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IDENTIFYING THE WASTES IN A TRANSPORTATION
COMPANY'S OFFICE PROCESSES

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HUKKIEN TUNNISTAMINEN KULJETUSYRITYKSEN TOIMISTOPROSESSEISSA

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Opinnäytetyön tarkoituksena oli hukkien tunnistaminen kohdeyrityksenä olleen kuljetusliikkeen toimistoprosesseissa. Lähemmän tarkastelun kohteeksi valikoitui laskutusprosessi ja sen hukkien tunnistaminen sekä analysointi.

Teoriaosiossa tutustuttiin laatujohtamisen ja prosessijohtamisen kautta Lean -filosofiaan. Lean -filosofian työkaluista seitsemän hukkaa olivat pohjana teoriaosuudelle, muita käytettyjä työkaluja olivat prosessikaaviot ja juurisyyanalyysit.

Työ toteutettiin työpajatyypisenä harjoituksena kohdeyrityksen henkilökunnan kanssa. Valittu prosessi määriteltiin prosessikaavioksi ja siitä tunnistettiin hukkia, jotka sittemmin analysoitiin juurisyiden selvittämiseksi teoriaosuudessa kuvailtuja työkaluja käyttäen.

Hukkien analysoinnissa ilmitulleita juurisyitä, jotka liittyivät turhaan odottamiseen sekä sähköisten järjestelmien puuttumiseen ja vanhanaikaisuuteen. Opinnäytetyössä ei pyritty ratkaisemaan havaittuja ongelmia, joten jatkotutkimusmahdollisuutena voisi olla sopivan sähköisen järjestelmän löytäminen kohdeyritykselle.

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The purpose of this thesis was to identify wastes in case company's office processes. Identifying wastes of the selected process and analyzing them was the object. Selected process was billing process.

In theory part terms quality management and process management were discussed and Lean philosophy was introduced. Seven wastes as a tool for Lean were opened and other tools that were introduced were process modelling and root causes.

The actual research was implemented as a work shop type of a practice together with the personnel of the case company. Selected process was described as a process chart and wastes were identified from it. Wastes were analyzed with tools described in theory part to discover root causes.

Root causes that occurred were related to unnecessary waiting and lack of modern electronic systems. In the thesis solving the problems weren't an objective, but possible further study could be auditing suitable electronic system and software for the case company.

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1 INTRODUCTION

1.1 Case company

In this thesis the case company is Koskinen Group. It is a medium sized company, which operates in road transportation and logistics. It is a conglomerate that includes four companies in Finland and a sub company in St. Petersburg, Russia. Koskinen Group is single family-owned company and its business was started back in 1937. Their main business is transportation services which include general cargo, containers, sand and gravel, and fuel. The company also offers warehousing services and selling sand and quarried stone products from their own sand pit. The company operates mainly in Finland but also in abroad when needed. (Website of Koskinen Group.)

The author is the great granddaughter of the founder of the company. The author's late grandfather led the company to its current state as he was the CEO of the company nearly 50 years. Nowadays the third generation, author's mother and aunt, is running the company. The author herself has been working in the company's office in Hinnerjoki many years and also her other family members work there.

1.2 Background

Transportation and logistics field is currently struggling a lot due to the general economic state there is in the country at the moment. There is a lot of ruthless competition in the field and many small and medium sized transportation companies have faced a bankruptcy after the beginning of the 21st century. Highly competitive bidding is at the dominance and European Union complicates the business along with labor unions demands.

There is a need for cutting every possible extra expense that company might have and every process in a company needs to be optimized. Office processes are often underrated and their importance is not seen by the management. Also, they are often

bit old-fashioned and new, more efficient methods are ignored. That's why this study concentrates in the case company's office processes.

1.3 Goals

Goal of this thesis is to identify wastes in a case company's office processes. Minimizing wastes will increase the company's profitability and in order to do that, the wastes need to be identified. Office processes' importance is not often noticed until there are problems occurring. Even though office work has changed as the amount of routine tasks has decreased over the years due to automation, there are still office processes that need to be done in order to run any business. (Kosonen & Pekkanen 2010, 8.)

In this thesis the author is going to start with theory part, which opens up concepts like quality management, process management and Lean. The tools used in this thesis are selected carefully. Process modelling is used because it gives a clear vision of the selected process, for identifying problems seven wastes are applied and finally Five whys is used to discover root causes. In the actual work, for the gathering of the needed information, the author has help from the case company's employees who are familiar with the selected process. This is accomplished via small-scale workshop.

1.4 Boundaries

This study focuses on identifying and analyzing wastes in the case company's selected office process. From all the processes the company has, the office processes are selected because the author is most familiar with them. The main focus in this study will be in the billing process and wastes will not be identified from company's other processes. Presenting solutions to problems which might occur when the selected process is analyzed will be ruled out of this thesis.

2 THEORETICAL FRAMEWORK

2.1 Concepts

This study aims to increase the case company's efficiency, productivity and profitability. So it is wise to take a deeper look into these concepts at first.

EFFICIENCY

Efficiency is the ratio between the amount of produced goods or services and inputs. In efficiency the focus is more on quantity than quality. Efficiency also refers to the amount of how much a machine or service is actually used compared to the possible maximum utilization of the machine or service. (Lönnqvist, et al. 2010, 82.)

PRODUCTIVITY

Productivity, which is used as an indicator for efficiency, is the ratio between used resources and the resulting output. Production's development and growth are the key elements of reaching higher productivity. In service business productivity is traditionally seen as short response time, meaning that the more customers served within a certain time the better the productivity is. (Website of e-economic.)

PROFITABILITY

Profitability is the ratio between profits and expenses. An organization gets profits from the products or services they sell and expenses are the costs that occur when producing those. Business is said to be financially profitable when profits are higher than expenses. Profitability measurements are made to find out whether it is profitable to continue the business at the question. (Website of e-economic.)

2.2 Quality management

Quality management is vital part of any organization. It guides organizations to aim to offer best possible products or services to customers with most effective and profitable way. It means that even though customer satisfaction is important, aiming only

towards higher customer satisfaction rate at any cost is not the way to go. In order to achieve total quality control, the company must at first understand the markets' and customers' needs. Second step is to improve the company's operations and reach higher quality. This includes delivering the expectations to the customers' needs, improving processes inside the company and making sure that company's operations, products and services meet the standards of quality systems. Only after these two steps are completed, there are satisfied customers. (Lecklin 2006, 18-19.)

It is rather difficult to say what are the issues that make quality in a company, but here are few common characteristics among these companies. Customer orientation is one of such matters, because in the end, customer is the one who decides what quality is. Management's inputs in quality control, and linked to this, clear vision and mission are also important. Encouraging employees to improve their work routines and know-how as well as including employees closely with quality control gives the company a great asset in making the company more competitive. Part of quality management is also constant developing; processes should be more efficient and profitable all the time. (Lecklin 2006, 26-27.)

2.3 Process management

It is common for people to mix up terms process and project, therefore it is important to make difference between them at first. Process is a chain of steps that are being repeated time after time when project is just one time thing. In Figure 1 there is simplified version of a business process. Process' main purpose is to create added value to the customer and it is achieved with taking the inputs from the supplier, going through the process and finally getting outputs or results to give to the customer. The process is a chain of events that uses different set of methods, people and their skills, machines, control and other resources in such way that benefits all parties. (Lecklin 2006, 123-124.)



Figure 1. Business process (Lecklin 2006, 124).

“Process management is founded on the basic question of how an organization creates value for the customer. The core belief of process thinking is that value is created for the customer in a chain of events, which can be called a process.” (Laamanen & Tinnilä 2009, 52). It is said, that when an organization creates enough value to its customer there is a possibility of financial success. In order to do that, the processes need to be evaluated carefully. (Laamanen & Tinnilä 2009, 10.)

2.4 Lean

Lean theory originates in Japanese car industry as the Toyota Company introduced a new philosophy to mass production after World War II. The new philosophy was all about simplifying the car manufacturing process by cutting all unnecessary actions from the process and making the process more flexible. The philosophy was labelled as Lean by Womack and Jones in 1990. (Womack & Jones 2003, 9.)

When observing production processes, there are two types of actions. Others generate revenues and others add costs. Lean’s aim is to get rid of those that only add costs, wastes. In Lean the wastes are categorized as transportation, warehousing, motion, waiting, over processing, over production and defects. These are the seven wastes that don’t make the product more complete, they only add costs. Besides these seven wastes there is also eighth waste which is skills. It has been added to the theory later on and it is not directly a waste but it is implemented with seven wastes. (Carreira & Trudel 2006, 17-19.)

Lean is pursuing on waste-free and flexible processes and those are important to any organization. Even though the Lean theory originates in manufacturing, it can be ap-

plied to fit the service industry as well. When applying Lean, it is crucial to remember that all the tools and measurements have to be applied too. Thinking outside the box will help in this matter. Also remembering the importance of answering to the customers' needs is important when applying Lean to service industry. (Sarkar 2007, 3.)

In Lean office the goal is to have office workers work as efficiently and smoothly as they can by changing the work habits and systems used at the office. Often noticed problem in offices is that the work and its quality vary a lot. It is difficult to identify problems in the office work because it is not as visible as in for example factory work. In Lean office it is important to identify the value stream flow to make it more sufficient. (Markovitz 2007.)

2.5 Tools

There are a lot of different kinds of tools that can be used when aiming for more efficient and profitable business processes. In this thesis process modelling, seven wastes and root causes are used to analyse the process.

2.5.1 Process modelling

Process modeling is a tool used to clarify the process. Business process modelling's goal is to closely represent the process in a way that not only experts of the field, but also other people can understand the process (Website of BPM). The model is a picture where the selected process is laid out step by step. The picture should be as simple as possible because it should be easy to read. The optimum is that the model fits into one page therefore it can't have very many steps in it. If some step in the process needs more precise guidance because it is more complicated, it can be created as secondary stage model. (Lecklin 2006, 140-141.)

Making a business process model is very important because it helps seeing the current state of the process. Improving something without knowing the current state of it is nearly impossible, that's why process model should be studied carefully before

making any changes or improvements. There are many different kinds of process modelling types with different hierarchy layouts. They are used for different purposes. For example Stakeholder analysis is a model where the actual process is not really even discussed, but it opens up who are the parties dealing with the process. Overall process model doesn't describe the actual processes very clearly, but it links the processes together and states the order of the processes. Individual flowcharts are the most common process model types. They describe the actual process more specific and with details. (Andersen 2007, 38, 41-42.)

In Figure 2 there is an example of individual flowchart. In this type of process model each stakeholder, in this case customer and departments of sales, manufacturing and distribution, has its own section. The chart describes buying process for part x. Different tasks, which are part of the process, are shortly stated in the model. The goal is to write as little as possible to the boxes in the chart. Boxes are connected with arrows and every box should have at least one arrow leaving it and one coming in, except starting and ending boxes. The boxes are shaped differently depending on the tasks, because different tasks have different symbols. For example, starting and ending symbols are rectangles with round corners and normal tasks are with sharp corners, when decision needs to be made the symbol is diamond shape and the rectangle with wavy bottom is a symbol for document. This type of process model is clear and easy, and it also gives comprehensive picture of the process described.

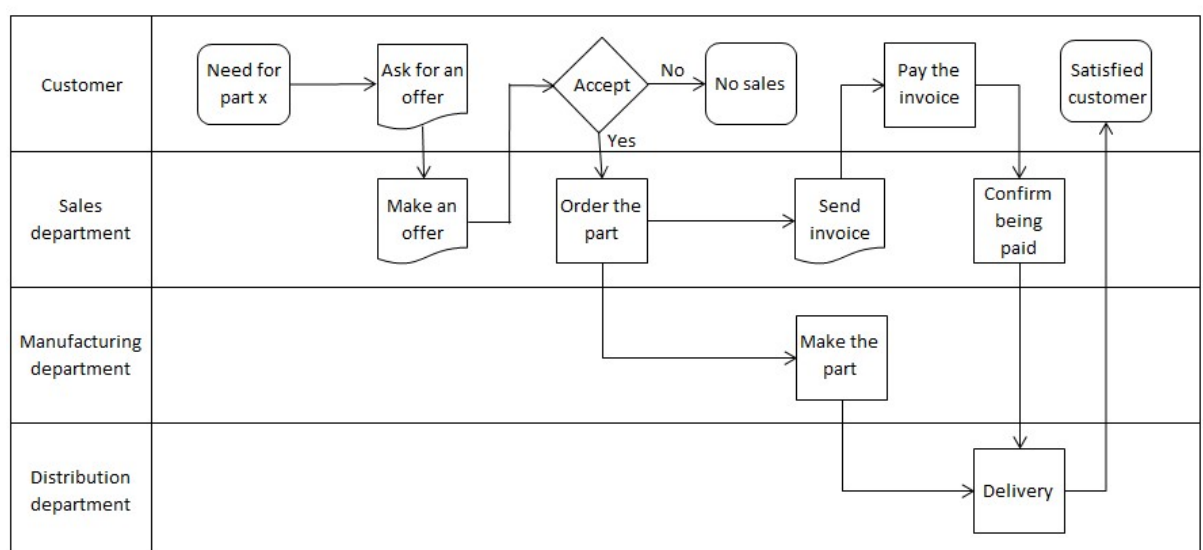


Figure 2. Individual flowchart.

2.5.2 5S technique

One of the tools used in Lean is 5S technique. Its main focus is to identify and eliminate wastes in processes and even though it is phrased to look like housekeeping rule, in Lean it has deeper meaning (Sarkar 2005, 1-2). The five S's are sort, set in order, shine, standardize and sustain. These are the steps needed to improve the process addressed. First, everything must be sorted to get rid of everything that is not necessary. Second step is to set everything its own place and set everything in their places. Cleaning the process comes next as a shine; this step contains inspecting the process more closely. Standardizing the process helps keeping it simple. Sustaining is the last of the five S's and it means developing the process continuously and up-keeping the 5S technique so that it will become a habit and that can increase the process' efficiency a lot. (Website of Kaizenworld.)

In one application of the 5S', which is designed to Lean office, there are four steps; stabilize, standardize, visualize and improve. In Lean office the product is not as tangible as it is for example in manufacturing processes, it is difficult to evaluate properly and due to that, the quality of the work might vary. Stabilizing of the office process is important because without it it is difficult to see what parts of the process are vital for the overall process and what are classified as waste. Standardizing the process makes it easier to identify wastes but it also helps simplifying the process. The process is more efficient the less it has steps and variables. Visualizing the process gives it transparency, which is much needed in most office processes. When a process is visible it is easier to manage and it is easy to give instructions and prioritization rules e.g. for new employees. Improving is the last step of this application and it means first changing the existing processes to more efficient state, and in a long run making bigger changes in processes and systems if needed. Redesigning the entire process at once is almost never worthwhile. (Locher 2013.)

2.5.3 Seven wastes

There are seven wastes in original Lean theory. The wastes are transportation, inventory, moving, waiting, over processing, over production and defects. When taking the

first letter of each waste, and putting them together, there comes TIMWOOD. It is a mnemonic that helps to remember all the wastes. In addition to these seven, there is also the eighth waste, the waste of skills, it has been added to the wastes later on, and so it is not included in TIMWOOD. (Sweeney 2015, 8.)

Transportation. First waste is transportation. Moving item doesn't add any value to the product so it can be stated to be unnecessary. To eliminate this waste it is important to plan all the actions in a process well. Moving different parts of process closer to each other or inventing more efficient ways to transport can decrease the waste of transportation (Website of Ceriffi). Transporting can also lead to unintentional damages on the goods (Bicheno 2008, 41).

Inventory. Second waste is inventory or the waste of warehousing. Inventories can easily add a lot of costs to the goods. The ideal situation to any company would be having no inventory at all, but it is almost impossible (Bicheno 2008, 42). To avoid warehousing expenses and too big inventories many companies today use JIT-system (Just-in-time). JIT-system means that companies want their products at right quantities at right time and that is possible only if delivery times are reliable (Karhunen, Pouri & Santala 2004, 290).

Motion. Unnecessary motion is waste that relates more to people and layout, not so much to actual goods. This waste is eliminated by ensuring "...that things (tools, materials, information) are where they need to be, when they need to be there." (Carreira & Trudel 2006, 25). High quality of workplace, like good ergonomics, can easily reduce unnecessary motions (Bicheno 2008, 41).

Waiting. Waiting is one of the most obvious wastes, it can occur in any step of any business process. It is usually when some stage of the process is finished but you have to wait for something before next stage can be implemented (Womack & Jones 2003, 351).

Over processing. Over processing consumes usually more resources than it can give, it is often additional fine-tuning to give the product something extra. Over processing can also be unnecessary bureaucracy, especially in big companies. This is a problem

when permission has to be granted by someone in a higher body of the organization or in some cases from multiple persons. This is often seen as a time-consuming and ineffective. Over processing is sometimes called also inappropriate processing, which also describes the waste well. (Carreira & Trudel 2006, 23.)

Over production. Over production is that some part of the process is ready before next one needs it. It can also be that customers won't need the products just yet; this again leads to inventory problems. One of the key elements in any business is that production is optimized to the need. (Carreira & Trudel 2006, 20-21.)

Defects. The last of the seven wastes is defects, in some contexts it is referred as rejects, re-work and defective parts. "Any disruption in a process creates a hole in time that travels across the entire system and adds a great deal of cost." (Carreira & Trudel 2006, 24). Depending on what stage of the process the defect occurs, a small defect can highly impact the whole process. Mistakes, errors in systems, missing or incorrect information and repairing can all be categorized as defects. It is important to pay attention to defects and to correction of those since for example quality defects are often greater than assumed (Website of Ceriffi).

The eighth waste, which has been added to the Lean theory later on, is skills and it is not as concrete as other wastes. It refers to the unused ideas, creativity or skills that the employees have (Website of Ceriffi). Employees often have useful ideas how to do things more efficient or simply just better. It is important to companies to encourage employees to present their ideas and even more important to hear them out (Website of Micon).

2.5.4 Root causes

Root causes are the main reasons errors or wastes occur in processes. When the wastes are identified it is vital to take a deeper look at them. Only by unravelling the root cause for the problem it can be fixed properly. If the problem is solved without figuring out the ultimate root cause it might reappear easily. (Website of MindTools.)

3 METHODS

3.1 Description of the process

In this thesis the focus was on finding wastes on the selected office process of the case company. The aim was to keep the process simple at this point and to keep in mind that selected process is billing process. In this thesis the beginning of the billing process is stated to be the moment when the transport order comes to the transport coordinators. Also, the concentration was on those customers who have on-going transportation contracts and price lists with the case company. The author decided to use post-it notes on a large sheet of white paper to demonstrate the business process. Post-it notes were selected because they are easy to rearrange and change if needed. At first, the author wrote down each step of the selected process on post-it notes. Post-it notes were arranged in chronological order from left to right and divided vertically into four sections; customer, truck driver, transport coordinators and billing department. These four sections made the chart clearer and more visual and they also show where the step described on a post-it note really happens in the supply chain. The sections were also colour coded by using different colour post-it notes to different sections to make the chart more visual. Orange described actions involving the customer, blue truck driver, green transport coordinators and pink billing department.

In Figure 4 there is a modelling of how the post-it notes were originally placed on the empty sheet. First the customer places transport order and gives all the details of the load to case company's transport coordinator. Transport coordinator plans the transportation, meaning time and route and whether the order is with full truck load or only partial load and can it be combined with something else. Transport coordinators are communicating with truck drivers daily and they give instructions to drivers. Driver loads, transports and unloads the cargo as the transport coordinator has planned, and at this point the cargo has been delivered to the customer. At the end of the week truck driver comes to the case company's headquarters and leaves all the paper work from the week there at once, if the truck driver won't come there, they will sent the papers via post office. Transport coordinators check all the papers along with waybills and after that they give them to the billing department. Billing department handles the waybill and other documents like driver's log as agreed and makes

the bill. Billing department sends invoices as e-invoice, via e-mail or alternatively paper invoices via post office. When customer receives the invoice, they handle it and when they have paid the bill, the case company's billing department gets notice, that money has arrived and then they check the payment.

Customer	Transport order		Transport delivery				Handling the bill	Paying the bill	
Truck driver		Loading / Transportation / Unloading		Waybills to transport co-					
Transport coordinators		Transport planning			Checking the waybills				
Billing department					Pricing the waybills	Making the bill	Sending the bill		Checking the payment

Figure 4. Original layout of the post-it notes on the sheet.

The sheet with post-it notes was showed to the case company's transport coordinators and billing department personnel and the author asked them to read it through and think whether they thought it was accurate or not. They had one afternoon to think about it and they all read it through carefully one by one when they had a suitable break during their work schedules. Transport manager pointed out that "Transport delivery" step was not necessary because the main focus was on the billing process. He also explained that usually the case company's driver loads from the customer's but the actual delivery / unloading is often made at the premises of the case company's customer's customer. With that said, the step "Transport delivery" would not even belong to the "Customer" section of the sheet. Others agreed with him and at this point the post-it note with "Transport delivery" was removed from the sheet completely. Otherwise everyone thought that the process was described correctly on the sheet with post-it notes.

In Picture 1 there is a photograph of the actual sheet where the post-it notes were clued. It is the same as Figure 4. Picture 2 was taken after case company's personnel corrected the process and the "Transport delivery" step was removed from the chart. Texts in these pictures are in Finnish because the case company's personnel felt more

3.2 Identifying the wastes

After the process was modified, the case company's personnel started to think about wastes in the billing process together with the author. It was proved to be a bit difficult to think and analyse the process they are dealing with daily basis. With careful thinking and discussions total nine wastes were brought out. In Figure 5 there is the modified layout of the post-it notes on the sheet and also the wastes are marked there with yellow spots. Wastes are also numbered so it is easier to follow.

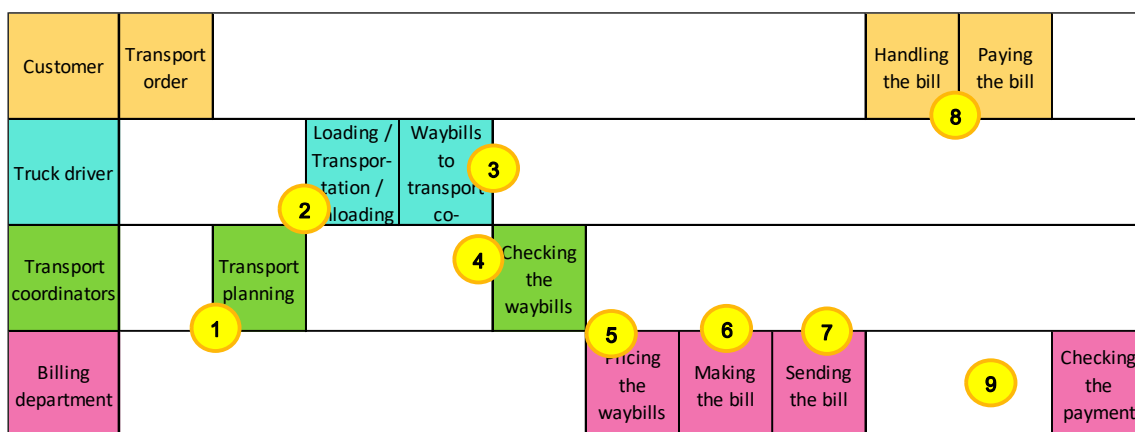


Figure 5. Modified layout of the post-it notes on the sheet and wastes.

The nine wastes shown in the Figure 5 are recognized by the author of the thesis, transport coordinators and billing department personnel and they are as follows:

1. Lack of suitable fleet
2. Information of the load won't get to the office immediately after it's been transported
3. Information or notes in the waybill can be inadequate
4. All the waybills from one week are returned to the office at once
5. Lack of specific price on the price list
6. Billing software is old and complicated
7. Sending bills via post office is expensive and slow
8. If for some reason the customer can't pay the bill on time
9. Terms of payments are long and movement of money is slow

When reviewing the wastes that were spotted, the author started to think whether two of the wastes were really relevant. With further discussion with transport coordinators the waste number one “Lack of suitable fleet” was removed from the wastes. That is because in this study the concentration was with the customers who have on-going transport agreements with the case company, and if there is an agreement, the suitability of the fleet has been evaluated beforehand. Because of the same reason the waste number five, which was spotted by the billing department, was also under discussion. Sometimes when waybill comes to the billing department, the personnel there haven’t been informed the price for the load in question. In that case they have to ask it from the transport coordinators or from the selling department. But this is rather rare with the customers who have on-going contracts and price lists and anyhow either sales representative or the transport manager have already negotiated the price for the load with the customer before it has been transported. After discussions with the transport manager also the waste number five “Lack of specific price on the price list” was removed from the wastes.

In Picture 3 there is a photograph of the actual billing process chart with wastes on it. Wastes were written in yellow post-it notes so they were easy to spot. After all the wastes were marked on the sheet, they were numbered from one to nine.



Picture 3. Billing process chart with wastes marked on it.

4 RESULTS

4.1 Process model and wastes

The work-shop type of action method that was used in this thesis worked well with the case company's personnel. They were able to give a great input especially for the second part which was identifying the wastes. The billing process map at the first part was originally created by the author to make the work shop process easier for the involved personnel of the case company. The author was able to do that because she also works in the case company's office and knows about their processes. Even though the original process map didn't change much during the work shop it was still important to get opinions on it from transport coordinators and billing department personnel.

Identifying wastes turned out to be a bit tricky for the case company's personnel since it is extremely difficult to see problem areas on actions they are doing with a daily basis. They were also so accustomed to doing things the way they have learnt them that it was problematic to think about how things could be done more efficiently. After a lot of discussions between personnel from the billing department, transport coordinators and the author, total nine wastes were named. From those nine wastes two of them were ruled out and in the end seven wastes were confirmed to be in the more careful analysis.

4.2 Root causes

The wastes or errors found in the billing process are evaluated by using Five whys - tool to discover the root causes. Each of the seven remaining wastes are analysed and discussed separately.

Information of the load won't get to the office immediately after it's been transported
Why the information of the load won't get to the office immediately when it's been transported? Because the case company doesn't use electronic bar code scanning - systems in their operations. Those systems are quite expensive and it would be a

huge investment for the company. The case company or its customers doesn't have urgent need for such tracking systems. In bigger transportation companies it is nowadays quite common to have electronic tracking systems on cargo. Those systems use bar code scanning which enables the information of the load to go straight to the billing department. Then the bill can be sent as soon as the load is been transported.

Information or notes in the waybill can be inadequate

Why the information can be inadequate? Because it is possible, that the load changes between the transport order and the actual loading. That happens sometimes due to customer's wishes. It is also possible that there are mistakes on the printed waybill. If the driver needs to make additional notes on the waybill for some reason by hand it increases the risk of errors. Changes in the waybill needs to be done if the load changes after printing the waybill or if something special occurs, for example if loading or unloading times exceeds the agreed limit or there is some defects in the cargo.

All the waybills from one week are returned to the office at once

Why the waybills and other documents like driving log and hour patch are sent to the office once a week? It is because the case company doesn't use electronical platforms for these documents. That is because these electronical systems are expensive and it is difficult to find a systems that serves the company's needs completely. This waste is relevant to the problem that information of the load won't reach billing department as soon as the load in question is transported. The drivers leave the document to the office if they arrive there at the end of the week and if that is not possible, they sent them via post office. When the waybills arrive to the case company's office, first the transport coordinators go through every document, which might take some time, and only after that the billing department receives the waybills. So in the worst case scenario, if the load is been transported this week's Monday, the waybills arrive to the billing department at the end of next week.

Billing software is old and complicated

This waste is debatable because the billing department uses couple different computer software and they all work as needed. However the software is partly old, almost outdated, and much more could be computerized in the billing process with modern and more comprehensive software. In the case company's billing process the pricing

is made by hand and using old fashioned tape calculators. This works but a lot of time and money could be saved with electronical systems. And why the billing software is complicated? Because the actual bill is made by one software, and accounts receivable is in another. Due to this the data must be transferred between different programmes and that is just extra work for the billing department personnel. Also both of these software have a lot of additional features that are not used by the case company and there is the possibility to use software more comprehensively.

Sending bill via post office is expensive and slow

Why bills are sent via post office? The case company aims to send all the bills as e-invoices or at least via e-mail but it is not possible with all the customers. While e-invoicing is getting more and more common all the time, some customers want to have paper bills and some require also the original waybills as an attachment for the bill. Sending bills as a traditional letters is incredibly inefficient because the costs of sending a letter are quite high compared e-invoicing and e-mailing invoices. Also the time that a paper invoice takes to get to the recipient varies a lot and it can take days.

If for some reason the customer can't pay the bill on time

In some cases customers won't pay the bill on time. In business to business transactions chain reactions are quite common in the current economic situation. For example if the customers won't pay the bill on time it might be because their customer hasn't paid to them on time and etc. Sometimes the bill is not paid because of disagreements between the sender of the invoice and customer. These disagreements in transportation business might be for example different opinions of who is responsible if loading or unloading of the cargo has taken more time than the transportation contract states.

Terms of payments are long and movement of money is slow

Terms of payments are often long, when usually in transportation business it is 14 days net, with big corporate companies it is often 30, 45 or even 60 days net. Combined to the problems described above related to the methods used to send invoices these long payment terms can really make the movement of money slow. And again when movement of money is slow in the some part of business the chain reaction starts and other parts get delays also.

5 CONCLUSIONS AND DISCUSSION

5.1 Conclusion on analysis

As a conclusion for analyzing wastes it can be stated that most wastes are caused by the lack of usage of modern electronic systems and software. Electronic systems like scanning bar codes could save a lot of time and make all the data available immediately for all parties. These systems are a big investment so they are not widely used among small or medium sized transportation companies in Finland. Even though the investment might be high when purchasing the system, but in the long run, it most certainly would be worthwhile.

Another problem was also related to old-fashioned ways of doing business. Sending bills via post office is slow and expensive, yet it is surprisingly common to receive and send paper bills in the transportation business. Also the problem is slow movement of money, which is caused by the overall financial situation in transportation field. Big companies with high hierarchy levels can also dominate the whole business field and state for example payment terms and other contract details to match their need. This also creates difficulties to small and medium sized companies.

5.2 Evaluating methods and results

In the end, the goals of this thesis were achieved to satisfaction. Methods used in this thesis were selected carefully and they were also applied successfully. Work shop type of method that was used in gathering information on the selected process and later identifying wastes worked well with the case company. In analyzing wastes the method that was used was quite loosely based on Five why's. In the end, the results on analyses were satisfying. It is possible that more wastes could have been noticed, if the work shop would have been more thorough. Wastes that were identified and analyzed in this thesis give great subject for further researching and finding solutions to problems that occurred in this study. Further research object could also be finding a suitable electronic system and software for the case company.

Koskinen Group was clear choice for case company from early on in author's studies in Satakunta University of Applied Sciences. The topic of the thesis was problematic to think about at first, and that was partly the reason why timeline in doing this thesis was quite long. With the help of supervisor from school and management of the case company the right or suitable topic was finally found. The author has also worked full time in the case company throughout the entire process. This was helpful because she had a great knowledge of the case company's operations before hand but on the other hand working in the case company and writing this thesis on the spare time felt a little bit too much at the times. In the end, the author is glad and proud she managed this process of writing a thesis, even though it took much more time than expected.

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