the mandatory document numbers to the newly created row. The accountant can instantly locate which invoices are split to different G/L accounts and cost objects, as all the cells in columns A to I are blank, except the document numbers.

D	E	F	G	H	I	J	K	L	M	N	O	
EUR	Tax	FI doc #	Doc #	Accrued	GR	Comments	Net amounts	G/L	Pcenter	CC	Order	WBS
-1,49	21%	Invoice 1	Invoice 1		Req		-1,23	g/l account	pcenter		order	
4,83	6%	Invoice 2	Invoice 2		Req		2,00	g/l account	pcenter	cc		
		Invoice 2	Invoice 2				2,00	g/l account	pcenter			wbs
		Invoice 2	Invoice 2				0,56	g/l account	pcenter		order	
5,01	0%	Invoice 3	Invoice 3		Req		5,01	g/l account	pcenter			wbs
7,89		Invoice 4	Invoice 4		Not req							
12,23	21%	Invoice 5	Invoice 5		Req		10,11	g/l account	pcenter		order	

Figure 25. Insert row macro.

The insert row macro is activated by pressing the keys Ctrl + r simultaneously. The author chose the letter R, because it resembles the word Row, making it easy for accountants to remember the shortcut keys. The key combination can be repeated as many times as necessary.

10.3.6 Insert default account macro

Invoices with an unknown cost object are accrued to the default cost account of the entity. The default account macro activates with the keys Ctrl + d pressed simultaneously. The macro inserts the default profit center and default cost object for the selected invoice. The default data is retrieved from the Entity specifics tab by the macro and eliminates the need for accountants to memorize or look up the entity's default cost account.

10.3.7 Data visualization

The Accruals file uses mild colors for user-friendly data visualization with the lists of invoices. Accountants can comprehend the large amount of invoice information quickly and proceed with the tasks in a timelier manner. To disguise the two document types from each other with ease, the FI invoices have the header and tab colored yellow, and the MM invoices in light blue. The debit invoices are with the default white background and credit invoices have a light gray background. The credit invoices are visualized with a different color to assist the accountant with inserting the net amount correctly with a negative amount. It is important for credit invoices to have the amounts inserted as negative for the CSV file to place the debit and credit lines appropriately, as well as calculating the lump sum correctly. If an accountant puts a positive net amount to a credit invoice, the amount will show with a red background, alerting the accountant to insert the amount as negative.

The column Text contains comments that accountants insert to the invoice within the SAP system. Invoices that must not be accrued will have a comment containing specific words, such as that a credit invoice will be received to cancel the debit invoice. The Accruals file marks the cells of the Text column or Comments column red if specific words are present in the cells. The invoice row is colored pink from which the accountant can draw the conclusion that the invoice should not be accrued. The accountant can find the reason why the invoice is pink by viewing the red cell.

Text	CSV	EUR	Tax	FI doc #	Doc #	Accrued	GR	Comments
		16,17	0%	Invoice 8	Invoice 8		Not req	
		18,19	0%	Invoice 9	Invoice 9		Not req	No accrual needed
Expecting credit invoice		20,21	0%	Invoice 10	Invoice 10		Req	

Figure 26. Invoice visualization.

The text of invoices that are accrued to the CSV file become light gray and the Accrued cell becomes green, as seen in Figure 24.

11 PHASE FOUR: IMPLEMENTING

The Accruals file was demonstrated to management and the process owner, who approved the project and agreed to have the improved process tested by a selected group of accountants. The accountants were selected from several teams that are responsible for different entities worldwide to ensure a wide range of entities are tested, and for the test users to share their knowledge within their team.

The improved process was officially tested during the accruals for February and March, following two training sessions in April for all accountants of the AP department. The rollout of the improved process took place on the first day of May.

11.1 Testing phase

The author and his colleague tested the Accruals file on a small and a large entity for the accruals of January. Through the practical testing and receiving feedback from his colleague, the author made adjustments and improved on user-friendliness. During this phase, the author demonstrated the visions of the Accruals file to some colleagues and obtained insight on other accountants' methods of working.

11.2 First trial run

For the accruals of February, the process owner selected seven test users who received the Accruals file and a PowerPoint with instructional slides to the improved process. The test users were observed during the accrual process and assisted by the author if support was requested. The observations and discussions provided feedback to the author, and the requests for assistance enlightened which activities may require clearer instructions or simplification. The test users were requested to send their completed Accruals file to the author for analysis. The files gave the author insight in which areas the Accrual file succeeded and where it fell short.

A questionnaire was sent to the test users to gain feedback on the process. A meeting was conducted with the process owner to discuss the feedback and to gather the process owner's thoughts on the improved process in practice. The process owner was pleased with the outcome of the trial run and was positive the improved process will become the new standard in the whole department of AP. Following the meeting, the process owner

requested all accountants to deliver the entity specifics necessary for automation to the author.

Based on the feedback from test users, the Accruals file received quality of life improvements and further optimization. The first trial run resulted in the creation of the insert row macro and insert default account macro, which were both added to the Accruals file.

11.3 Second trial run

Previous to the second trial run, the Accruals file received updated written instructions according to the feedback gathered from the first trial. The process owner collected the updated Accruals file and instructions, and distributed the material to the test users for the accruals of March. Accountants of the largest company X entity participated in the second trial run, in addition to the original test users. Having used the Accruals file in February, the original test users managed to complete the accrual process independently.

Feedback from the second trial run was gathered through discussions and by sending out the questionnaire to the new test users. Following the feedback on the second trial run, the previously mandatory filtering of invoices was removed and the CSV macro was reworked into a single button that recognizes if an invoice is part of the lump sum or has its own cost objects and G/L accounts.

11.4 Training sessions

Based on the two successful trial runs, management decided to implement the improved accrual process and scheduled a rollout for April accruals. The process owner informed the author that management requested training sessions for all accountants at AP. Two training sessions were scheduled in the last week of April due to the large amount of participants. In the training sessions, the author presented a full demonstration of the Accruals file and its capabilities. The author demonstrated the improved accrual process with the accountants performing the steps simultaneously.

The managers of accounts payable attended the training sessions, as well as the process owner, who was available for assistance and guidance. The aim of the training sessions

was to prepare and involve the accountants for the transition from the current process to the improved process.

11.5 Rollout

The final version of the Accruals file was distributed with instructions to accountants of the AP department for the rollout scheduled to take place on the first day of May. The rollout proceeded smoothly with accountants utilizing the written instructions to complete the accruals for their respective entities.

A new questionnaire was sent out to accountants individually, to request their thoughts on the Accruals file and the improved process. The feedback was vastly positive, thus it was possible to continue to the last phase of business process improvement.

12 PHASE FIVE: CONTINUOUS IMPROVEMENT

The final phase is to continue optimizing the accrual process through feedback and new opportunities. The Accruals file requires regular adjustments to the entity specifics, which may change by entities entering or leaving the scope of SSC. Tax percentages are subject to change frequently considering the global presence of company X.

The author will monitor the performance of the Accruals file by analyzing the accrual postings of accountants to ensure the improved process delivers the required results. The accrual postings have the finalized Accruals file of each entity attached, which will be examined to ensure it works as intended. Additional improvements may be implemented once the accountants are more familiar with the Accruals file and the capabilities of Excel.

Other previously mentioned improvements, such as eliminating the first activity from the process, may be coded once time allows. New optimization to decrease the invoice volumes for accruals is discussed in the conclusion and recommendation section at the end of this thesis.

13 FEEDBACK AND RESULTS

This chapter presents the research methods used in this thesis project and the feedback on the Accruals file provided by the test users and accountants. The actions taken based on the feedback are listed and explained, with a time analysis and comparison between the previous and improved process described at the end of this chapter.

13.1 Research methods

The author conducted research throughout the different phases of the project, utilizing several methods of qualitative research. Interviews with management were held in a focus group setting, and the accrual expert was interviewed individually. Open-ended questionnaires were sent to accountants participating in the trial runs and the rollout, to gather feedback on the improved process. Observations were made during the analyzing phase as well as during the trial runs in phase four. The output of the trial runs and the rollout were analyzed to determine the accuracy of the Accruals file.

13.1.1 Interviews

Qualitative interviews were held with management and with the accrual expert through multiple meetings. The interviews consisted of open questions and discussions on the previous, and the improved process, with topics such as data reliability, process standardization, and trial run results. The interviews are confidential and not disclosed in this thesis.

The interviews with management were set in a small sized focus group and were based on prepared questions, but also partly conversational with spontaneous and unplanned questions. Meetings were scheduled with the accrual expert shortly following the trial runs. In these meetings, the accrual expert answered the questionnaires for the trial runs, and other open questions to gain additional feedback on the improved accrual process. The undisclosed questions regarded the results of the trial runs and discussed additional improvements to the Accruals file.

The interview method was chosen to allow mutual discussions and acquire detailed information and opinions. The author also chose the method to avoid misunderstandings by conducting the interviews face-to-face. The focus group interviews were the pre-

ferred interview method, allowing the members of management to discuss the topics with each other and with the author. The alternative could have been open questionnaires, but these would not allow active discussion between management, the accrual expert, and the author.

13.1.2 Questionnaires

Qualitative questionnaires with open-ended questions were used to obtain detailed answers written in the words of the accountants. The aim of the questionnaires was to receive feedback on the trial runs, the rollout, and the experiences of the Accruals file.

Questionnaires provide a high amount of detail effectively within a short period, as opposed to individual interviews. Feedback received shortly after the accruals is likely to be more factual and detailed than obtaining the answers to the questions at a later point. Conducting interviews were not a possibility, as all accountants are occupied with additional tasks at the beginning of the month, while using a questionnaire allows the accountants to answer at their own convenience. Scheduling focus group interviews were inconvenient due to the amount of coordination it would require. Individual interviews would be too time-consuming for the author, due to the additional tasks at the beginning of each month.

13.1.3 Observations

In phase two of analyzing, the author observed three accountants performing the previous accrual process to note an accurate description of the process step-by-step. The previous accrual process was not standardized, thus the observations' output was diverse. The most efficient tasks were carried over to the improved accrual process and the Accruals file. The result of the observations provided the base for the previous process flowchart and process map.

The observation method was selected to directly witness the reality of the accrual process. This method is preferred to questionnaires and interviews, as respondents may not provide the exact actions taken or may forget to mention some steps of the process, resulting in unreliable data. The observations were controlled with the author requesting the accountants to talk through the process while performing it, to ensure nothing goes unnoticed.

Observations during the trial runs gave the author valuable insight on the ability of the Accruals file to perform in practice by persons unfamiliar with the file. The observations were made during this phase of the process to complement the feedback from the questionnaires.

13.1.4 Output analysis

The previous three research methods focused on gathering the users' experiences with the Accruals file, however, the author desired to analyze the output of the Accruals file as well. Analyzing the output is crucial to determine whether the Accruals file functioned as intended or not, which other research methods cannot provide.

13.2 Questionnaire for trial runs

The questionnaire was sent out to seven accountants who used the Accruals file for the accruals of February. An identical questionnaire was sent to the three accountants new to the Accruals file in the month ahead. All the ten test users answered the questionnaire.

1. Was the file easy to use for a first time? Which parts are complicated (to understand)?

Nine accountants responded that the Accruals file was easy to use by following the provided instructions. One respondent commented that the file was not easy to use for the first time, but replied in question seven that the instructions were clear.

The majority of the test users expressed that they did not experience any part of the Accruals file as complicated. Two accountants stated that the invoice filtering was confusing and another two respondents mentioned that manually inserting new rows to Excel was unclear to them.

2. Do you think a column with data is missing or unnecessary in the list with invoices?

All the respondents concluded that no data was missing or deemed unnecessary.

3. What issues did you run into using the file?

Three accountants found that some of the net amounts were not calculated correctly by the macro. This is due to pre-inserting the tax code percentages based on the entity specific instructions found in the Intranet. The instructions did not mention if a tax code concerns a reverse charge, which is subject to 0% VAT.

One accountant encountered an issue of invoices requiring different cost objects inserted to multiple rows. At the time, the instructions did not explain the procedure of correctly inserting new rows and the Accruals file did not include the insert row macro yet.

Two accountants ran into an issue where Excel would not permit the user to copy and paste data from one column to another. During the first trial run, the Accruals file required accountants to filter invoices that should not be included in the accruals. Excel is not capable of copying and pasting a range of data correctly if rows are hidden within this range.

The remaining four test users did not encounter issues with the Accruals file.

4. What benefits do you see in the file?

All the test users agreed that the Accruals file greatly reduces the time it takes to complete the accrual process. Half of the respondents mentioned that completing the process with the Accruals file would lessen the risk of user errors. The Accruals file received praise for its user-friendliness and simplicity. The respondents perceived the CSV activity as considerably more efficient using the Accruals file than it was previously.

5. What did you dislike about the file?

Nine accountants had no criticism to give about the Accruals file. One accountant disliked inserting rows manually, although the task is performed manually in the previously used process.

6. What changes/features would you like to see that would improve the file for you?

Half of the accountants did not have suggestions for improvement. One accountant desired automation for MM invoices, however, this is not possible to implement reliably. A button that automatically creates a new row was mentioned as a suggestion, and was

later implemented to the Accruals file. One test user inquired if the filtering could be removed to promote user-friendliness. An accountant indirectly requested for the removal of filters, by having the copy and paste function working properly. Another suggestion was to remove invoices that do not need accrual from the invoice list, however, the purpose of the invoice lists is to serve as future reference and removing invoices is prohibited.

7. Were the instructions in the PowerPoint easy enough to follow?

Two of the ten test users reported that the instructions were incomplete with certain details missing, such as how to proceed if an invoice requires several rows for different cost objects. The remaining eight test users were satisfied with the information provided by the instructions.

8. Do you think that, once familiar with the file, you could finish the accruals faster than your previous way of working?

Seven accountants answered the question with the words “Yes, greatly” and commented that using the Accruals file would save a great amount of time. Two test users stated that working with the Accruals would be faster than the previous way of working once the file is updated and finalized for rollout. One accountant was not familiar with the current process and had not taken part in previous accruals.

9. Would you use the file next time over your previous way of working? Please explain.

Eight out of ten test users responded that they would prefer using the Accruals file to the previous process. One respondent would prefer the Accruals file once the suggested improvements are implemented. One accountant was not familiar with the accrual process and could not make a comparison.

The majority of respondents would prefer the Accruals file because of its efficiency and simplicity compared to the previous process. Two test users mentioned that using the Accruals file would greatly reduce user errors. Three respondents stated that the layout of the Accruals file is user-friendly and pleasant to work with as opposed to the previous process.

10. Other comments?

The final question of the questionnaire gave the test users an opportunity to give open feedback regarding the Accruals file, or ask questions directly to the creator of the file. The majority of replies are confidential and are not disclosed.

13.3 Questionnaire for rollout

A questionnaire was sent to 30 accountants, of which 24 responded by the time of writing, two days after the accrual day.

1. Was the Accruals file easy to use (for a first time)? Which parts are complicated to understand?

Every respondent agreed that the Accruals file is easy and clear to use with the provided instructions. Many valued the training sessions and found them of great support for the accruals. The respondents did not run into complications as the instructions were said to be detailed and to the point.

2. What issues did you run into using the file?

The minor complications the accountants experienced stemmed from user errors and neglecting the instructions of the insert row macro. Another issue that the instructions did not anticipate was the scenario of an invoice being assigned the incorrect document type in SAP. The vast majority did not encounter any issues using the Accruals file. Four accountants requested assistance from the author during the accruals.

3. What benefits do you see in the file?

All three macros received praise for their ability to save a large amount of time in the accrual process. The Accruals file received positive comments about the reliability and its ability to reduce human errors and eliminate double work, thus lowering the amount of stress some respondents expressed. Overall, the file's data visualization gained a large portion of positive feedback, such as clarity, organized layout and navigation assistance. The information in the Accrued and Comments column was noted as an excellent reference on how invoices were accrued, or why they were not. The majority of the respondents commented on the user-friendliness of the file and ease of use.

4. What did you dislike about the file?

None of the respondents commented a dislike to the Accruals file.

5. Around how many parked invoices did you have for your companies?

The answers to this question are confidential information used by the author to analyze time measurements.

6. How much time do you estimate that the file could make the accruals faster for you, once you are familiar with the file?

The respondents had challenges to answer this question accurately as the invoice volumes vary every month and the majority were using the Accruals file for the first time. The most common estimate was a minimum time save of one to three hours per accountant for a first time user. Others commented with “a significant time save” or “half the time”.

7. Would you use the file next time over your previous way of working? Please explain.

All respondents answered that they would prefer using the Accruals file to the previous way of working. The motivations are similar to the benefits commented in question three. The process owner was enthusiastic about the success of the rollout and desired for the improved process to replace the previous accrual process.

8. Other comments or questions?

Most respondents left comments thanking the creator of the file for creating the Accruals file and lowering the stress levels of accountants on a normally very hectic day. The questions and certain comments are confidential and not disclosed.

13.4 Actions on feedback

The valuable feedback from the accountants participating in the trial runs and the rollout led into the creation and implementation of the following improvements to the Accruals file:

- Removed the requirement to filter invoices
- Merged two CSV buttons into one
- Updated instructions based on observations and received questions
- Automated the function of the Accrued column
- Included new specific text that triggers the invoices as red
- Included function to mark the currently selected invoice in bold font
- Accruals file functions with data of several sources
- Created the insert row macro
- Created the insert default account macro

The earlier versions of the Accruals file had two separate buttons for creating the CSV file. One button named “CSV lump” would create a CSV file with only the lump sum, with another button named “CSV” creating the file with the invoices to their own accounts as inserted by the accountant. The macros performed the actions above for the visible invoices, thus it was required for accountants to filter invoices accordingly. The macro creating the CSV file was reworked to only one button that is able to distinguish the correct CSV destination for every invoice. As a result, invoices no longer need filtering, which solves the copy and pasting issue accountants experienced. The filtering was also identified as a risk where accountants inexperienced with filters might overlook the hidden invoices.

The Accruals file instructions were rewritten with each update to provide answers to questions the accountants asked the author. Data visualization was improved to automatically mark accrued invoices, color invoices red to accountants’ preferences, and identify the selected invoice with a bold font. The bold font function was added to the Accruals file after the rollout based on feedback.

A	B	C	D	E	F	G	H	I
Vendor	Reference	Text	EUR	Tax	Fl doc #	Doc #	Accrued	GR
Vendor X	Invoice 4	Note by accountant or local entity	7,89		Invoice 4	Invoice 4		Not req
Vendor X	Invoice 5		12,23	21%	Invoice 5	Invoice 5		Req
Vendor X	Invoice 6		12,13	0%	Doc 6	Doc 6		
Vendor X	Invoice 7		14,15	0%	Doc 7	Doc 7		

Figure 27. Bold font invoice row.

The Accruals file as described in this thesis functions with the received Excel file. Additionally, in the event that the accountant does not receive the Excel file, the Accruals file operates by accountants retrieving invoice data directly from the SAP system with-

out additional manual steps. Two quality of life macros were created to assist the accountant in creating additional rows for invoices if required, and to remove the need of memorizing an entity's default account.

13.5 Time analysis

The previous activity of sorting invoices for a small sized entity timed at five minutes and for a medium sized entity ten minutes. The sorting invoices macro completes the activity in three to five seconds regardless of the invoice volumes. The Accruals file will consistently complete the sorting activity faster than an accountant performing the activity manually will.

Inserting the net amounts manually was timed with an average of 35 seconds per invoice. The task of retrieving the tax codes and clicking the button for net amounts has an average duration of a minute. The insert net amounts macro is estimated to save an hour of manual work for every 100 FI invoices. Assuming a highly efficient accountant found the net amounts immediately from the first page of an invoice and managed to insert the net amounts every ten seconds, the manual activity would be faster if an entity had six or less invoices. However, in such a scenario, it is not mandatory to activate the insert net amounts macro, and the accountant can still utilize the benefits of the Accruals file for all other activities of the process.

Manually inserting the information to the CSV header and saving the file in the correct format averaged at two minutes, with an average of 90 seconds per invoice transferred to the CSV template. The duration of the macro filling in the header and creating the CSV file with any amount of invoices is five seconds, thus saving an estimated 2.5 hours for every 100 invoices.

The time saved in the three activities mentioned above grows exponentially with the volumes of invoices.

14 CONCLUSION

This final chapter summarizes the aims and objectives of this thesis and how these were met. The reliability and usability of this thesis are discussed and recommendations for further improvements are suggested.

14.1 Summary

The aim of the thesis project was to create an Excel file for company X that automates tedious manual user tasks to decrease the accrual process time. The aim was met successfully by designing and creating the Accruals file with the macros that substitute the main time-consuming user tasks. Several quality of life improvements were implemented to the Accruals file in addition to the main objectives.

The first objective was to automate time-consuming process activities. An extensive process map of the previous accrual process allowed to identify timewasting user activities and to analyze the possibilities of automation. Three activities were identified containing a large amount of waste that could be eliminated from the process. The first objective was met by creating the macros and designing the Accruals file.

Reducing overall process time was the second objective of this thesis. The time saved by using the Accruals file over the previous process greatly depends on the invoice volumes of each month's accruals. Larger entities will see the most benefit as the efficiency of the Accruals file grows exponentially based on the amount of invoices. Small and medium entities also benefit from the Accruals file as it reduces user errors, and eliminates all three activities of sorting, inserting net amounts and creating the CSV file. Entities with small volumes also have a good possibility that the net amounts are known in SAP and may finish the accruals without the need of any manual work other than clicking a button and extracting tax codes from SAP. With the Accruals file taken in use throughout the department, the overall process time is greatly reduced as the time analysis in this thesis explained.

The final objective was to standardize the accrual process throughout the accounts payable department. The automated sorting creates a layout that is identical for every accountant. The Accruals file was designed with a fixed user-friendly layout to give each user an identical experience to ensure accurate and consistent results. Any accountant

can accrue any entity with the same procedure without the need for additional training or materials. This was accomplished with the macros automating the entity specific data that is located in the tab Entity specifics of the Accruals file. The procedure is now the same for every entity, with the macros taking care of the differences between the entities. The author hosted two training sessions for all accountants in the department and the Accruals file is made the new standard of completing the monthly accruals at company X.

14.2 Reliability and usability

The author and his colleagues assure the reliability and usability of the Accruals file through extensive testing. Both management and the process owner examined and approved the Accruals file, which was then put into practice by a selected group of test users. The feedback received from test users is deemed reliable, as the improved process will affect the work performance and time of the accountant if the answers were not truthful.

While the Accruals file cannot be used in a different organization, the theory on the five phases of business process improvement can be utilized for a similar project. The fact that the Accruals file replaced the previous accrual process proves the reliability and usability of the file, and the thesis project.

14.3 Recommendations for further improvements

The final phase of BPI, the continuous improvement, will be applied for the Accruals file as the data is subject to change. Change may occur in tax percentages, cost objects, approvers, or by entities entering, leaving, or merging within the scope of company X. The scope of entities globally is extensive and data may require frequent updates. Any changes in relevant data must be updated immediately to the Accruals file to ensure the credibility of the process. The Accruals file is also subject to improvements based on suggestions made by accountants once they are familiar with the process and the capabilities of Excel.

This thesis focused on improving the accrual process that takes place on the first day of the month at the accounts payable department. The improved process assists and speeds up the posting of the accruals.

The accrual process can be improved further by taking preemptive action to reduce the volumes of the invoices that require accruals. A suggestion is to create a macro that displays the invoices that are unprocessed by each purchaser, approver and releaser of company X. It would show a list of names with the number of invoices each person has to process before the month end. By selecting the cell containing the person's name, the macro would create an email requesting the person to proceed with the X number of invoices still unprocessed. The email sends the kind request with a list of invoices that still require attention. This preemptive action would result in fewer invoices included in the accrual process, thus further reducing the process time.

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Questionnaire for trial runs

1. Was the file easy to use for a first time? Which parts are complicated (to understand)?
2. Do you think a column with data is missing or unnecessary in the list with invoices?
3. What issues did you run into using the file?
4. What benefits do you see in the file?
5. What did you dislike about the file?
6. What changes/features would you like to see that would improve the file for you?
7. Were the instructions in the PowerPoint easy enough to follow?
8. Do you think that, once familiar with the file, you could finish the accruals faster than your previous way of working?
9. Would you use the file next time over your previous way of working? Please explain.
10. Other comments?

Questionnaire for rollout

9. Was the Accruals file easy to use (for a first time)? Which parts are complicated to understand?
10. What issues did you run into using the file?
11. What benefits do you see in the file?
12. What did you dislike about the file?
13. Around how many parked invoices did you have for your companies?
14. How much time do you estimate that the file could make the accruals faster for you, once you are familiar with the file?
15. Would you use the file next time over your previous way of working? Please explain.
16. Other comments or questions?