Project towards automatic invoicing

Case: Metso Minerals Inc.

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ABSTRACT

This thesis is written to bring up way to improve invoicing efficiency in Metso Minerals Inc and drive the company towards new procedures. The new solutions that are implemented support general fashion moving towards more and more automated invoice issuing. In case of Metso Minerals individual solutions are searched to find best possible way to find common practice to satisfy the needs of the customer as well as Metso. The solutions utilize SAP as ERP system as well as an invoicing tool and e-invoicing with Basware.

For Metso Minerals DC Europe, the commissioner of this thesis, the outcome of this thesis serves as an information base following which the long way towards automated invoicing can be continued. The project is carried out with the invaluable knowledge and help of SAP specialists and the manager at the DC office. The results are gathered from combining theory with measuring procedures at the DC Europe office. The results introduce strengths and places for improvement for the future implementations towards more automated invoicing and well tested working methods to be shared to other Metso units.

Table of contents

1. Introduction

Metso Minerals issues countless amounts of invoices daily, each of them sent individually to customer via email. In addition, certain ones are forwarded to customs and the forwarder.

This thesis works as a project plan towards more efficient invoicing process. It explains problems, challenges and exceptions on the daily invoicing process at the Metso Minerals DC Europe and following which people working with invoicing could carry out their tasks more effectively and accurately. As a result saved time could be used for tasks better complimenting each one's individual strengths and skills. Thesis will approach the topic from operations management point of view and concentrate on managing effectiveness. In addition theoretical descriptions of automatic invoicing and invoicing possibilities with SAP R/3 as ERP system will be described as well as, information flow and usage of invoices within Metso Minerals Tampere.

As a leading supplier on its field Metso Minerals carries a responsibility of offering better solutions in order to help its customers to carry out a change towards automation, without forgetting its own results. However as not all the customers have same tools in use the aim of my thesis project is to find an effective way for invoice handling to suit each customer's need.

1.2. Need for the project

Doing my practical training and afterwards continuing work at the Metso Minerals DC Europe as a Logistics Coordinator, the need for more effective way to carry out invoicing has been experienced in the first hand. Now, each person in the logistics team has his/her own areas and customers they are responsible of. The process of invoicing includes entering the calculated freight costs, saving the invoice in SAP, which serves as an archive, taking the invoice out as a PDF and saving file to his/her computer. The invoice is then sent to e-mail addresses required by the customer. All the work is done manually.

Research over implementing automatic invoicing made by Bruno Koch from e-invoicing company Billentis and the results have proven that small steps taken towards automation give more successful result. DC Europe has taken started to implement factors that give an advantage when reaching towards automation of invoicing. As there are wide range of customers with specific needs Bruno Koch's research serves for Metso's approach working towards automation.

Automatic invoicing is not tomorrow's news for Metso as corporation as the automatic form of e-invoicing has been taken is use already. Now along with my thesis DC Europe is to take the step towards reaching for results described by Soile Hiekkasalmi-Linna, Development manager at Metso in Basware's customer story: "Alongside cost-savings and significantly reduced processing times, we've been able to steer our business towards more goal-orientated purchasing. "

1.3. Objective

The objective on this project plan is to create firm base for three different invoicing systems to be taken in broader use for most of DC Europe's customers by taken new procedures and tools for tryout. The tryouts support DC Europe's journey towards more effective and accurate and also less time consuming and manual process of invoicing. The thesis aims to point out the problematic details and find a common manner to work through them. The project plan serves DC Europe's final goal of automation of invoicing.

DC Europe issues even up to 650 invoices per customer each month. Saving the invoices to your own computer and sending the invoices to correct parties is the most time consuming part of the invoicing process. Therefore, even though the invoicing would not yet be completely automatic, the new procedures would brings savings to the works hours, as more efficient way attacks to cover those two steps. In addition, the time used for resending invoices that have not reached the payer would decrease. The savings in time bring along financial savings.

In today's unstable economic situation it is important to make the business cycle quicker. Meaning that when invoice is issued promptly, payment will be received quicker. Also as amount of manual work decreases, fewer mistakes can be expected. All

these factors are actors affecting on customer satisfaction. With the time saved in invoicing processes the personal skills and knowledge can be turned to account better. These factors support Metso's values of aiming to better and better customer service and appreciating employee's individual skills.

1.4. Research method

The work methods described on this thesis are gathered from daily processes carried out at the DC Europe office. The theory part is based on articles and literature concentrating on project management, e-invoicing and ERP systems. I will meet with employees within the company who are experts working on the topics discussed over the thesis. They provide more inside point of view how separate functions are carried out within the company.

Research over the time used for invoicing is collected from DC office. The results can be considered indicative as the invoicing methods vary between the customers and invoice issuers. In addition, SAP as a tool, brings its own effect to the results. Towards the end of the project the guidelines set will be tested and an empirical research will be carried out. I aim to gather experiences how the improvements work in the daily bases. According to the results functioning of my work and be evaluated and further improvements and changes to the guidelines can be suggested.

2. Theory: Managing effectiveness

Improvements for effectiveness are often results of successful operations management. The theory part for this thesis will concentrate on improving productivity by improving process design and labour positioning as well as paying attention to ERP systems. The tools that are provided for usage and their roles on this are presented towards the end. As this thesis will concentrate on invoicing, the purpose on invoices will be presented at the end.

Operations management, together with process design and together with positioning human resources form together the base and provide reasons to the changes that will be presented later in the case study. The case study will concentrate on automation and bring more effectiveness by changing process methods to bring more effectiveness into activities in an office environment.

2.1. Operations management

In Heizer and Render (Operations Management, 2011, 36) describe the role of operations management (OM) as the set of activities that creates value in form of goods and services by transforming inputs into outputs. Such activities take place in all organizations regardless whether the output is tangible or intangible, product or a service. Operations management goes deeper than production planning as it only is about the actual creation of goods. Traditional view over operations manager's task included matching employees to right jobs and providing proper training, work methods and tools and moreover providing motivation to complete the work given.

The key goal of operations management is to improve productivity. Productivity is however cannot be counted simply just by dividing inputs by outputs. Even though each operations manager aims to gain the best possible results and effectiveness often is experienced as the key for success mostly in financial terms, OM has 10 major decision areas following which the individual process is run. The decisions areas concentrate on design of goods and services, processes and capacity, quality management, strategies for layout and locations, focusing human resources, supply chain management, procurement and inventory planning, and scheduling and maintenance.

Managing operations functions similarly regardless the product to be created is a tangible or intangible, a product or a service. Managing a process includes planning, recruiting, organizing, leading and controlling throughout all steps of the operation. Each operation includes 3 functions that are to be performed during them: operations, finance and marketing. Operations function creates the product or the service and finance controls and follows the monetary flow. Marketing creates the need if required and interacts with the customers.

Productivity is the ratio between inputs and outputs. It can be calculated by dividing output, the goods or services, by inputs, the resources, labour hours and capita invested. Improved effectiveness can be considered as the fruit of labour of increased productivity. Productivity itself is dependent on three variables labour, capital and management. Labour stands for the work force, whose education and knowledge, well being and correct ratio affect on productivity. Capital is the machinery, programs and investments in general made for processes. Management is considered the most influential of these. It directs the labour and capital as well as technology and knowledge within both to reach the best possible results. To simplify, management combine human and mechanic power to best possible match to improve productivity.

Company's or organization's decision to change their processes draws back to willingness to improve their competitiveness and to survive in rapid changes happening in markets. Automation is one way to improve effectiveness. Automating processes require investments in to tools, but pays back in form of labour costs. The effect of automation is generally considered as cut down in human labour force. However it can also be considered as redirecting the skills and knowledge of the employees to further improvements and tasks requiring more individual attention.

2.2. Focus on process design

A process strategy is how organization approaches the transformation of resources into final products. The objective of a process strategy is to build a process strategy that answers to requirements set by the customer and meet the product specifications, cost or other constraints set by the organization itself, Heizer and Rendell, 2011. Each process designed to follow one of four variations of process strategies: process focus, repetitive focus, product focus or mass customisation.

Process focus devotes to producing low-volumes and multiple varieties of products. As during this thesis the processes done within an office are purchasing, sales, logistics and product support. Each of these processes require a high variety of activities to be run during performance, some of them require continuous change, some are standard each time. Common feature for all process focused are not utilizing their facilities, the tools, programmes or machinery to the full.

Designing processes concentrate on finding ways to design the process in a way that it reaches the competitive advantage in terms of low costs, differentiation or customer response. It searches for steps that do not add value to be eliminated and those that would add value in perceived by the customer and also how changes would add sales. As changing the entire process would be extremely costly, the processes are mapped into several different charts to see which actions are the ones that could be changed or eliminated in order to the whole process to perform better. Some of the actions and even complete processes are better to be bought outside of the company so that better concentration on actions within the company can be paid attention to.

Automation is one of the tools to be used to improve productivity. Once actions are separated with in processes, changes into each can be made. Separated actions, that do not require high specification and by automating some tasks with in the process the labour intensity can be decreased. Lower labour intensity can lead to further development as employees can direct their time better to other more demanding tasks.

Automation requires investment on or better exploit of tools and programmes in use. In many cases automation is taken in use as vendor machines or parts of production. However in office tasks automation can be directed to actions such as sending or documents once they are saved into programme used. Electronic forms used in today's business world support the important approach of sustainability through cutting down the material costs on sending and printing as no print are needed to be taken out or send as a concrete mail.

To plan as effective process as possible it needs to tie together all functions and tools as wells as outsourced actions as effectively as possible. E-invoicing is one of the possibilities that the tools in use offer. Even though e-invoicing is a broad aspect over all electronic forms of invoices that are sent in an electronic form, the best result are gained if it is posted straight into accounting. The take an advantage of these

organizations often outsource their payments to a third party who is specialized on offering such services.

2.3. Enterprise resource planning

ERP, enterprise resource planning, is a company specific management system that ties together all resources and operations within the company. ERP is software following which all aspect of business can be controlled, measured and run including planning, procurement, and inventory management. Supply chain as well as customer relations management are controlled though it. ERP systems interact with suppliers; they provide customer service and follow order progressing by using the software. Often it also includes applications to be used for managing finance and human resources. Not to mention its importance as a decisions making tool or an archive.

Material requirements planning, MRP is used for control manufacturing processes by managing inventories and planning production. With the help of it the production schedules and customer demand can be run more accurately and therefore with a better productivity. As an extension for MRP a MPRII was created. Material resource planning II controls more variables than its predecessor. It ties together warehouse management, purchasing, inventory and capacity planning and integrates data from software used for each of them. In addition it can be used for follows more that the actual output of product of service. With MRPII the environmental issues of productions scrap and emissions can be followed.

To be able to tie together participants, customers and suppliers, in MRPII system ERP systems have been created. ERP systems are company vides, but as many of them have been created in a way that enabled companies that work together to share their databases. Such provides a great aid for controlling the MRPII systems. With the help of common database business functions can be scheduled better and some activities automated or integrated.

There are few major vendors of ERP software, out of which the biggest ones are SAP, Oracle, Peoplesoft, Invensys, ABB Automation. All of these provide best modules or software to suit best each industry. As Metso uses SAP it is introduced in the following.

2.3.1 SAP

SAP is a Germany based company founded in 1972. The name stands for "systems, application and products in data processing" (www.sap.com). Today SAP is the world leader in enterprise applications, in terms of software and software-related service revenue. Their mission is to help companies of all sizes to run better by reducing costs and optimizing performance.

SAP offer packages each fitted to suite small to large companies to reach their set goals. With the software company can support its tasks from core business operations like supplier relationships or production varying into warehouse management, sales as well as, all administrative functions, through to customer relationship.

In practice SAP carries all the information over the business processes the company has gathered and provides a toll based on which decisions can be made and daily processes run. So that any actions can be carried out a master data needs to be created. As Glynn C. William states in his book: "Master data forms the basis for transactional processing." (Glynn C. Williams, 29, 2008).The master data is company-vide, but data is generally outlined by plant. This means that changes made at one part of the plant affects on all using the same data.

Master data is created for all parts of supply chain, from forwarder to each of the suppliers and customers. The data consist of company's basic data; contact details and such. Organizational data states your organizational structure like sales area, including the seller, distribution channel and product division and specified preferences with delivery plants to be used. Company code data includes the information to be used for financial accounting purposes.

2.2.1.2. Operating with SAP

SAP is divided into 3 core applications, under which the tasks are divided: Financial, Human resources and Logistics applications. To cover the purpose of this work we shall concentrate on the logistics, also known as supply chain application and sales and distribution module (SD). Navigating through SAP is done with transaction codes given for each transaction. Entering the transactions templates can be saved to most of the

transactions to ease carrying out the operations. All in all SAP in modifiable to suit the best possible you personal usage.

When an order is entered into SAP it gets a sales order number, starting 30… under which all information concerning the order can be found. Each order is shipped under one or several delivery numbers. All deliveries shipped together are called a shipment. Each delivery beginning 80… then gets more specific information under it. Delivery goods issued, shipment and handling unit all together are required so that the delivery can be invoiced. When a delivery is closed and singed off by dispatching department, all of them become visible in SAP.

The requirement for information on invoice varies between countries. The standard invoice follows guidelines set for pervasive invoice. The country specific requirements, such as certain texts, can be added to the customer data, after which all information will print out to all of the invoices.

2.4. Human Resources Strategy

"The objective of a human resource strategy is to manage labour and design jobs so people are effectively and efficiently designed." This is how Heizer and Render described the goal of human resources strategy. Ensuring this to happen they consider that each person needs to be efficiently utilized and most of all have a reasonable quality of work life. The factors listed are the key to reach mutual trust and commitment that are the factors for a successful human resource planning.

Even though today most of production is made by machines people are the ones who make the company. With human resources planning it is not only about making people work more efficiently in productions, it is most importantly about matching skills and knowledge with tasks to provide the best possible results, for today and for future. Each human resource plan should be aware of constraints that influence on peoples wellbeing and therefore also attitude towards the work. The design of labour plan follows 3 decision areas: labour planning, job design and labour standards.

The constraints to be taken under consideration are as follow: location, process, product and layout strategy and schedules and employees individual differences. Location strategy concentrates on providing a pleasant working environment, layout how work

positions, mostly in production, are pointed. Product strategy recognizes the types of skills needed to carry out the production. Process strategy includes the same, but for the technology and machinery. Schedule answer over the timetable for the process and individual differences is about more daily matters concerning employees, such as stress or information flow within the work place.

Labour planning determines the type of employment used for the project, if the project requires long-term commitment or whether using temporary workers can cut back the labour costs. It is also in charge of providing the schedule to suit best the production scheme. Labour planning recognizes whether the process s best to be run through night or only during the days and in how long and often shifts.

Job design specifies the tasks for each individual or a group. There are five different components that are commonly used to provide job description for each employee. Labour specialization ties the worker in one tasks only and so become a specialist on his/her own field. Specialization would provide faster learning and more efficient results, as tasks would not be changed during the day. This ideology draws back to 18th century, when it was better to know everything about something and not something about everything. Job expansion supports the latter and therefore is better on maintaining employees' interests.

Job expansion believes that variety of tasks support better quality of working life. The variety can be reached by enlarging tasks on ones on the same skill level. Job rotation moves the worker from one job to another, each requiring specific skills. In job enrichment responsibilities are added to the job and by empowerment more and more trust on workers even on the lower levels are given decision power and therefore supported to improve better.

The remaining components concentrate on the psychological aspect of the work planned. The job characteristics of variability of skills used, to see the results of his/her job done and seeing its significance, to get to complete the work on own term and getting feedback are need to be followed so that the worker stays motivated in his/her position.

In addition to factors listed previously matters that influence on productivity form the human resources planning point of view is the work environment and methods and tools given to complete the tasks. The interaction with machines and programmes together with environment all sum up to work ergonomics. Having all tools within the reach and suitable for the job done improves noticeably productivity.

Working method describes the knowledge of the work ergonomics. It describes how each activity and work is performed. Methods are often individual and therefore they require analyzing so that the best ways can be found and brought into general usage. There is a variety of methods to be examined, starting from body movements during operations, activities and interaction between man and the machine or the flow or movement of a worker or material.

2.5. E-invoicing

E- invoicing draws back to 2001 and to Single European Payment Area (SEPA), an European initiative for integration on area of payments. It aims to integrate national credit and debit schemes into common European vide one and strengthening Euro's status as the operational currency. In additions it drives to more frequent usage of card payments and decrease the cost of cash distribution and most of all simpler cross boarder payments. (Shortcut to SEPA. 2011). The goal is to make e-invoicing the main payment method by 2020.

E-invoice stands for an invoice that is issued and received in an electronic form. The invoicing method can be anything from invoice sent by e-mail to fully integrated payment management systems, (Ingo Schlegel, 2011). E-invoice data must be in structured and accessible format, so that the receiver is allowed to process the invoice at his/her site (Penttinen and Tuunainen, 2009).

From EU initiative electronic form of invoicing has expanded into use not only on company level, but also in countries. Many governments have applied e-invoicing in use in the financial units under state. The electronic invoicing has spread to be as used in other continents as it is in Europe.

EU along with many other countries has accepted e-invoices legally binding in year 2004. The problem most often met was that an electronic form of invoice could not be considered authorized. Even though great changes have been made on this field, exceptions do still exist. EU recommends the use of e-forms in invoicing. Alongside with companies with greatest trading volume has been pushing their clients into approving the form of invoices. Over the time the ability to offer invoices in an electronic form has not only proven to offer saving, but also to work as an advantage on sales situations (Bruno Koch, Billentis, August 2011).

E-invoices come in two forms: PDF and EDI. PDF does not fulfill all of the descriptions set for an e-invoice, as it is not automatically processed into receivers information systems due to data format, (Penttinen and Tuunainen, 2009). PDF form however brings out the savings in comparison to using paper forms. The invoicing process becomes more efficient, reliable and greener. Studies show that changing from paper version to e-invoice can save up to 1-2% of the company's turnover in a yearly scale or with automated invoice processing 60 to 80% savings. (Bruno Koch, August 2011).

EDI, electronic data interchange, is electronic data transfer between companies. EDI invoicing requires two companies to connect with each other. The National institute of Standards and Technology defined the term for United States department of commerce in 2006 as follow:

 "A computer-to-computer interchanges of strictly formatted messages that represent documents other than monetary instruments. EDI implies a sequence of messages between two parties, either of whom may serve as originator or recipient. The formatted data representing the documents may be transmitted from originator to recipient via telecommunications or physically transported on electronic storage media."

EDI invoicing requires high volumes of information flow to be profitable. In most cases companies have an operator who offers e-invoicing solutions, such as Basware, to connect the two companies together. Operators forward the invoices to correct receivers and in need the data can be converted into form suitable for receiver. Edi invoicing is considered reliable and really good at matching the invoices with correct orders of the receiver, (Lahti and Salminen, 84.85, 2008).

Electronic invoicing or e-billing has offered great savings for companies after its implementation. The most notable the savings can be seen at the accounting departments, but as from the invoice issuer's point of view savings generate from cutting down the sending costs and time used for the process daily. E-invoicing aims to expand itself into the whole procurement chain, from procurement to sales, and by so reduce the length of the business cycle.

PDF- form of e-invoice and EDI- invoice are collateral and supportive forms of invoicing, which are to be used for separate purposes. E-invoicing is used for regular and agreement based invoicing, that is used with expense, procurement and goods invoicing. The form of the invoice is standard. EDI-invoicing is commonly preceded by an order in e- form and the invoice is to be modified to fulfill the receiver's needs. At Metso the used form is e-invoicing.

Regulations on archiving vary between countries. In general it is however requires that the invoice must be kept unaltered for the named storage period. The periods alter by country, the European proposal is 6 years. Businesses have freedom of choice the place of storage for the provided invoices, (Igno Schegel). Therefore not all countries accept a database, for example SAP or Basware, as a legally binding archive. As explained at the website for European committee for standardization, CEN, each country has specific requirements concerning factors including format, media, process, security and/or location and all of them should be taken into account.

2.5.1. Advantages and disadvantages of e-invoicing

L. Luminaho and J. Rämänen give out strong hopes for e-invoicing advantages in their article Electronic invoicing in SMEs. The vide spread use of e-invoicing has been touted to save 200 billion Euros worth of costs, reduce CO_2 emissions by 3 tons per year and free resources for productive work." Research done by Billentis the company specific savings is to be 60 to 80% savings in invoicing process. This means 1-2 % savings in turnover, (Bruno Koch, August 2011). The ideas given may seem a bit exaggerating, but they are most importantly illustrative and provide a vision over what can be reached.

In an automated invoice processing everything starting from invoice creation is done without a human involvement, therefore the gained advantages are on that high of a

scale. Decreased human interference releases work hours and most importantly employee skills to more challenging tasks and operations. Due to that, the invoicing process and also the whole process chain can be carried out more efficiently. More challenging work description also enhances work environment.

Changing paper version to an electronic version of an invoice supports greener and more sustainable way to do business. The savings in paper can be best seen in archives, which after electronic form of invoice are no longer needed. In addition as invoices are not sent in paper form the transportations costs as well as emissions are reduced.

Ability to provide e-forms in correspondence with the customer is considered as a competitive advantage. Therefore organization if is able to provide up-to-date services in form of electronic invoicing that support more effective processes. Along with EU's initiatives and drive to develop to electronic form of invoicing it is better for the organization to be able to provide such a service.

The disadvantages are similar to effects with all automated actions. Electronic invoicing puts high trust on the tools and machinery used and the feeling of control diminish. The action made is no longer in person's own hands. As actions get automated controlling the exceptions gets tougher.

Change into electronic invoicing is hard for smaller companies, the transitions requires a investment to a program through which the invoices can be handled. Even though the invoicing process it self is not hard to control or require specific IT skills, (L. Luminaho and J. Rämänen, 2011), if being pushed by a bigger company towards the change, the smaller one might become reluctant.

2.6. Role of an invoice

To support the topic and further contents of the thesis the purpose as well as contents of an invoice is explained in the following. In addition to the normal financial accounting, invoice also serves as an export document used for custom clearance for export and import purposes. In addition they carry information over tracking the movement of the goods in transit for the customer.

As we are working within free circulation in EU, the custom procedures take part only when the goods taken in or out of countries outside of European Union. None of the deliveries will leave or enter EU boarders without an invoice so that interest on revenues and trade statistics can be controlled.

For import purposes an invoice includes all the information required by the customs of the receiving country. Most important information in addition to the actual value of the goods is the valued added tax code, VAT, the information on country of origin and company ID number. VAT is a tax that is added to the value on the goods upon its arrival to the country. In addition the custom codes of the origin countries are found on the invoice.

In addition to the delivery address the forwarder gets the information over his role in during the delivery. The Inco term on the invoice reveals who will be the paying party of the delivery. The Inco term also states whether, who is in role to take care of the organizing the customs clearances. The measures for the packages delivered, as well as special requirements are stated on the invoice.

Also for the customer an invoice reveals a lot than the payable amount. In most cases the invoice includes a tracking number for the goods. The reference used by the forwarder to recognize the delivery can be seen on the invoice. Following the information the client can have view over the movement of his/ her purchases. Also the invoice contains the information over the contents of the delivery.

A traditional role for the proforma invoice is to show the goods value for the custom purposes and therefore has no commercial value. In Export Practice and Management, book by Alan Branch other usages for proforma invoice are also listed; the amount or the buyer's name on the invoice differs from that of bill of exchange. Both of these terms fulfil in proformas used at DC Europe.

At DC Europe proforma is an invoice issued by our customer for their customer. It has the selling prices for the final customer, whereas the invoice issued by us has our selling prices for our customer. Proforma is used so that would not see the margin added to the original sales price. Most commonly they are used in 3rd party shipments to Asia-Pacific area or to Africa. Proforma invoice travels with the delivery and is attached to the package by customs at Tongeren warehouse or by despatching the department in Tampere.

2.7. Key to successful project plan

Project plan has a clear starting point and in the end aims to reach well defined goal. Each stage of the project is to be individually explained and questions over what, who, why and when need to be answered. Stating after project characteristics listed on Ricardo Viana Vargas' book Practical guide to project planning, 2011, each project is focused to accomplish a clear and defined goal on deadline. Each project is individual and non repeatable. Heizer and Render, 2011, listed also unfamiliarity of the project tasks to describe project features. They also recognize tasks requiring complex interrelated tasks requiring complex skills; the projects tend to cut across organizational lines. The more important the project goal is for the organization, the higher the change of succeeding in it is.

For a project manager it is crucial to be able to tie together all pieces, stages as well as participants on the project, similar to all stages of operations management. Managing projects include 3 stages: planning, scheduling and controlling. Planning stage includes team organizations, goal setting and definition of the project and its goals. Scheduling names the inputs; people, money and supplies and relates them to each other. Controlling phase monitors the usage of inputs and therefore the investments. In addition the quality and outcome as well as schedule are monitored.

A project consists of five main stages: initiating, planning, execution, monitoring and finally closing. The first stage is when a need is identified and transforms into an issue that requires a solution. Planning is the key part of the project where all functions involving need to be listed by detail and scheduled. Execution carries out functions listed and monitoring takes time to see what is achieved and opportunity to perform corrective actions. Closing phase is usually consists of evaluations done as auditions. The results are then discussed to see the improvement and to learn from the mistakes made during the project.

3. Case study: Project towards automatic invoicing

The case study is done for distribution centre Europe, DC Europe, at Metso Minerals Tampere. The main goal of automation is still multiple steps away at the DC Europe and will not be reached within the timelines of my thesis. However Metso has taken important steps and has gathered tools and 3rd parties required to complete the project. All in all, there are areas at DC Europe sales that need to be left out of the project. CIS area; our customers in Russia, Kazakhstan, Ukraine and Belarusian, require that much more specific attention on the export documents, including invoices, that automations of even the improvement that are to be offered would not support their need.

3.1. Company: Metso

Metso offers globally technology and services on three different fields; Mining and Construction Technology, Energy and Environmental Technology, Paper and Fiber Technology**.** The research concentrates on Metso Minerals, which more specifically offers leading equipment for mining and construction technologies.

Metso works in 300 units in 50 countries worldwide with a strength of about 29 000 employers. Paper and mining are the two biggest fields bringing in more than half of yearly sales. During 2010 the sales divided rather equally between Europe, Asia-Pacific area and southern and northern America. Service business, which for Metso consist of spare- and wear parts, repairs, rebuilds and maintenance as well as providing process analysis, is the most profitable business within the company.

Metso has a vision to work together as one with its partners in order build more sustainable world, seek innovations:" Working as One to be Number One". The goal is set to be reached by following the missions to "contribute to more sustainable world by helping our customers to process natural resources and recycle materials into valuable products".

DC Europe is situated at Metso Minerals Tampere plant. At the plant crushing and screening equipment are being manufactured, in addition steel foundry is traditionally manufacturing foundry castings. In addition to international sales of wear and spare parts, domestic sales as well as capital sales, the sale of crushing machines is handled from Tampere plant. When mentioning Metso further in the thesis, it refers especially to Metso Minerals.

3.1.1. DC Europe

Commissioner for this research is Metso Minerals, DC Europe. Distribution center Europe handles spare and wear parts procurement, sales and distribution worldwide. All sales are for export. It is situated in Tampere, Finland. DC has control over Metso's main warehouse in Europe, situated in Belgium and another warehouse in Tampere, Finland.

The tasks divided within DC Europe are divided in the in to purchasing, part support, warehousing, customer service and logistics team. The thesis concentrates on the tasks named for the logistics team. The business process with in DC Europe is pictured in figure 1 below. DC Europe's customers are divided into Metso sales organizations SSOs and dealers. Both purchase to their own warehouses, where their own customers are served or mediate orders straight from our warehouse to the third party.
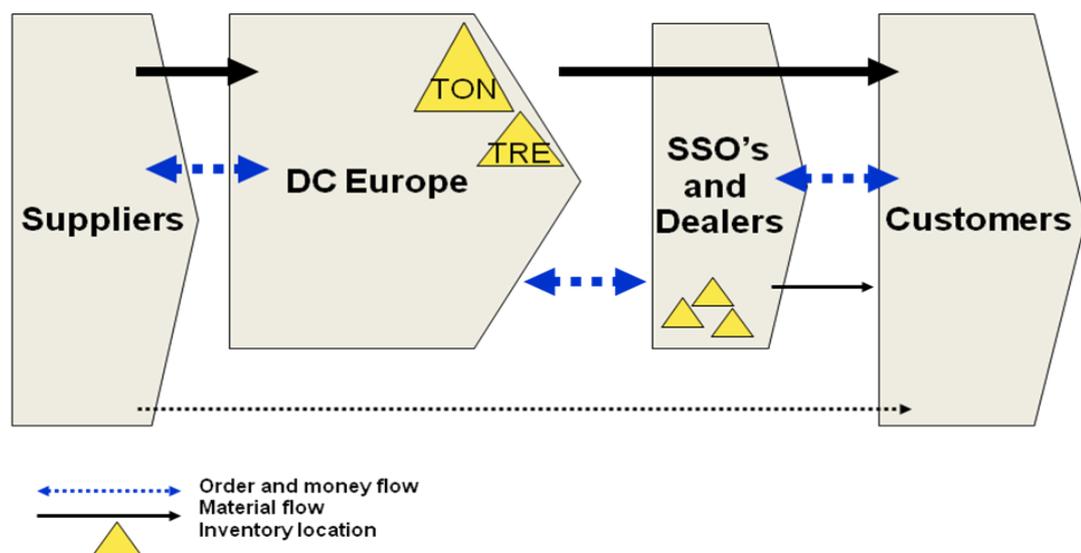

FIGURE 1. DC Europe business processes

The order process at the DC Europe is pictured below in figure 2. To improve the effectiveness of the project it has been decided to change the invoicing activity and therefore also working methods of the logistics team. The figure pictures the steps taken in Tongeren warehouse. Corresponsive process in Tampere warehouse is similar by its outline, the processes is more flexible and less automated.
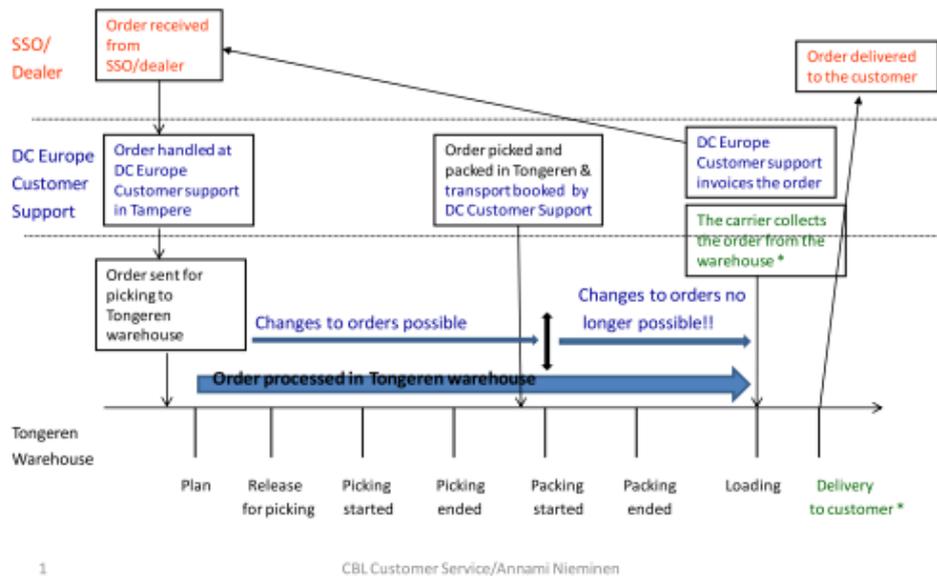

FIGURE 2. Order handling process at DC Europe, SKF warehouse

The warehouse in Tampere serves markets in Nordic countries; Norway, Sweden and Finland as well as Baltic area and CIS countries; Russia, Ukraine, Kazakhstan and Belarusian. Tampere warehouse is serving whole world, in case Tongeren does not have stock on required products.

The Europe's main warehouse in Tongeren, Belgium is the nominated warehouse to serve rest of the world. The warehousing processes are outsourced for a company called SKF Logistics Services. At SKF the dispatching department is called customs Tongeren. They are in charge of informing logistics team in Tampere about orders ready to be delivered and also adding required information, such as proforma, for outgoing packages. When mentioning the customs further in the thesis, it refers to both dispatching departments, Tampere and Tongeren.

SKF is run according to a timetable, where each trip, built of forwarder and destination areas, is closed according to a schedule. Closing a trip means closing and therefore singing off orders, so that they become ready for pick up by a forwarder. The orders also become ready for invoicing. As Tampere warehouse does not traffic as big volume of goods, the schedule for them is not as tight, but they do have regular pick up by the most used forwarder.

3.2. Steps taken

During summer 2010 DC Europe implemented SAP as their software solution. Having a functioning enterprise resource planning system is inevitable base for automatic invoicing. The automation will later on be built around transaction in SAP. It will serve as an archive, display tool, sending method and database for information required.

During spring 2011 a new pricing system for Metso units around Europe was brought in use. DDU is one of the Inco terms 2000, a term for international commerce published by International Chamber of Commerce, Delivery Duty Unpaid. In practice DDU means that to each part sold a certain percentage has been added in order to cover the transportation costs of the main transportation modes nominated. After DDU it has become more useful to start using invoicing lists in SAP instead of going the invoicing order-by-order following printed sales orders gathered from the customer service persons.

3.2.1. DDU

Metso uses DDU pricing for all its units within European Union: Sweden, Poland, Austria, Czech Republic, Italy, Spain, Portugal, France, Holland and UK. Also it is planned to be broaden to over seas units as well, starting from USA. DDU is named after Inco term 2000 delivery duty unpaid. International Chamber of Commerce describe the term DDU as follows: "the seller delivers the goods to the buyer, not cleared for import, and not unloaded from any arriving means of transport at the named place for destination."

In DDU pricing Metso has calculated a percentage that is added to the price of each part sold. The percentage is calculated after freight costs on nominated forwarders. The percentage varies between 3,6% and 9,8%. DDU pricing covers all deliveries with nominated forwarders, except special arrangements such as taxi deliveries or individual full trucks ordered for smaller deliveries.

As to be seen on table, figure 3 below, DDU has an affect of more than halve the time used on invoicing. As the number of invoices grows the effect of the pricing system becomes more and more apparent. The 631 is the number of invoices issued for Metso France plant. If DDU pricing would not have in use for France the time used for issuing all the invoices would have taken 23,3 hours, which is more than one and half standard workdays in a month. That is a notable amount used for invoicing one customer. The time used for invoicing with DDU-pricing is 1/3 of the non-DDU time. The same amount of invoices can be issued in 15 hours.

INVOICING TIMES FOR NOT DDU-PRICED AND DDU-PRICED CUSTOMERS		
NUMBER OF INVOICES	INVOICING TIME NON-DDU (min.)	INVOICING TIME DDU (min.)
1	2,25	1,5
2	4,4	2,8
631	1398	904

FIGURE 3. DDU invoicing times

3.2. Basware

Basware is a Finland based company that provides electronic services for two financial processes: purchase-to-pay and Financial Management. Metso uses its invoice processing and matching service that belong to purchase-to-pay services. In practice this means that Basware serves as an e-invoice base into which the invoices sent will save themselves into XLM.form. The receiver receives a notification about incoming invoices and is able to find the invoice from Basware's database. The payment itself is issued in Basware.

To be able to take advantage of Basware's services both, the invoice issuer and the receiver has to have an agreement with the service provider and therefore an access to Basware's database. The service supports the whole range of different ERP systems and also offers integration services between different ones. Basware allows the company to follow its invoices through out the handing process and store them for the period of time needed, most commonly 2-3 years. To follow regulations over the archiving of the documents the database can also serve as an archive.

3.3. Current stage

As stated earlier the daily invoicing process in DC Europe is mostly manual work. For each team member has their own customers whose logistics and invoicing they are responsible of and also has accustomed to his/her own methods to issue the invoices. Some get printed out sales orders from the customer representatives and do the invoices following them in SAP. Other option is to use billing due list in VF04 function in SAP where is possible to see all undone invoices and sort them by factors like customer number or forwarder.

The outcome of a sorted list that offers a view over deliveries, those are ready for invoicing. A delivery can be invoiced once they have been closed by the despatching department and therefore are ready to be shipped. Behind each delivery the freight cost is added if required, the list can be run through in whole, in parts or each individually. Invoices are saved to SAP with an invoice number, but to be able to send them forward each invoice is issued out and saved as PDF in your computer. Then invoices are sent to the customer one by one by email. As the invoices are sent in an electronic form they are now considered as a form of electronic invoice.

Orders leaving out of EU the invoices are then sent to custom representative in Metso's warehouse in Belgium and to nominated forwarder. In cases with proforma invoice, the proforma is scanned from paper version that can be found along with printed out sales order that needs to be sent to the customs and also with clear markings of its usage for import purposes only to the forwarder.

The invoices for courier shipments leaving from Tampere warehouse are issued by the despatching department. As they also issue the waybills for the deliveries and attach required documents into the packages leaving they afterwards scan the invoices along with waybills to logistics team's group e-mail, where the received files are forwarded to the customer.

The waybills offer tracking information to the customer as the tracking ID does not update to SAP in a similar was as it does when the goods leave from the Belgium warehouse. In Belgium warehouse the bookings for courier shipments run EDI, help of which the tracking ID update to SAP and therefore also to SAP. In Tampere the courier bookings are done manually. The booking requires as invoice number, because of which the tracking number does not print out on the invoice. The tracking number is sent to the customer on the waybill.

3.4. Human resources

The project plan carried out in this thesis mainly concerns only the logistics team at the DC Europe. The logistics team consist of the foreman, team leader, a SAP specialist, 4 logistics coordinators and 3 logistics support trainees. The despatching department in Tampere with its 2 full time and 1 part time employee also belong to the logistics team.

The key persons in this project are the SAP specialists, one from logistics, other from customer support team, who with a help of the specialized personnel within the company help to find the best practices and most useful tools and layouts in SAP. Also they serve as a valuable source of information and discussion for the thesis. The daily practices requiring invoicing involve mainly around the specialists, coordinators and the trainees. SAP support and the team leader do their part as well, but their volume is considerably smaller. Each person has their own customers, whose logistical issues they are in charge of.

3.5. Final goal and advantages

As stated before the absolute final goal of the project towards complete automation of invoicing remains still in the far future, the goal for now is find ways to use the tools provided better for our advantage. The main aim is to find a golden mean to best fulfil the needs and aims of both parties; DC Europe and the customer. At the final stage the outputs and tools provided are taken full advantage of. The activity of invoicing will be executed in a more effective way.

In daily processes this means savings in working hours, diminishing manual work, mistakes, improve accuracy and on-time invoicing. All these factors are to resurface as work efficiency, customer satisfaction and most of all it can now be relied on that all the invoices get sent. From company point of view the advantage can be seen as cost savings.

From the view point of human resources the improvement made will leave more time to concentrate on tasks requiring more specialization. As the most basic and simplest tasks during work day will then be automated, more time is left for tasks requiring more skills and offer a change to grow and take more responsibility in daily tasks. Also the remaining time can then be directed to more useful tasks such as development.

At the final stage all invoices are to be automatic. At this stage, all invoices would be sent to forwarding agents and customs if so required. The system would use the help of MTG, Metso transportation gateway, where all information over deliveries would then be concentrated.

4. Project plan

The project initiation came from the head of Tampere DC. The invoicing activity at the DC was considered dragging behind its time and that the tools for use were not taken advantage to their full. The invoicing needed to be developed to be more effective, accurate and up to date and therefore also improve the complete customer service process. The project takes place in fall 2011 beginning in September and ending at the end of November.

The initiative meeting was attended by the head of DC Europe, manager of the logistics team, two SAP responsibles and me. In the meeting our customers were divided into 4 groups. The division based on whether the customer were Metso sales organisation, SAP implemented or not, Basware user and if they were in- or outside of EU. The dealers were divided into their own group. Also customers in CIS area; Russia, Ukraine, Kazakhstan and Belarusian, were left outside. The project was set to involve logistics team and the dispatching department at the DC Europe.

Within the timelines of my thesis and this project plan aim is to implement e-invoicing as well as automatic invoice sending to few customers. Following the result the more effective invoicing method can be taken implemented in use for more and more customers and finally shared to other Metso units. The advantages are targeted to reach an outcome as previously described: more effective, accurate, on time invoicing and therefore savings in financial ways as well as time vice. The amount of the manual labour is to be cut down so that the special skills of the individual can be directed to better usage.

The problems that are to be faced during the project:

- Customer adaptation and cooperation

- The challenges of the global system; the changes and their effects on others units

- Sufficient tryout before final implementation

4.1. Division of customers

Dividing the customers into subgroups aims to provide each of the clients a way to receive their invoices in a way to fit to their own tools in use. As described before about the invoices for the deliveries going behind EU lines need to be sent to the forwarder and also to warehouse, in order to get one of the invoices to travel with the goods in air and road shipments. Therefore the clients outside of EU were divided into their own group.

4.1.1. Customers with Basware

Metso sales organisations in Sweden, United Kingdom, France, Germany, Metso Mining in Finland and also USA have implemented Basware in use. As for these customers the final goal of automatic invoicing can be reached as Basware is a service provider for e-invoicing and the invoice issuing requires no further effort than processing through the list of deliveries to be invoices. The countries within EU also belong to DDU-pricing.

In practice for these countries the invoices are created in VF04, maintain billing due list. The list of invoices, searched with country's customer number, is run through in VF04, Simultaneously the invoices get saved into SAP and once the invoices are printed out in transaction VF31, output from billing documents, the invoices get automatically sent to Basware. Invoices get stored in Basware and simultaneously customer receives a notification of a received invoice. Customer can then login to Basware and find the invoice.

As for USA they are next to be taken into DDU pricing. Until then, the freight costs still need to be added on each delivery. Naturally the invoice needs also to be sent to forwarder as well as the customs to pass the customs clearances. Luckily USA does not use proforma invoices, so that invoices for import and export clearance do not need to be separated.

In addition to previous procedures all named customers are given entitlement to display part of our SAP system as explained in following.

4.1.2. EU customers with SAP

In addition to the UK, Sweden, Germany and France in the following Metso sales organisations use SAP as their ERP system: Poland, Czech, Spain and Portugal. All of the customer with SAP will be granted display rights to DC Europe's SAP. Usually SAP gives an error notification if you are trying to view an order made by another plants than the one you are working at. The functioning of a display right will be explained further.

At DC the invoice needs to be issued and as all Metso SSOs in EU countries belong to DDU pricing the invoicing means only running through VF04 list with listed customer numbers. For further advantage, as the customers have rights to find the invoices from our SAP, they will now be able find the old ones that are left on sent or gone missing on the way. Also as some of the customers require packing lists for the deliveries they have received, display rights gives possibility for that as well.

4.1.3. Non-EU customers with SAP

This group is given the same rights as described before and also require the invoices to be sent to customs and the forwarder as with USA. This group includes Metso sales organisations in Singapore, Australia, China, India, Peru, Brazil, South Africa and Chile. Each of them requires the freight costs added to invoice, in case the Inco term settled for the purchase CPT or DDU, requires such.

Sending the Australia's and Singapore's invoices to forwarder and customs is more complex as they use proforma invoices for import clearance, so that the customer would not see invoices issued by us and see the margins that have been added to their sales price. So as the invoices would normally be sent straight to customs and forwarder, in these cases only the proforma gets send to customs and forwarder gets our invoice named as export invoice and the proforma as import invoice.

4.1.4. Customers without SAP

For all customers within this group the invoices will be sent via e-mail. The e-mails are to be listed to SAP behind the master data. As the invoice gets saved into SAP, the invoice gets automatically sent to e-mail addresses gathered from the customer.

There are few Metso sales organisations in Europe that have not yet taken SAP in use: Italy, Austria and Holland. They all are part of DDU pricing so no freight costs need to be added. This group also include Metso Norway, Ghana and Turkey, which both require invoices to be sent to forwarder and the customs. Also freight costs need to be added, in case the Inco term named requires so.

Main part of this group consists of dealers. All of them require freight costs to be added to each invoice. The dealers are mostly within the EU boarders so the invoices only need to be sent to the customer.

Within this thesis display right stands for role given to chosen users of SAP. Even though all Metso units are using the same ERP system and are linked to each other, in order to keep information flow more subtle and easy to use, each unit has access to transactions within their own unit. Metso USA and France have previously given rights to see the availability on the plants warehouses. For invoicing purposes accessible transactions are added.

The role given in SAP is named YS_GL_SD_OUTPUTS_FI_PLANTS, as pictured on figure 4. The role is to be saved into the visiting plant's SAP, in this example USA's, by SAP responsible at their plant. The new transactions that are added for invoicing purposes that the role gives are VL03N and VF05N. Both transactions allow only to look and print out, not to change anything.
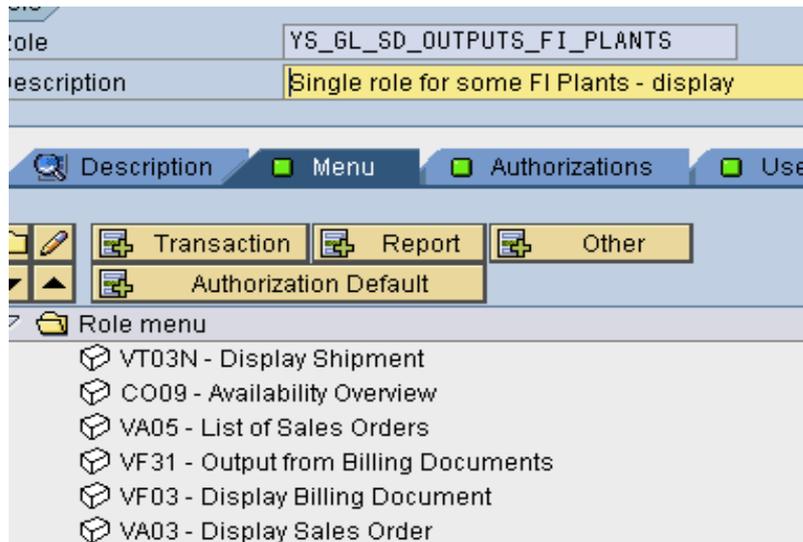
FIGURE 4. Display role

From VL05N, billing document output, the customer can overview invoices for orders of the customer in question. VL03N, display packing list, is for following packaging information, tracking information can be found behind each delivery. In addition, to be able to see the invoices and also information behind them, the tracking details and package details to be able to provide better customer service also to their end clients. Once given the display rights the customer can also see the order confirmations made for their orders.

4.1.6. Customer details behind master data

From the customers, who have no yet or will not implement SAP, DC Europe has required a group e-mail address that would bring the invoices to all users that need to receive the invoice. Now, for most of the customers the invoice is sent to contact that has placed the order and to accounting person in the company. Automatic invoice sending would work better with a group email, as SAP can be implemented to send all the invoices to certain addresses each time.

SAP forwards the invoices to addresses listed behind master data as an e-mail named as the number of the invoice. As the invoices will be sent to same address each time an invoice for the customer number is saved in SAP. Therefore the automatic sending of invoices can not be taken in use when sending invoices to forwarders or the customs, as one forwarder is not used with every order and all the invoices, even when going outside EU boarders, does not need to be sent to the customs.

4.2. Planning

Planning stage is carried out at the end of October, once theory, background and possibilities for the project have been investigated throughout. This stage is to be carried out by me, with the help of one's attending the initiative meeting. The aim for this part is to stand as guidelines for the execution stage by listing out steps and actions that need to be carried out, so that the final goal can be reached.

4.2.1 Gathering customer information

Gathering the customer stands out important for various reasons, out of which the main one is that according to information we the rest or the phases are executed. The information needed concentrates on getting the group e-mails from the non- SAP customers, Metso Partner database with information over all customers Metso vide is to be searched and the customer preparedness to follow the new invoice receiving method and to follow up how legally binding an electronic invoice is in the countries where such option is offered, in accounting and archive means.

A request for group e-mails has been issued before by head of logistics to all customers that DC serves, not just dealers, Metso Sales units in Norway, Ghana and Turkey, whom it concerns the most. Group emails are collected so that constant updating does not need to be done and it can be relied on that the invoices reach all correct parties the group mail information is needed from each customer belonging in this group.

Whether a customer with a SAP is ready for taking the offered method of receiving the invoices can be taken in use, they must be consulted. At the moment USA is prepared to take the system in use, Sweden is keen on trying and France is ready as long as they get oriented to the system. The same type of research needs to done to all. These types of decisions are made by managers and SAP personnel, so the information is to be gathered by persons in corresponding at the DC Europe.

To start with finding out the preparedness, Metso partner data base, a Metso vide used data over each customer covering all details of each customer individually, needs to be gone through customer number by customer number to find out e-billing account numbers. This is to be done by me.

The legal aspect of e-invoices is the same for all of the EU countries where the electronic form of invoice is commended method for accounting as well as archiving. In cases of customers with SAP, we need to make sure is it enough for them from a legal aspect, that they will no longer receive a copy of an invoice in a separate file and only have it as an electronic version in SAP database.

4.2.2. Updating SAP master data

Correct data is the key to successful execution of all changes that is to be done to SAP. The changes are to be done by SAP responsible persons together with the customer representative, responsible over the customer at the DC Europe. As capital sales at Tampere plant has already taken e-invoicing with Basware in use, they will be helpful and share the knowledge gathered once implementing the procedure to their own invoicing. The updates are done, as customers get ready for new implementations, the first ones at the beginning of November.

4.2.3. Customer orientation

Out of the customer groups that were divided for invoicing methods, ones with SAP in EU, other with SAP outside EU, ones with Basware and the last one without SAP, can be oriented following common guidelines, but remembering each one's individuality. All customers with SAP are to receive a common guide, ones without SAP their own and Basware users their additional notification. The orientation is to be done before the new method is taken in use with each of the customers individually. To follow Metso's vision DC Europe takes responsibility on sharing the know how to all customers in order to work better.

The change that is to be faced is the biggest for customers with SAP. The new system leaves the customer more in charged over the invoicing process as they are now finding the information, previously offered straight to their e-mail, by themselves. Guidelines to find answer questions where, why, how, when and what need to be included to the orientation. In addition to a Power Point presentation, each customer is entitled to a personal orientation if they require such.

The orientation presentation needs to include following information:

- How to add display rights and what does it mean

- What can be found behind VF05N and VL03N

- When does the information appear there

- What does the given information stand for

- How to print out information

The orientation is to be done by person responsible of SAP and the managers as they carry most knowledge to point out the most important factors and issues to be considered. If more thorough orientation is needed, for example a visit to their site, that will be taken care of by SAP responsible and managers.

4.2.4. Orienting logistics team

The change for logistics team at the DC Europe the change that is about to come, will more likely to be pleasant, as the work load brought by invoicing process will be cut close to a half. The orientation will consist of a meeting where the project will be introduced by logistics manger. In addition to manual how to proceed and the effects on daily procedures, it will point out the exceptions and how to continue with non- EU invoices. The introduction will take place once the implementations are ready to be taken in use in a wider scale, with more customers.

The manual for logistics team needs to include answers to following points:

- A walk through the whole project

- Customer groups and the differences

- The effects on daily procedures

- Which parts the project will not bring solution, non- EU shipments, proformas, CIS

The manual will consist of guide how to carry out the procedure SAP and possible country specific instructions in case such are to be needed based on research over legal aspects. In addition to logistics team, also customer representative team will be thought through the changes in invoicing.

4.3. Execution

Execution phase of the project started on the second week of November. The solutions for the invoice sending are taken in use one by one, so that attention for each could be given.

For each of the invoice sending methods, the invoices are issued by running through the billing list in VF04, pictured below in figure 5. The view shows all orders ready to be invoices. The orders are presented delivery by delivery. They can be organized be sold-to-party, shipment, forwarder or anything that helps sorting out the deliveries for

invoicing. The invoicing settings are per plant, all sales offices at Tampere plant are under same settings. When a setting is changed it affects all offices at the plant.

Maintain Billing Due List

S	BlCat	SOrg.	Billing Date	Sold-to pt	BillT	DstC	Document	DChl	Dv	DocCa	Address	Name of sold-to party	Sold-toLoc	Sort
X	L	FI00	10.11.2011	195076	YF2	GB	802542147	10	10	J	146401	Garriock Bros Ltd	LERWICK	
X	L	FI00	10.11.2011	195076	YF2	GB	802542351	10	10	J	146401	Garriock Bros Ltd	LERWICK	
X	L	FI00	10.11.2011	227437	YF2	GB	802540274	10	10	J	147774	Central Screen & Crushing Services	COALVILLE	
X	L	FI00	10.11.2011	939502	YF2	AT	802538965	10	10	J	24460	Metso Minerals (Austria) GmbH	WIEN	
X	L	FI00	10.11.2011	939502	YF2	AT	802541081	10	10	J	24460	Metso Minerals (Austria) GmbH	WIEN	
X	L	FI00	10.11.2011	939502	YF2	AT	802542492	10	10	J	24460	Metso Minerals (Austria) GmbH	WIEN	
X	L	FI00	10.11.2011	939502	YF2	AT	802542568	10	10	J	24460	Metso Minerals (Austria) GmbH	WIEN	
X	L	FI00	10.11.2011	939502	YF2	RO	802542807	10	10	J	24460	Metso Minerals (Austria) GmbH	WIEN	
X	L	FI00	10.11.2011	959001	YF2	GB	802541075	10	10	J	24469	Metso Minerals (UK) Ltd	RUGBY	
X	L	FI00	10.11.2011	959001	YF2	GB	802541862	10	10	J	24469	Metso Minerals (UK) Ltd	RUGBY	
X	L	FI00	10.11.2011	959001	YF2	GB	802542740	10	10	J	24469	Metso Minerals (UK) Ltd	RUGBY	

FIGURE 5. VF04- Maintain billing due list

4.3.1. Customer information

Going through the Metso Partner database to find customers who have already notified their EDI invoicing ID, it was found out that Metso SSOs in Sweden, USA, Finland and France could be approached with e-invoices. EDI invoicing ID is the reference put into SAP as the invoice receiver, which then directs the invoice to a correct Basware account.

The e-invoicing with Basware in Metso is run by accounting unit that is in charge of payment traffic for all of the Metso plants in Tampere area. They are encouraged towards change into Basware. Rest of the Metso units listed previously with an ability to accept invoices trough Basware; UK and Germany, have not yet received any invoices through Basware. The functions need to be tested by accounting units before it can be taken in for trial to pants.

For the moment some units are using a group mail address, which could be taken in use for automatic invoice sending. As the addresses are to be created by the customers them selves, regardless of multiple requests over them, a covering list of addresses has left not gathered. Therefore we will concentrate the tryout on addresses available.

4.3.1.2. Legal aspect

According to European committee for standardization, CEN "both parties must store the original invoices for a period determined by applicable law. During the mandatory storage period of an invoice, the competent tax administration has the right to audit stored invoices." Country by country, the requested period of archiving changes between six and eleven years. EU recommends invoices to be archived in a form they are received. Detailed information for country specific periods is to be consulted with the customer, once discussing taking the new method in practice. For DC Europe's SAP is considered as legally binding archive for data, as it is for all of Finland.

EU legislations support the use of e-forms in invoice receiving as well as archiving. Until long countries, such as Poland, have requested invoices to be signed and sent as paper versions for legal reasons. In 2010 EU commission for taxation and customs presented second directive on VAT invoicing, Council Directive 2010/45/EU. The directive encourages to member countries to lose country specific laws regarding invoicing process. In addition to promoting electronic form it also supports freedom of choice regarding the invoicing method.

The customers chosen for trying out the e-invoicing is Metso Finland Mining. With Mining the legal aspect will not need to be researched or discussed. For Sweden that is next one in line for implementation, the invoice is required to be kept unaltered and accessible through out the archive period and for Sweden the invoice archive is outsourced to Basware. For France as the try out partner for display rights, SAP is also considered as a legally binding archive for invoices as well as invoices them selves.

4.3.2. Tryout for e-invoicing with Basware

The tryout for e-invoicing with Basware is the most complex, as it requires attendance from Metso's accounting unit, who is in change of the cooperation with Basware, in addition to DC Europe and the customer. The first tryout was carried out with Metso Minerals Finland. The reason MM Finland was chosen is that other units at the Tampere plant, capital sales and foundry have already issued e-invoices for them to Basware.

The tryout is first made in test mode, called RMM, so that the invoice does not merge in to the ledger and mix up the accounts, other vice the out come of the test mode is similar to regular invoice. As the accounting unit for MM Mining, as well as for Metso Sweden, working together with them is simple. They are the receiver of the invoice, so that it is easy to follow, whether all the parts of the invoice look as they are meant to.

With first of the tests the sent invoice got stuck into the RMM and never reached Basware. Luckily, the problem turned out to be small as SAP department at the plant noticed one false tap chosen. The second test was carried out successfully, after the problem was corrected, and accounting department found the invoice from Basware's RMM. After the tryout has been carried out successful e-billing can now be issued in production, as a real invoice.

The settings for sending invoices as e-invoice are similar as they would be if the invoice would be sent as EDI to Basware. The settings are done by changing display output-condition records: Billing, VV31, see figure 6. As output type YF24 was chosen. YF24 is for invoice that also includes packing list. YF24 was chose as out put type, in addition to that it has been used as output type through SAP times and as it was not used as output type in other sales offices at Tampere plant. Therefore the invoice sending as EDI to Basware with output type yf24 affects only DC Europe.
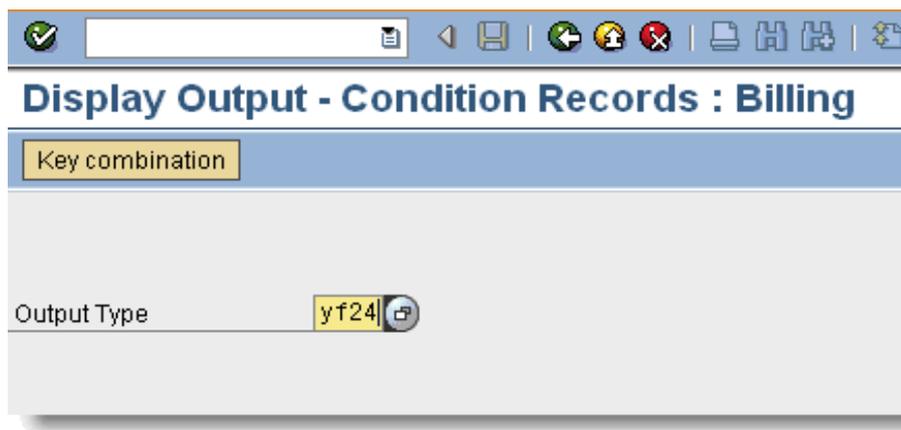
FIGURE 6. VV31

As key combination in figure 6, sales organization/ customer number was chosen. The key combination stands for a condition that determines to which parties the output will be sent. At the display condition records, figure 7, Metso Minerals Finland Inc. was chosen as the customer for the tryout by its customer number 921250, with a extra zero at the end, so that the customer number would refer to bill-to customer instead of sold-to customer. Behind the customer number the settings for the invoice output are made. After saving these settings, once invoice is saved in WF04, maintain billing due list, and printing out the invoice from VF31, billing document output, the invoice gets sent to Basware in EDI, automatically.

FIGURE 7. Create conditions records, e-billing

The function chosen behind the customer number LS, logical system. As a partner ebill, e-billing was chosen. Basware is named as the recipient behind the ebill. The get the invoice be sent as EDI, transmission medium 6 was named. Dispatch time stands for, the function that is required to be carried out before the invoice is sent to its chosen output. The chosen 3, sent with application own transaction. With EDI invoicing this transaction is billing output. These conditions can be seen separately in figures 8, 9 and 10, or together in figure 7. EN, English was chose as output language.

FIGURE 8. Partner function

FIGURE 9. Transmission medium

FIGURE 10. Dispatch time

4.2.3. Functioning of the display right

DC Europe representative visited Metso France plant during the second week of November working with SAP as one of her topics. She introduces the personnel at the plant to functioning with the display rights, as Metso France had requested for. The rights given for Metso France are as described on figure 4. The aim of the introduction was to introduce the whole organization to display right usage, so that data base currently used for saving the invoices could be taken out of use. DC Europe has made an exception with Metso France and saves all the issued invoices by the purchase order number, to the database named for invoices.

The introduction was half successful. The accounting department of the plant agrees to start using the display right, but the sales department found the new system to require too much adapting in addition to all other changes they have made during recent times. Therefore an agreement was made, that Metso France has time to accustom on finding invoices for the orders with display rights until the end of the year and be ready for change at the beginning of 2012.

The display right does not require changes to be made in SAP at DC Europe's end. The invoices are issued as normally in VF04 and freight costs added if required. After the invoice is saved, it is ready for the customer to find it from the document flow that opens behind the order number. In addition to financial details, customer can print out the packing list.

4.3.4. Tryout for automatic invoice sending

The automatic invoice sending was tried out with a Scottish dealer Garriock Bros. The trial period took part at second week of November. As SAP is a company wide system, it was confirmed that the capital sales would not have open orders to the customer. This way no accidental invoice sending would not happen and the tryout be followed better.

The changes in SAP were made to VV31, Display output- condition records: Billing, identically to e-invoicing settings. Invoice with packing details, YF24, was chosen as output type and customer number with extra zero as the key combination. For the future, the output can also be determined so that the non-EU invoices get sent to the customs and the named forwarder in addition to customer.

To the Display condition records for the chosen output type, that is only valid for FIOO, Metso Minerals Tampere site, customer records were defined in order to choose the customer used for the tryout. Garriock was chose as the customer by their account number, 195076. To recognize the customer as a bill-to-party, 0 was added to the end of the customer number, see figure 11 below. This is because information behind bill-to-party contains more specific details that is not visible behind the sold-to-party information. In addition set SAP requires the bill-to-party information, to fulfill the conditions set for the transaction

FIGURE 11. Display condition records

Function restrictions were added, so that the SAP would recognize the contact as BP, the bill to party. E-mail as a tool for messaging was added transmission medium by choosing 7, simple mail. Usually the medium for print out put here is 1, where saved file prints out as PDF- file or to a named printer. Dispatch time is 4, print immediately, by choosing this the files gets send every time the invoice saved into SAP. All these functions can be seen individually in figures 12, 13 and 14 or together in figure 11.
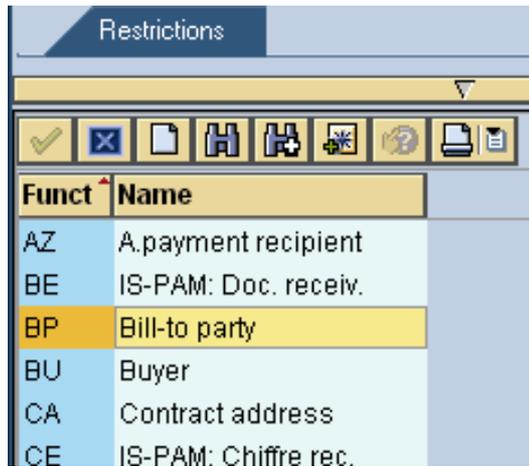
FIGURE 12. Function restrictions

FIGURE 13. Transmission medium
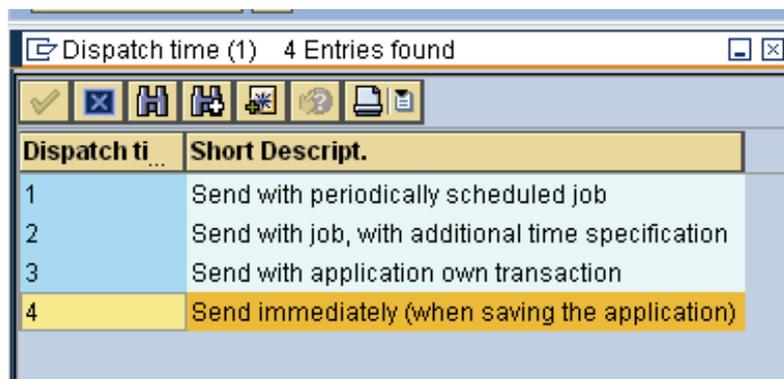
FIGURE 14. Dispatch time

As a result for the changes, when saving the invoice to SAP, customer receives an e-mail with 2 attachments, pictured below in figure 15. One of them was named 'invoice+ the number of the invoice' and the other only 'invoice'. Out of these two the one without the invoice number held the actual invoice within, looking exactly the same as it does when printing out an invoice as a PDF. The other one was an empty file. When customer opens the invoice in their e-mail, the invoice issuer receives a confirmation e-mail to confirm that the invoice has been opened. The issuer's e-mail is recognized through the SAP user ID.

```
-----Original Message-----
From: Katja Kuusisto
Sent: Wednesday, November 09, 2011 12:15 PM
To: l.hunter@garriock.co.uk
Subject: Invoice 578355



Find the invoice attached Invoice 578355.pdf  Invoice.PDF
```

FIGURE 15. Received e-mail

4.4. Monitoring

The monitoring stage was carried out after each group of invoice sending had been processed, starting half way of November. The results include the effect on invoicing efficiency, customer feedback, and invoice issuer's feelings on how the new invoicing procedure feels among the daily procedures. According to the results improvements to further implementations can be made, as well as the strengths can be shown

4.4.1. Monitoring customer's with Basware

One of the main outcomes of the e-invoicing through Basware was that all available tools were now taken in advantage. In addition to more effective invoicing technique the tryout for e-invoicing brought up details that need to be considered in the future. Implementing the e-invoicing included so many aspects that working together with all

Metso offices at the Tampere plant and with accounting department in addition to the receiver, the tryout raised the importance of cooperation.

Discussing experiences over Basware an important detail came into awareness. If the sales price and total sum at the invoice do not match, the invoice gets sent to person who raised the order. The final sum needs to be approved before the invoice can be normally issued in Basware. With DC Europe this means that only invoices for orders with DDU-pricing go straight to Basware. If freight cost is added to a separate line the cost have to be accepted first. With Finland orders are EXW and no costs are added. Metso units in Sweden, UK, Germany and France are all in field of DDU- pricing, but as Metso USA is not yet taken DDU-pricing in use. So that invoices could be issued to USA more effectively, it would be better to implement DDU- pricing first and e-invoicing with Basware only afterwards.

During executions, small details that all need to be correct before the invoice reaches the correct receiver. With the constant cooperation with all parties involved the details could be corrected immediately, most of them were details that no one knew the reason why they need to be the way they are. Now that the details were set correct once, they will be correct for all the future executions.

From the invoice issuers point of view issuing the invoice to Basware, leaves an uncertain feeling due to the fact that Basware has not been used before. Once the invoice is issued and printed out in VF31, it cannot be seen whether the invoice ahs reached the customer. To improve the matter; rights to access Basware to follow up the invoices sent are needed for logistics team.

For Metso Minerals Finland invoices had until now been sent also as paper version in mail. Therefore with Metso Minerals Finland all whole scale from environmental advantages until savings in time and funds can be seen. The time savings can be seen on the figure 16 below, before invoicing the example amount of invoices 631 took 12,3 hours, but the time used afterwards is 1/3 less. Invoicing process from issuing the invoice in VF04 until printing it out in VF31 takes only 4,2 hours.

INVOICING TIMES FOR E-INVOICING		
NUMBER OF INVOICES	INVOICING TIME BEFORE (min.)	INVOICING TIME AFTER (min.)
1	1,25	0,5
2	2,25	0,8
631	736	252

FIGURE 16. Invoicing time before and after e-invoicing

Next the DC Europe can extend the tryout to Metso Sweden. Within next week tryout for Metso UK, France and Germany will take place late November behalf of the accounting unit. Once this is done successfully, the tryouts can be carried out at DC Europe as well. Next in line will be Metso USA and Canada.

4.4.2. Monitoring display right

Try out for the display right brought up the effect of different cultures, that all need to be considered in global working environment. The French are many times adapting on changes with a slower schedule, that we are accustomed in Finland, but to find best solution for both, adaptation time until the end of the year was agreed. The try out with the French how ever pointed some points to be taken into consideration, such as common rules on using the display right, as only one user can be viewing the order at once and when the invoice can be found from SAP. A schedule following which invoicing would need to be done at the DC office, to follow delivery closing and pick up times at the warehouses.

As the accounting department in Metso France agreed on starting to use display right. The sales organization in France orders massive volumes of goods and that is naturally visible in number of invoices issued. The database used is not considered, as the most effective invoice transmission tool and lot of invoices are not found from the database for various reasons. List of up to 300 missing invoices are required at the end of each month by the accounting department. With the display right, missing invoices can be retrieved by the accounting department and saving DC Europe from the trouble.

The display right has the biggest effect on invoicing of all new invoicing methods and they can be seen strongest with Metso France, because of the database used for invoice saving. The Figure 17 below shows the times used for invoicing with display right. The number 631 is the number of issued invoices for Metso France in July 2011. According to calculations made 2050 min totals 34 hours of work, within a month. In comparison to 2 hours, that the same process takes time with display right, the difference is indescribable.

INVOICING TIMES WITH DISPLAY RIGHT

NUMBER OF INVOICES	INVOICING TIMES BEFORE (min)	INVOICING TIMES AFTER (min.)
1	3	0,2
2	6	0,4
631	2050	126

FIGURE 17. Invoicing times with display right

4.4.3. Monitoring automatic invoice sending

The invoice issuer's point of view for the automated invoice sending is rather clear. As one stage of the invoice issuing process is cut down, it makes the whole process a lot faster to proceed through. Naturally, a change in normal work habits feels unaccustomed in the beginning, but when noticing how conveniently to invoice is sent the change is appreciated. As a dealer, with Garriock, the freight costs still needed to be added which brings along detours to the invoicing processes. After the trial period, the automatic sending is switched off.

The affect in invoicing effectiveness will be more visible when more customers are implemented and will be most visible with DDU-priced customers. With Garriock the time consumed is the time for calculating the freight costs for each shipment. Adding the freight costs individually to each shipment in VF04 and saving the invoice takes time 0,5 minutes for one, 0.9 minutes for 2 invoices, see figure 18 below. The corresponsive times before automatic invoice sending were 1,25 and 2,4 minutes. With greater invoice amounts the, such as 631, the won time in invoicing can grow up to a day of work within a month, 7,7 hours.

INVOICING TIMES WITH AUTOMATIC INVOICE
SENDING

NUMBER OF INVOICES	INVOICING TIMES BEFORE (min)	INVOICING TIMES AFTER (min.)
1	1,25	0,5
2	2,4	0,9
631	757	295

FIGURE 18. Invoicing times with automatic invoice sending

From the customer's point of view, Garriock was happy to take part on the tryout and promised to provide feedback over what they receive as well as to forward the received e-mails, so that the output got by the customer could be seen. On the first day there were only 2 invoices to be issued. Both of them reached the customer within no time. During the last two days a similar amount of invoices were issued. What raised a question with the customer was that, the e-mail has two attachments and whether some information was missing, as one of the invoices is blank. This is something SAP does and a way out of it has not yet been found.

During the test period an invoice for Garriock was also issued in Tampere warehouse. Until now an invoice had been sent via fax, but now as the invoice goes straight to e-mail, but as the tracking number does not print out on the invoice, the AWB for each delivery leaving needs still to be sent via fax to logistics teams group- email. The invoice is then forwarded to customers e-mail. This now adds extra e-mails received to the customer. Adding the tracking number to the invoice would need to done before saving the invoice, but getting the tracking ID however requires an invoice number. This is a vicious circle, which will need to be solved in the future.

Another point that requires attention is the confirmation mail over a received e-mail by the customer. The confirmation about sent invoice does bring along more trusting feeling that the customer has actually received the sent invoice. Trying out with one customer with a small amount of invoices, this does not cause too much trouble, but with more considerable amount of invoices this would bring along a relative wave of unnecessary e-mails. An opinion gathered from the logistics team agrees that the confirmation e-mails are redundant and if only possible with SAP avoidable.

4.5. Closing

Closing the project, done for my thesis, leaves the received results for further development towards automatic invoicing. For the future purposes pros and cons of implemented systems have been researched and tried, so that improvement can be searched based on them. Even though the implementation and try outs done during the project are only a scratch of the surface reaching the final goal of automated invoicing, it brought up the challenges to be faced, limitations and complexity that is daily life when working in global environment and with the tools given.

Executing the e-invoicing in Basware was able to show how tight cooperation with involving parties and Metso offices push through to aimed results. Sharing the known details to perform better is one of Metso's main visions. It became fulfilled with this tryout. The outcome was what was aimed for; a working base following which future implementations can be carried out.

For customer's behalf Basware is brought out as an additional tool and know how on how to function with that is between Basware as service provider and the customer. It is likely that not everyone in the office will have access to the database. Therefore, as described in the beginning, display right for Metso Tampere plant and so, also to DC Europe's database is given. The challenges with the rights are explained later.

The tryout for display right brought up one of the key issues when working in global environment; differences in cultures and work habits. Implementing display right with the French was most likely not the easiest to start from, but they raised a crucial point on how flexibility is important, when driving towards changes. In addition, it gave a reminder of Bruno Koch's research over e-billing which stated that small steps taken, drive towards success.

In introducing and teaching customers in the future it must be remembered, that the change is notable for them, as it requires the most from the customer's point of view, therefore flexibility must be remembered without forgetting the goal reached. Next time the common result must be discussed right in the beginning. To start with a timetable of closing times for deliveries from each warehouse must be reviewed, so that a timetable for when invoices are available for the customer to display can be created. DC Europe is then to run the invoices according to the schedule. This way, confusions over why something has not been invoiced from the customer's point of view can be avoided. In

addition, as only one user can display the order at once, an agreement over how to exit the order after finding the information needed, is required.

The result about the advantages were close to shocking and got you wonder, why relative changes were not driven to be made earlier. In defence for the old invoice saving method, the number of invoices taken in for the example is really high, even for Metso France and for other customers the change in invoicing time will not be as big, but it will be notable and bring savings in work time worth tens of hours.

The automated invoice sending works from the customer point of view. As a result it can be used as a base for further implementations, starting from other customers and finally to forwarders and customs. From the despatching department's point of view the results are more problematic and the vicious circle with problem with tracking number is to be solved to ease the system in future. The tryout proved that the made changes in invoicing process fulfil the aimed goals of effectiveness and accuracy.

As an invoice issuer it can be trusted that all invoices get sent. Therefore the confirmations e-mail about the received e-mail by the customer feels unnecessary and therefore, if possible, confirmation e-mail sending is to can be taken off in SAP. Customer feelings about the automatically sent invoice were confused because of the two attachments. In the future, customers must be remembered to inform about this.

After tryout two tickets, fault notification, were made to SAP administration aiming for changes for features that appeared during using automatic invoice sending. The first one is to remove the confirmation e-mails. The second one was to change the subject field of the e-mails. For a customer, the invoice number currently shown as the text does provide any information itself and therefore customer cannot relate the received e-mail to his/her order. The second ticket seeks for getting the customer PO number as the text on the subject field, in addition to words 'invoice for'.

5. Conclusion

This project succeeded to offer building material for the further journey towards automatic invoicing. As the DC Europe had begun to make changes to its activities, long before, this thesis succeeded to carry out the first implementations in invoice sending were made. Personally, everything done during the project opened eyes on how widely the changes have affect on, how SAP as a global tool and Metso as a global company are stiff in their movements.

The final goal of the automation is to have such a well constructed, thought through and tested system that can be presented to other Metso units around the world without a fear of failure. Therefore, even though the thesis does not provide final solutions or fully implemented changes, it is considered as a crucial part of the complete project towards automated invoicing. Working together with other offices at the Tampere plant and in agreement with customers builds up Metso's vision " Working as One to be Number One".

With the results gotten with the invoicing methods tried out during the project give only an illustrative estimate on the effects that the new methods can bring along. The time the invoicing process takes can vary customer by customer and day by day. The effects listed in the work were per customer, so the effects that future implementations will bring up will multiply the effects.

This thesis started out with a starting point and clear goal where to go. Only the execution was missing. Along the journey gone through, the start got well behind and the work that needed to be done to reach the goal became clearer and the end closer. With the tryouts problems were faced and realizing and even solving part of them formed a steady base following which the future implementations can be carried out. More research, tryouts and changes will need to be made.

To summarize the work done and to bring this thesis to a close it can be said that goal named was reached; the future implementations have now a base and examples following which more and more customers can be invoiced more effectively and therefore address the time that becomes available to tasks better suited for each ones individual know-how and abilities.

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